The three most important letters in home theatre...

Others are struggling to make home theatre sound almost as good as your local theatre. We've surpassed it. Others tell you how home theatre must always be done. We've customized it. We know that one size doesn't fit all. You define your needs, and we will help our dealer design a custom system based upon your personal requirements.

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On-screen programming makes the ACT I as easy to use as your TV. Hand crafted in America, it has separate glass epoxy circuit boards for the three input audio section, three input video section and power supply. Utilizing 1% metal film resistors and the most advanced surround sound processing integrated circuit, the Acurus ACT I has a smooth and refined sound that surpasses processors costing several times the price. Brought to you by Mondial Designs Ltd., acclaimed in Europe, Asia and America for engineering the best value in quality audio components.

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Fashions, Fads, & Single-Ended Amplifiers

A
s in any community bound tightly together by shared enthusiasms, the High End is regularly swept by tides of fashion. Some of the fads prove to be based on something of value, and outlast the initial burst: loudspeaker spikes and Tiptoes, for example, or the resurgence of tube designs, or making use of high-quality passive components. Other fads, particularly if not based on good engineering, fall by the wayside. (Does anyone still use a Tice Clock in their system? Or suspend their cables and interconnects on little acrylic bridges?)

Still other tweaks do seem to have a real effect on sound quality, but one too small or inconsistent to justify the work involved, even if the cost is small. Does anyone other than Clark Johnsen still routinely check their discs for Absolute Polarity? More importantly, does anyone still cryogenically freeze their CD-\(\text{s}\), or apply CD Stop-light—the infamous "green ink"—to the edges of their CDs? In each of the two latter cases, the effect on sound quality was positive. However, as the underlying technical problem of datastream jitter became more fully understood, and as low-jitter CD transports, D/A processors, third-box re-clocking devices, and electrical datalinks and connectors with matched impedance characteristics became available, the need for the tweak solution faded away.

Where does that leave the current fashion for low-powered, single-ended amplifiers driving high-sensitivity loudspeakers? I just don't know. Certainly, this is no flash-in-the-pan fad—I first heard such a system in Japan in 1978. And the Franco-Japanese philosopher/audio engineer Jean Hiraga has promoted the benefits of simple amplifier design—the simpler the better—since the mid-70s. But only in the last two years has the single-ended craze really caught fire—driven in the UK by Peter Qvortrup's Audio Note company, and in the US by Joe Roberts' Sound Practices magazine, by Cary Audio Designs, and by commercial and DIY amplifier designs from high-end founding engineer Nelson Pass.

A single-ended power amplifier—tube or transistor—represents a radical departure from the philosophy that has fueled the development of audio equipment since the start: that to make a component "better," you try to make it more "accurate"—trying to prevent it from imposing its own character on the signal. Whereas for decades amplifier designers have striven to make their designs, in effect, "straight wires with gain," a single-ended power amplifier is a bent wire without much gain. True, the best-measuring SE amplifiers, such as Nelson Pass's solid-state designs, or the Bel Canto Orfeo that Dick Olsher reviewed a few issues back, have astonishingly low distortion for such simple circuits. But it's still a high enough level of distortion that there can be no doubt about its audibility.

With their high output impedances, too, SE amplifiers introduce very audible changes to the sounds of almost every loudspeaker they're used to drive—as explained by Robert Gurst in this month's "Letters" section. Also in "Letters," Dick Olsher, an enthusiastic proponent of SE designs, argues that a typical response change is only 2dB. But don't forget—if a 0.1dB change in response over, say, a couple of octaves can be heard, 20\textit{times} that change over the same bandwidth is, in high--end audio terms, a \textit{gig} difference, not a subtle one. Heck, my mother could hear that kind of difference. "Ah, but you have to listen through the errors SE amplifiers make to hear the magic they produce, particularly in the midrange," argue the SE proponents. But with such audible changes, I have a hard time believing that to be possible.

Where do I stand? I don't yet know. Color me skeptical—the only SE amplifier I've heard at any length left me distinctly under-impressed. Yes, the midrange textures were gloriously liquid, but the bass was anemic, the dynamics limited, and the highs both rolled-off and grainy. Yet, as one of the ideas \textit{Stereophile} was founded on was for its readers to listen for themselves. I have to admit that my opinion of SE sound is not fully formed. What I intend to do early in the New Year, therefore, is to get myself a couple of SE monoblocks—from Cary or Bel Canto, say, or from Gordon Rankin's Wavelength Audio—and have some fun listening. For the one thing that SE amplifier owners seem to be having is fun.

Cyberspace is full of their buzzing. Whether they're enjoying foolsing around with homemade horn speakers, mostly based on Dr. Bruce Edgar's Tractrix enclosures, or just grooving on the unique thrill that comes from listening to something you've built yourself, the SE crowd seems to be the furthest thing around from the traditional image of the pursed-lipped, politically correct audiophile sitting in his solitary chair listening to endlessly different LP pressings of the \textit{Casino Royale} soundtrack. And that can't be all bad.

\textbf{Personnel Notes}

Talking about \textit{Stereophile}'s self-proclaimed "Toof Man," Dick Olsher, some of you may have noticed that two brands notably absent from his review schedule in the last few years have been Manley and VTL, whose products are designed by David Manley. The reason for this is that Dick's wife, singer Lesley Olsher, has made two albums for David's Vital Records; I felt that keeping Toof Man away from Manley's models would be the fairest way of resolving any potential conflicts of interest (not that there were any). David Manley now no longer owns Vital, meaning that Dick is once again free to write about Manley--designed products. You'll see from his review of the Manley 175 monoblock in this issue that DO has managed to both like the product and annoy the reviewer—not an easy feat!

\textit{John Atkinson}
**FEATURES**

**INFINITIES**
To accompany reviews of the Infinity IRS Epsilon and Genesis Technologies 11.5 loudspeakers in this issue, Infinity co-founders Arnie Nudell (now with Genesis), Cary Christie, and John Ulrich talk with Robert Harley, Thomas J. Norton, and John Atkinson.

**BUILDING THE HI-FI HOUSE**
Thomas J. Norton on everything you need to know if you want to build a new house with a dedicated listening room, as he did.

**RAYMOND LEPARD: NO ONE WAY TO PLAY**
The transplanted British conductor talks with Barbara Jahn.

**MAHLER'S SYMPHONY 1 ("TITAN")**
Stephen Francis Vasta recommends recordings.

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SINGLE-ENDED CLASS A

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

The Cary Single-Ended line was inspired by the famous 300B triode vacuum tube of the 30's. The 300B tube is considered by tube aficionados, on a world-wide basis, to be the finest audio tube ever designed.

The Cary Single-Ended Class A Triode Amplifiers have the high-end audio community in a state of complete reappraisal of what hi-fi truly is. We took classical circuits of the golden years of audio and combined these designs and techniques with the components and advances of the 90's.

A Cary Single-Ended Amplifier should be considered as an extension of a true musical instrument — not some "auditory hi-fi spectacular, unemotional and ear-bleeding apparatus"!

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

Please audition and look at one of the Cary Single-Ended Class A Triode Series Amplifiers at your favorite high-end authorized Cary Audio Dealer.
PARADIGM Bipolar Speakers set the highest standard of technological excellence and deliver breathtaking performance!

"a true high end speaker... there's literally nothing else on the market at anywhere near the retail... which combine this level of sound quality, accuracy and wide smooth frequency response..."

Andrew Malcolm, Audio Ideal Guide

"stunning image... astounding front-to-back layering... performs as well as one would expect from speakers in twice the price range-simply marvelous... have a listen to these gems."

The Inner Ear Report
LETTERS

GOOD SAM
Editor:
Praise should go out to Sam Tellig for introducing the RA Labs Black Gold Mini Reference loudspeakers. Living on a college budget, it is very hard to refine one's stereo system. After auditioning these speakers, both my roommate and myself could not think of a better pair of speakers for the price. Now a pair sit in my apartment making wonderful music. Maybe when I am out of college, I'll spring for the Audion Silver Nights to complete my system.

TODD A. PICKTHALL
Chelmsford, MA

GOOD COREY
Editor:
I wish to send my condolences to the editorial staff of Stereophile over the loss of Corey Greenberg. I shall miss his wit and humor. I always looked through the table of contents to see if he was reviewing any equipment.

I received my first trial issue of Stereophile in the midst of the Armor All dispute and thought, "These people must be on drugs to believe such stuff!" The more I read, the more open my mind became.

Then the Coreymeister showed up, and Stereophile had a whole new look. Less esoteric equipment, more affordable gear. And most of all, humor, both at audiophiles in general, and himself in particular. I hope you can find someone who will continue to review "Real world" gear. My equipment is pushing 20 years, and I'll be looking for new equipment. As much as I would like to own Krell, Bang & Olufsen, and the like, I'll probably end up purchasing NAD, PSB, and their like.

Keep up the good work and, as the Romans said, "Illegitimitat non Carborundum."

DOUG E. EICHER
Somerset, PA

BAD COREY
Editor:
I certainly will not miss Mr. Greenberg and vinyl what is possibly our finest recorded legacy.

MICHAEL WAYNE
Chicago, IL

BAD SAM
Editor:
Though sometimes annoying and potentially inimical, it is nevertheless always amusing to find in print the poorly informed and thoroughly uncogitated writing of a flagrantly irresponsible and incompetent reporter, in this case Sam Tellig's opus concerning Everest reissues (November '94, p.33).

It may interest your readers to know that Everest was considered to be the audiophile label par excellence, and its sound to be among the finest which could be commercially achieved, the only exceptions being a few small, largely semicommercial enterprises. Far from being "bottom of the barrel [obscurity]. . . sort of an audiophile label—before there was such a thing," Everest made a huge impression on record buyers and makers, and was the object of adoration to the same degree that its then workaday, nothing-special cousins RCA and Mercury are today.

Furthermore, numerous record labels with specifically audiophile intentions and pretensions flourished in the late '50s, Everest being perhaps the best and brightest, although sound and pressing quality plummeted after Bert Whyte sold the company. Both music-lovers and audiophiles are truly fortunate to once again have available on both CD and vinyl what is possibly our finest recorded legacy.

M. A.

GOODBYE, COREY
Editor:
I'm sincerely sorry to see Corey Greenberg leave—I hope he will eventually return. It was inevitable that a talented iconoclastic writer, certainly a Gonzo in the tradition of Hunter S. Thompson, would give controversy a brisk stir. Bravo! His mistakes were minor, his successes major—a positive force to be sure.

JOHN WHITE
Madison, WI

HELLO, KRISTEN
Editor:
First, I'd like to say that I'll miss Corey Greenberg in the pages of Stereophile. I guess I'll pick up a subscription to wherever he is at. Second, HEL-LO!!, Kristen Weitz!

I've been subscribing to various magazines (including Stereophile) for a few years now. However, no one seems to be coming in from the ground floor. I look forward to reading her future articles. The explanations she gave made sense to me. Along the way of her journey, could you ask her to touch on the following?

1) Will system integration be noticeable when you use two American amplifiers and, say, a Japanese A/V receiver in a Pro-Logic setup?
2) Why is saying "Sony" like using the F word at my local dealers?
3) You're living in a dream world if JA is helping you with setup and personal insight. (Maybe Martin Colloms could stop by my house?)
4) How about analyzing the feeling you get when UPS roars up and you know it's party time!

We regret that resources do not permit us to reply individually to letters, particularly those requesting advice about particular equipment purchases. (We are also unable to take telephone calls regarding equipment purchases.) Were we to do this, a significant service charge would have to be assessed—and we don't have time to do it anyway! Although all letters are read and noted, only those of general interest are selected for publication. Please note, however, that published letters are subject to editing, particularly if they are very long or address more than one topic. All correspondents should include their name, address, and a daytime telephone number.

Stereophile, January 1995
Announcing

HIGH DEFINITION COMPATIBLE DIGITAL®

For years, the high-end has anxiously awaited the arrival of HDCD®. High Definition Compatible Digital® is a revolutionary way of encoding and playing back a CD with much greater resolution and dynamic range than previously possible. As much as 20 bits of musical resolution can be achieved with HDCD®, rivaling the highest-quality analog master tapes.

Developed by Pacific Microsonics, HDCD® was designed to match the ultimate resolving power of the human ear, while maintaining compatibility with the existing 16-bit CD format. All HDCD®-equipped CD players and D-to-A converters will play back both HDCD® and non-HDCD® encoded discs. Indeed, non-HDCD® discs are played back with astonishing clarity, because the HDCD® hardware acts as an ultra-high-quality digital filter when a non-HDCD® disc is played—much higher quality than can be found anywhere else.

Enlightened Audio Designs is proud to be among the first to deliver HDCD®. Our Series III products combine HDCD® with Digital Flywheel™—the most advanced jitter-reducing circuitry in the industry Series III extracts the most from your present CD collection and takes full advantage of the growing library of HDCD® discs. You owe it to yourself to hear the difference. Call for your nearest EAD dealer.

Enlightened Audio Designs
300 WEST LOWE • FAIRMONT, IOWA 52556 • 515-472-4312
5) Why do some amps run hot? And how hot is too hot?
6) What percentage do cables, amps, recordings, and speakers play in obtaining deep, tight bass?
7) Is it a defense to an assault charge that “my dealer told me I need AudioQuest” after blowing $400 on TARA Labs cables?
8) Continue Greenberg’s legacy of testing “Real World” gear.
9) Did you call Martin Colloms? I’m available Friday so he can help with setup.
10) Number 9 couldn’t happen—I live in The Real World!!!!

MARK D. STANNARD
London, OH

I appreciate the greeting, Mark. My mission in writing “Getting Real” will always be to examine affordable equipment, to discuss the problems and joys of living in the Real World, and, I hope, to relay my experience in a way that Real Worlders can relate to. To me, the musical experience will always be of primary importance. Finding the equipment to enhance the pleasure of the experience will come next.—KW

PENT-UP FED-UP-ISM
Editor: Please indulge an out-gassing of pent-up fed-up-ism. Reading many of the recent articles, letters, and Manufacturer’s Comments in Stereophile has led to an irrefutable conclusion: You are all wrong. The search for validation of single-ended over push-pull tube amps, of tubes over solid-state, of SS over SE or PP tubes, is futile—as futile as the struggle over class-A vs class-AB vs class—Ad nauseam.

You audiophiles reviewers/manufacturers obsessed with one kind of equipment over another need to get a life—seriously! I don’t ever want to see or hear your pathetic comments in a public forum ever again, anywhere. And I’ll be watching! I’ll now expose your absurd obsessions so everybody sees them for what they are. Buckle up for safety.

If you eliminate such possibilities as being dragged by a chain tied to the foot of a diaphoretic elephant, there really is no bad way to travel around the world. Whatever way you choose, you will have an experience you will never forget. The route, the length of time of the journey, the distance traveled will certainly vary. But every person who has accomplished the feat has enriched themselves through the experience.

Why in the audio hobby does everybody get so obsessed with the vehicle that they forget the journey? The point here (of Stereophile, of the hobby, of the equipment) is reproducing music in the most pleasurable way possible in our homes. This does not mean there is any one best way to float any given audiophile’s boat. So you reviewers, letter writers, and manufacturers can just cut it out. Present what you’ve got, why it sounds good, the limitations, and let audiophiles in exploration mode decide for themselves.

Of course, you beginners and dilettantes need to pick yourselves up by your collective bootstraps and quit buying by the numbers out of various lists of other people’s ideas of the “best” components. The pleasure in the trip is the journey. Educate yourselves! Listen to good equipment that is well set-up—which may be harder than it sounds. Too many dealers do not get it right often enough. Broaden your exposure. Join local audio/audiophile clubs. Listen to stuff in other peoples’ homes. Listen to live music... puuuhhhhhheezee listen to live music. Do not fall under the spell of any dealer, audiophile, or “consultant.” Use them to enrich your own understanding of what it is you seek, but don’t fall for them or their prejudices. Decide for yourself. There is no quick fix.

Once you settle into a system (finally!!), this can take years! that makes music just the way you like it, enjoy it, share it, but don’t get obsessed with it. Your system sucks compared to live, non-amplified music. On the other hand, most amplified live music almost always sounds better on a good home system than in concerts. This makes a good system for lovers of amplified music probably more important than for lovers of acoustic, non-amplified music. Lovers of amplified music should be allowed some obsession latitude—the kind you offer a kindly but goofy uncle. But it seems that the lovers of non-amped music who should be the least obsessive because of the superiority and availability of live non-amplified performances make good audio equipment nearly oxymoronic. You can get listenable, probably enjoyable non-amplified music out of carefully assembled systems, but it isn’t good enough to get obsessive about—yet.

Once you achieve the first level of musicophile consciousness—a system that never fails to get you into the music—the journey is not over. And this is where a lot of you audio adolescents (not an age—a state of mind) fall off your skateboards. You found one way to assemble a system that makes great music. Big deal. That’s like the first sweater Grandma crocheted that was an acceptable color, fit the recipient, and didn’t look like it was made by Grandma. Here’s a wakeup call, you audio flat-earthers—there’s more than one way, more than one system, more than one type of equipment that will make exceptional music.

What is today your personal ideal system is just one stop on the journey. You may be satisfied with it for a long time. Or you may already yearn for something new over the next horizon. The love of music over the love of equipment empowers you to go off in a completely different hardware direction just for the heck of it, just to see what you’ll learn from the experience. Maybe you’ll like it, maybe you won’t, but you will learn. This, unfortunately, isn’t economically feasible for all current Stereophile readers. Don’t worry, you have plenty of time. You can explore what is going on in other quadrants of the equipment spectrum in your own time and in your own way.

Keep reading the mags and books. Keep listening to live music. Keep adding new—to you music to your collection. Keep listening to systems in as many different places as you can. And stop bleating about how great one kind of equipment is over another. Whichever type/design of equipment you tout as best, you are wrong. We all know it now, and we aren’t going to take it anymore. So cut it out.

Now let me tell you about my system. It’s absolutely incredibly musical. Nothing I’ve been able to assemble in 20 years has come close to making music the way this system does. The combination of components, interconnects, cables, and room work together to move the overall sound beyond what is possible in more normal combinations and rooms. Other systems I’ve had sound like toys by comparison. It’s all SS. No, I lied—it’s all PP tubes. Not really—it’s hybrid SS and SE tubes. If you really must know, it’s SS preamp and SE tube amp with homebrew 100dB/W speakers. Well, not exactly, it’s a tube preamp and class-A SS mono-blocks with English electrostatics. Lied again. Look, just come over and listen to it—maybe I’m full of crap.

DOUG BLACKBURN
Honeoye Falls, NY

MISSING IN ACTION?
Editor: I would like to see an update or thorough article about HDCD “decoder” hardware. You originally predicted availability in June 1993. As of July ‘94, Reference Recordings was predicting November ‘94.

LEO HENTON
Auburn Hills, MI

For the answers to these and other questions about HDCD, see Robert Harley’s review of the Pink Triangle DaCapo HDCD D/A processor elsewhere in this issue. And there’ll be more on HDCD next month.—JA
**ENTRY-LEVEL TUBES?**

Editor:
Where in the world are the reviews of entry-level tube amps in Stereophile? With a couple of exceptions, there's nothing at all in "Recommended Components" below 2700 bucks! Many of the manufacturers whose dearer products have garnered raves in your pages offer more reasonably priced tube designs which you have thus far chosen to ignore: the Cary SLA-70B, Sonic Frontiers SFS-40, Quicksilver GLA, Audio Innovations SA800, Yakov Aronov SA-30, VTL ST-80—all come in under $1700. Surely DO shouldn't spend all his time listening to five-figure Jadis (Jadi?).

**JIM BARNARD**
Toronto, Ontario, Canada

**WRONG RATINGS**

Editor:
I am mystified, shocked, stunned after finding the Green Mountain Diamante loudspeaker listed in Class C of "Recommended Components."
I find it remarkable that this so-called Class C speaker was able to finish number eight as Best of Show at the '94 Miami Show against all the other Class A and B speakers in the top 18.
But is it all that remarkable or surprising? No, not really. The Diamante is truly a Class B speaker, finishing where one might expect it to finish: near the top.
Where does that leave the Stereophile rating? I don't agree with it. The vote in Miami doesn't support it. Where did it come from? I re-read Steven Stone's review, and can not find anything noted that should result in less than a Class B rating for the Diamantes.

The note in October's "Recommended Components" described the Diamantes to be "balanced...rather mellow." Perhaps this is what is perceived by Stereophile to be their flaw? On the other hand, it is an opportunity to utilize components and cables to produce a natural and balanced sound that would be otherwise impossible if the speakers were too bright to begin with. This is one of the challenges of high-end that certain audiophiles like and others do not.

**ROY H. LARSON**
Mesa, AZ

Our "Recommended Components" ratings are arrived at taking into consideration all relevant experience with each component. In the case of the Diamante, though SS was taken with their sound, my own auditioning convinced me that the speaker's balance departed far enough from neutrality that Class C was the correct category. Please remember, Mr. Larson, that this is still a strong recommendation and does not invalidate your purchase of the Diamantes, if that is your concern. —JA

**MISLEADING RATINGS**

Editor:
I have observed Stereophile's component ratings for a number of years, particularly in the D/A converter area, observing such things as the travesty of continually praising the Meridian 263 in the same breath with the Counterpoint DA-10 or the Adcom GDA-600. I own all three of these units, and the Meridian is by far the lesser—it does not belong in Class C in "Recommended Components." Never was it a contender for anything. It has limited dynamics, limited lows, and sounds withdrawn when compared with about anything!

RH has been on a crusade for the 263 processor for some time, and the rank and file out here do not buy it! The 263 has always been average—I know! I tried to live with one for about four months—changing digital cables, the whole schmeer.

The Adcom is in another class when compared to the Meridian—dynamics, timbre, extension, etc. The Counterpoint with the Ultra Analog card is superior to both the Adcom and the Meridian. It also has the very intelligent design of allowing the user to install the latest card—a real boon for those of us who believe the DAC is the heart and soul of the digital process, and are aware that it is a rapidly changing technology. The Counterpoint's internal components are also a cut above average.

It is apparent to me that RH develops agendas at times that have very little to do with the best sound. If a manufacturer rakes him over the coals, his ego gets in the way of his listening and thinking processes. Counterpoint recently did just that, and they were right on—they hit the nail on the head! One comment Counterpoint made was that a 263's value will be nil in a short time. It already is! You can't sell a used one. I tried to give mine to my son—he thought it sounded flat! So I bought him an Adcom 600. I listen to it at times, and I really do not feel I'm missing much.

RH is out of touch with the majority of us out here, and if he had his way, he would get the manufacturers headed the same mule-headed way. We all know that he prefers hiked-up midbass, ignores the boxiness of name-brand cone-based speakers, loves flat, compressed midrange, ad infinitum.

The point of all of this is that RH is misleading people about components, and a lot of it is contrived and derived from a bruised ego—witness the Theta debacle. Enough already. To witness this happening in a magazine that I enjoy is a bit sickening at times. Do get a second opinion on all D/A converters! There seem to be alternate agendas there (Counterpoint beware). Sela, may your future be interesting.

**LEONARD WELDON**
Douglasville, GA

What Mr. Weldon must realize is that products within a single class in the "Recommended Components" listing will vary in sound quality and value. Not all Class B preamplifiers, for example, sound equally good. Moreover, a fairly wide range of sonic characteristics can be represented by components in the same class. Consequently, the capsule sonic descriptions in "Recommended Components" are no substitute for reading the full reviews and auditioning the products yourself before buying.

As for the merits of the Meridian 263, I stand behind my recommendation of this processor. Although Mr. Weldon is correct in characterizing the 263 as having limited dynamics, lacking bass extension and power, and sounding slightly laid-back in the mids, those things the 263 does well for $895 (a sense of ease and musical rightness, for example) in my judgment outweigh those limitations. In my review of the 263, I pointed out those characteristics in great detail, cautioning readers that the 263 may not suit all systems or tastes. That's why you should never buy a product solely on the basis of a positive review. I agree with Mr. Weldon, however, that the Adcom GDA-600 is the better-sounding processor, and explicitly stated that view in my report ("[The Adcom]...vastly outperformed every converter under $1500 I've heard..."

My only agenda is to provide Stereophile readers with informed opinions about which products I think are worthy of their consideration. My job is to describe a product's sound, build and parts quality, and technical performance, then offer an opinion about the value of that product relative to its competition. I am at a loss to understand Mr. Weldon's oblique references to "agendas," a manufacturer "making me over the coals," the "bruised ego," and the "Theta debacle" (f).

It's ironic that Mr. Weldon uses the Meridian 263 to support his view that my listening taste is out of touch with that of Stereophile's readership. Of all the products I've reviewed in the past 65 issues of Stereophile, I've received more calls from happy readers who bought the 263 on my recommendation than I've received about any other product. Even more ironic, the product about which I've received the second most enthusiastic reader feedback is the Thiel CS3.6—perhaps the loudspeaker he had in mind in the last sentence of his penultimate paragraph.

Mr. Weldon, you should stop worrying about my opinion of the Meridian 263, and just enjoy the music. —RH
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WorldRadioHistory
Resolution enhancement

Editor:

Robert Harley's review of three anti-jitter boxes (November '94) was very thorough and enlightening. There seems to be some confusion about the difference between resolution enhancement and the increased precision of oversampling reconstruction filters. I would like to help clear that up, and to present some information and opinions on resolution enhancement.

Resolution enhancement of a digital sample stream, as used in this context, has the goal of "adding the bits...that would have been there had the signal been of higher resolution." In particular, 16-bit words are increased in precision to 18 or more bits.

This is to be distinguished from interpolation, which might be described as "adding the words that would have been there had the original sample rate been higher." While useful for conceptual understanding, this lay description of interpolation is, in general, not quite correct in that the original sequence may not be present in the output. A quick overview of the concepts behind sample-rate conversion is in order.

A discrete time sequence (sampled in time, not necessarily quantized in amplitude), $x[n]$, defines a unique analog signal, $x[t]$, band-limited to one half the sample-rate. Interpolation is a special case of sample-rate conversion in which the band-limited analog waveform (as defined by the input discrete time sequence) is resampled at a new rate and phase. It is clear that if the new sample rate is not an integer multiple of the old sample rate, or if the phase change is not an integer number of sample periods, then the original samples will not in general be preserved. Nonetheless, the output sequence represents exactly the same analog band-limited signal as the original (to within a small time-shift). This all assumes that the samples are not quantized in amplitude.

If the input discrete time sequence, $x[n]$, is quantized, producing a new sequence $x'[n]$, then error is introduced and the analog waveform, $x'[t]$, now defined by the (time and amplitude) discrete sequence, is not the same as the original analog input. If all of the sample-rate conversion processing were done with infinite precision, then the output sequence with new sample rate would represent exactly the same analog waveform, $x'[t]$, as defined by the input discrete sequence—ie, will contain the same quantization error. This is as good as you can do assuming that the input sequence was critically sampled (sample rate = 2x bandwidth).

Quantizing the output discrete time sequence will introduce additional error, as will quantization performed during computation. The result is a new sequence $x''[k]$ representing a new analog signal $x''[t]$. Thus, by resampling and quantizing, we are now twice removed from the original analog signal. By increasing the internal word length and the word length of the output sequence, the additional error can be minimized, bringing us closer to the singly modified $x'[t]$ signal. This is why oversampling filters often provide higher output precision. The increased precision does not, however, decrease the error present in the original discrete sequence, $x'[k]$. Oversampling reconstruction filters are used despite the increased noise so that the anti-aliasing filter can be implemented largely in the digital domain. This should not be confused with oversampling the original analog signal. There are many benefits to oversampling analog/digital converters.

The previous discussion has implications about what we can expect to achieve through resolution enhancement. A resolution-enhancement device has as its input a (very nearly) critical-sampled digital data sequence with 16-bit precision that describes an analog signal. Nothing more is known about the signal.
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desired analog signal. As described above, a unique, band-limited analog signal is defined by the input sequence. This analog signal, as defined by the sequence, is the best possible estimate that can be made of the desired analog signal without making additional assumptions.1

What additional assumptions are reasonable? Is it even reasonable to assume that there is error in the discrete sequence? While it is highly unlikely that an analog signal could be quantized without introducing error, some computer music is described and generated as discrete amplitudes. In this case, the composer has explicitly created a digital sequence that by definition has no quantization error; any changes made to the sequence would introduce error. Okay, so when listening to computer music, definitely use the unmodified 16-bit output.

What do we assume about digitally recorded analog signals?

Judging from the information provided in “Manufacturers’ Comments,” the engineers at Audio Alchemy seem to have decided that in some cases it is best to assume that high-frequency signals (above about 10kHz in Audio Alchemy’s figs.3 and 4 on p.243) are the result of quantization error, and should be attenuated. It is entirely possible that most digital recordings today could stand to have a little “intelligent softening.” It should be noted, however, that this approach will in some cases remove information from the signal. The trick is coming up with an algorithm that can accurately guess when high-frequency signals are likely the result of noise, and not part of the desired signal.

Testing this algorithm using “lower”-frequency sinewaves (<10kHz) is not very revealing. Such a test is bound to give encouraging results. The top-octave frequencies are removed, error is reduced. Simple. A better test would attempt to reproduce a wide-band signal. In particular, what happens when trying to “enhance” a flute or other sinewave-like sound that also contains some high-frequency harmonics such as the signal shown in fig.5 (p.243)? It seems likely that the flute will be coerced into a more sinewave-like tone (fig.6). In this case, the harmonic structure of the flute is lost. Error has been introduced rather than removed.

As is often the case in engineering and audio in particular, performance is constrained by a tradeoff: in this case, signal preservation vs noise reduction. Many audiophiles believe that errors of commission (quantization error) are more offensive than those of omission (diminished spectral content).2 I think that one should be extremely cautious when assessing a product such as this to be sure that one is not giving up too much in the pursuit of low noise. I have not yet had the chance to evaluate the DT1 Pro—local dealers have been selling them before they even get to the shelf. I look forward to auditioning it.

CHARLES Q. ROBINSON
President, Digital Alchemy
Boulder, CO

SINGLE-ENDED RULES

Editor: Martin Colloms’s latest communiqué regarding single-ended tube technology (“Letters,” October ’94, p.23) raises important technical issues concerning the interaction of a power amplifier’s output impedance with the loudspeaker’s impedance and its impact on frequency response and power delivery into a mismatched load. MC portrays SE tube amps as being “impedance-challenged”

1 If the analog signal was oversampled, or, equivalently stated, if the bandwidth of the analog signal is known to be much less than one half the sample rate, then resolution enhancement is possible. For an interesting discussion of this principle from a deterministic perspective, see Thao and Vetterli: “Deterministic Analysis of Oversampled A/D Conversion and Decoding Improvements,” IEEE Trans. on Sig. Proc., Vol.42 No.3, 1994.

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in the extreme; unable because of their "3 ohms of source impedance" of coping with variations in load impedance, and as imposing gross sonic colorations of up to 6dB (peak-to-trough) on the final frequency response of the loudspeaker.

Of course, such an interaction is real enough (JA and TJN have documented it in the pages of Stereophile), but I believe that MC has overstated its negative consequences. He leaves the lingering implication that the SE aficionados have been blinded to falling in love with the musicality of such power "cripples" on those rare occasions when they were by chance partnering a compatible load. The truth of the matter is that SE tube amps work and work well with a much greater subset of extant electrostatic and dynamic speakers than Martin would have us believe. Consider an amplifier with an output impedance of 2.7 ohms. The drop in its output voltage when the load drops from 8 ohms to 4 ohms can be shown to be just under 2dB. Note that this result is independent of the amp's actual output voltage level. For most of us, this error represents an almost barely noticeable difference, but it highlights the need to keep the partnering loudspeaker's impedance above 4 ohms [or to use a loudspeaker with little change in its impedance magnitude with frequency—Ed.].

In my review of the Cary Audio Design CAD-805 (Vol. 17 No. 1), I detailed the search for a compatible load. There is no such thing as a universal amplifier. JGH has long preached the necessity of considering the amp/speaker on a system's basis. For a reviewer to state that a particular amplifier (either tube or solid-state) blew his socks off driving brand XYZ loudspeaker should not be construed to mean that the amp in question will perform similarly driving other speakers. Of course, an SE amp does have a range of likes and dislikes as far as load impedance and sensitivity go. But these are not as strict as MC's criteria of 7.8 ohms minimum and 92dB/2.83V/m sensitivity. A 4 ohm minimum is okay, provided the amplifier has 4 ohm taps and the loudspeaker sensitivity is 92dB or higher.

Many users have successfully deployed 87-90dB sensitive speakers—eg, the Spendor SP-1, the Audio Artistry Mozart, the ProAc Studio 1S, and the Swans Batons. Certainly, as long as such moderately sensitive speakers are blessed with a benign impedance magnitude, and you don't expect rock 'n' roll sound-pressure levels, such a pairing will do fine in a small room. Even more surprising is the successful pairing of SE amps with some small electrostatics, such as the Martin-Logan CLS II and the Audiostatic ES-100/SW-100. I was startled by the gutsy performance of the Komuro 300B-based SE (offered through fj in New York) on the Audiostatic system. Rated at 7.5W into 8 ohms, its level of microdynamic bloom eclipsed that of many 100W amps. For most dynamic speakers, however, a 92dB/W/m sensitivity specification represents a more sensible pairing for an amplifier limited to 10W.

I also disagree with Martin's and Markus Sauer's contention (July '94, p.22) that an SE amplifier's high source impedance perforsc spells poor bass performance. High-Q bass alignments will obviously be exacerbated by the poor damping afforded by the typical SE amp. What's required is a loudspeaker with an overdamped bass alignment (eg, an extended bass shelf) which, in concert with a poor damping factor, gives a subjectively full yet controlled bass output. Under such conditions, I have heard excellent bass definition from SE amps.

Finally, I must take exception to MC's concept of order in equipment reviews. If by "order" he means preserving the status quo to the detriment of a new star, holding back praise so as to protect an existing "politically correct" pecking order, then I must counter with a fat No! It is my perception and belief that readers
expect nothing short of the truth. Called upon to make a value judgment, a reviewer should wield a mighty sword. To shrink back from an honest and well-reasoned opinion is a disservice to our readers. I invite you to re-examine the January 1994 cover of Stereophile. I suspect that the missionary position assumed by the Krell relative to the CAD-805 must have alarmed MC's sense of order. Although this was clearly not about the Krell at the CAD-805 (these amps fill such disparate niches in the marketplace), I wonder if MC felt Krell's status threatened by such visual imagery.

At this point in my sonic odyssey, I will tell you that I'm convinced that single-ended glory has mainly to do with how honestly and purely such amps reproduce that first watt of audio power. What happens in that first watt is equivalent to the Universe's moment of creation. It defines all of music's micro-dynamics, and lays the foundation of the entire soundstage. It's a small consolation to me to be told that if I didn't like that first watt of solid-state drive, there are 200 more like it in reserve. Despite MC's swearing over a stack of Krells to the contrary, it is my opinion that the first watt belongs to SE amplification. This technology that time almost forgot is finally getting the attention it deserves in this "New Age" of audio.

DICK OLSHER
Los Alamos, NM

SINGLE-ENDED ABSURDITIES

Editor:
As a loudspeaker designer, I have sat on the sidelines and watched as the single-ended tube-amplifier craze has taken form. I have also noticed how quiet the loudspeaker community has been. (Why can't George Tice make speakers?) After Sam Tellig's column on SE amps last November, in which he suggested that you try using them with Klipsch La Scals (the Realistic speakers sound better), I can keep the collective consciousness of my area of the market quiet no longer. There simply must be some things said.

The most obvious is the absurdity of using "good" equipment with horrible loudspeakers. One attribute of a high-quality loudspeaker system is the ability to define and expose differences in what is driving it. If an audio system takes on the same character when loudspeakers of many varieties are used with the same amplifier, then the chances are great that there is an order of magnitude of coloration occurring. (I must also add that if we are to attract more women and minorities into this world, we must change some of our terms. Instead of saying that a system is "colored," let us just say that it is "spectrally challenged.")

The practical aspects of properly marrying these amps to a loudspeaker are immense. The low wattage figures stated by the manufacturers are bad enough; but tests done by Stereophile have shown that most SE amplifiers do not even come close to putting out their stated power into a resistor, much less into a loudspeaker load. Knowing what loads loudspeakers present to an amplifier, I can safely state that if the SE amp is rated at 50W, it will deliver less than 20W of power before clipping audibly. This seems to be fine and acceptable, but if a Krell delivered only 50% of its stated output, Dan D'Agostino would be held up for public ridicule.

There is a severe double standard occurring, and it should no longer be tolerated by the editorial staff of Stereophile. If you are to truly serve the needs of your readers, then you must state unequivocally that "even though this amplifier is stated as being a 30W mono design (the Bel Canto Orfeo, for example, that DO reviewed last July [Vol.17 No.7]), it does not even come close to its stated output. It is, in fact, a 17.5W amplifier with no tolerance of any impedance variation, and to achieve even a 3dB

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headroom, you must be happy with 20% distortion." Hooked up to the Thiel CS3.6, Stereophile's 1993 "Loudspeaker of the Year," this amplifier dips at 2.7W!

With such a marriage made in hell, are we to the point of finger-pointing? Clearly it is time for this industry to grow up and start offering products that are more universally acceptable. Toob Man is right—there is absolutely no reason for a loudspeaker today to have an impedance curve that drops down to 2 ohms. The only excuse is poor engineering.

Equally strenuous to the amplifier is impedance variation. When a loudspeaker states 8 ohms, it will usually be all over the map, dropping to 2 ohms at some frequencies, going up to 30 ohms at others. Unity Audio has dedicated itself to addressing this problem. Our new ED editions (Easy Drive) loudspeakers will have less than 3 ohms of variation (+1.5 ohms) across their range from 80Hz to 20kHz. Our New Mini Monitor varies by less than an ohm over this range. This is something that reaps sonic benefits, but is also a responsibility we owe to our customers to ensure that our speakers will sound good with their amplifiers. We have found that a great deal of the sonic signature negatively attributed to tube amps (tubby bass, rolled-off high end ...) is directly traceable to impedance variations affecting the power curves of tube amplifiers.

The closer you get a loudspeaker's impedance to being a constant value, the higher performance you will achieve with their mating. I would like to thank Kevin Hayes of VAC for working with us on this research.

The obvious next area is to equate this real-world problem of dynamic range and power of the "hi-fi" experience to that of a live music event. I routinely have musicians come and play for me in my listening room, positioned between the loudspeakers. Hearing a live event in a normal-size room (16' by 22') gives new meaning to the word "dynamic." I have often experienced levels of 115dB on acoustic instruments in my room, and over 125dB from drummers. Even a solo acoustic guitarist has shocking dynamics. This experience is a sobering one to any designer. (I highly recommend this to anyone who is interested in a reality check!) For a group (audiophiles) that carries the banner of aspiring to attain the goal of the live music event, one must ask how we, as a group, have gotten so far out of touch with our roots.

Clearly the main problem is the audiophile fascination with the midrange band of frequencies, forsaking all else for that little glimpse into heaven on female voice. High frequencies count a little—as long as they don't get in the way of the midrange—but we can forget the bass.

As a designer, I wish to dispel the myth that the almighty midrange is "by far the hardest to reproduce properly." Sorry, but it just ain't true. If this were true, then we would have an entire world of loudspeakers that have great bass and high ends, and mediocre mids. (As a self-proclaimed bass freak, I freely admit that by far the most difficult region to reproduce correctly is the bass.) John Atkinson has even stated that the midrange qualities of the current loudspeakers have reached a level of neutrality that a reviewer must look elsewhere for quality differences. (He was written many nasty letters about this statement, further proving its merit.) We have become a group of single-interest voters, reminding me of a friend I have who is voting for a candidate from the KKK simply because he is the only candidate who is anti-abortion.

This is obviously leading to the direct problem that high-end audio is on the decline, and, if not changed, will begin to disappear as the dinosaurs did. The perverse aspect of all this is that the "average customer" who shops at Circuit City—one we audiophiles love to ridicule—has more of a clue than many of us. When confronted with many "audiophile" systems, their first response is, "What does it sound like on real music?" Billy Joel played back at 74dB—what a concept.

"Turn it up." "Why does it sound so bad?" "What is clipping?" "But it wasn't even loud!" "Why is there no bass?" "What do you mean, 'bass doesn't matter'? My favorite musician is John Entwistle. I still have an 'I'd trample you to see the Who's T-shirt.'" "How much did this system cost? $24,000?! If you spend $60,000, do you get the same bass? No? Listen, I have to go now—but, ah, we'll, ah, talk."

When he leaves, we, as audiophiles, look at him and say, "Boy, he just doesn't get it, does he?" For all the problems Corey Greenberg created, his popularity must be traced to the fact that he is a portal to the real world, speaking for the 10 friends each of us has who used to be into audio, and still would be if we got him.

What makes me most angry is being put into a position of having to choose between standing idly by and watching an industry I love commit suicide, or choosing to jeopardize my company's future by telling the truth. This is the job of the Academy for the Advancement of High End Audio, but so far they have chosen to act as if they do not really understand where the problem lies. Well, it's simple. In the year 2037, when the last surviving audiophile dies, the point will be real obvious. Corey was right when he stated (in the premier issue of Home Theater Technology magazine) that "in the future, all high-end systems will be surround-sound based..." Bingo! Why? Because they are fun! Home Theater is fun! Dynamic hi-fi systems with kick-ass bass are fun! Buying a $6000 amplifier that won't drive anything is not fun. Having friends come over for dinner and say, "God, I hope he doesn't make us listen to that Chesky CD again" is not fun. Sitting down and watching Jurassic Park on laserdisc with surround and bass is fun.

Realizing that J. Gordon Holt—the oldest person on Stereophile's staff—gets it the most is fun. Crucifying someone who is stupid enough to tell the truth (ME!) is fun. Someone buying a Radio Shack speaker instead of a Unity, Thiel, Vandersteen, etc. is crazy. Sam, I know your sense of humor, I pray to God you're laughing.

So, is there any way to bring fun to those souls with single-ended hearts? Actually, yes. You must begin with a blank sheet of paper and design for the single purpose of serving the special needs of these amplifiers. (Kind of sounds like an ad for the Special Olympics, doesn't it?) It ain't easy. All you need is a speaker that has these properties:

1) High sensitivity—94dB/W/m or more. This one is easy. All the best drivers in the world are at least 88dBA/W/m. Maybe 89dB. Dedicated drivers are a must.

2) Totally flat impedance. Tom Norton has outlined the impact of load impedance on SE tube amplifiers (thank you, Tom) and outlined the impact it has on sound. In testing these SE amps, it has also been discovered that if you want to get 20W of clean power, you better have an 8 ohm speaker being driven at the 8 ohm tap. If your speaker goes down to 4 ohms anywhere, you are looking at a 7W amplifier. The window is minute. For best sound, you must have an impedance curve that varies less than one ohm across its entire range. Piece of cake.

3) Self-powered bass. Tube amps hate to move current. If you make it play bass, then you have all those electrons moving for the bass, and the tiny guys running for the high end get canned. Just picture this start of the Boston Marathon with the thousand runners moving off the line; one guy in the middle of the confusion is the midrange. Another is the high-end. Everyone else is bass. If you do not ask the amps to play bass, every-

Stereophile, January 1995
thing will sound better. If you run solid-state power on the bass, you can turn it up to match your high-efficiency speaker. It is the only way to get real bass. Bass that doesn't have a biline. "Boy, this is really good bass—for a tube amp that doesn't have any power." Real meaning: Your neighbor is laughing again.

4) Limited warranties. To get high efficiencies out of your drivers, they must be light, with very short coils. Meaning—you hook up to Krell and it's Roman Candle time. Customer must wear helmet to protect from flying midrange when they borrow a KSA-300S and play Dijos "to see what these babies can really do." Manufacturer is told, "I was sipping cappuccino on Sunday morning listening to solo harp when, for no reason, my speakers exploded and caught on fire. This will be covered under warranty, I trust." Customer gets mad when manufacturer states that he needs the old drivers back; customer tells manufacturer that he is still looking for the midrange cones.

If you have a loudspeaker that has all of these properties and maintains the sonic traits of the finest audiophile loudspeakers (and doesn't cost an arm and a leg), then you can have fun. You must also prove that it is worthwhile for a manufacturer to produce such a beast. Unfortunately, only one loudspeaker in the world meets all of these needs, and it's sitting in my living room. And it's not for sale.

Have fun hunting. Maybe stacked K-horns, Bozak Concert Grands—wait, JBL is making the Paragon again—Altec Voice of the Theaters, headphones with horns, speaker wire with gain, SE amp penile implants... ROBERT L. GROST President, Unity Audio, Lansing, MI

SINGLE-ENDED FUN!

Editor:
The recent manufacturer squawk over single-ended amplifier superiority (or lack of same) is interesting to me because, like most audiophiles with an electronics background, I had always regarded a single-ended tube output stage as something found in old AC/DC table radios and the small guitar amplifiers chosen for recording by rock guitarists specifically for distortion at low volume.

To make a long story short: divorce, apartment, no substantial spls allowed. To keep myself busy, I decided to build an amplifier. My original intention was to build a replica of a Mac 75 pair, or a 275. An absolute inability to find new, suitable output iron, and an unwillingness to pay the sums asked for 33-year-old, organic-insulated, random-wound transformers meant that something else was in order. (An aside: careful perusal of the Mac patents reveals that these transformers are, if anything, cheaper to wind than conventional-quality transformers. Why won't anyone wind these?)

A chance happening on an advertorial in a small-circulation DIY magazine regarding the unbelievably expensive Audio Note Ongaku amplifier, with complete schematic and mention of available output transformers—although not silver-wound, as on the real thing—caused me to think. I already had the 211 tubes and sockets in my junk box; the outputs, at $250 apiece, were expensive but not prohibitive; I could get the roughly 1.2kV B+ needed by using common power transformers in a voltage-double configuration instead of bridge or split-phase. About a thousand bucks for 25W purred steady, but I figured that if a time ever came that I could live with 25W, it was now.

Surprisingly, I managed to complete the beast in about a month—and for less than $750—and it now has about 100 hours on it. I will spare you the constructional details, except that the power transformer is a St. Louis Music (schock outfit that bought the once-proud Ampex name) stock item, the small-tube B+ and heaters are powered by another guitar power transformer, and the 211 heaters by old Kenyon filament transformers are from a hamfest. The caps and resistors are typical audiophile (metal-film and poly), and the rectifiers are straight silicon—although I should build some kind of soft-start circuit for it.

My current speakers—Spendor LS3/5as—are exactly wrong for this amplifier. But since I rarely listen to symphonic music and am prohibited from too much real bass, I am happy with this unit.

Does it sound as good as a real Ongaku? I hope it doesn't. I'd hate to think that those lucky few who can pay $50,000 for an amplifier are getting no benefit from their outlay. I don't envy them—I presume they worked hard for their money, and I sincerely hope that they are getting their money's worth. But, for $49,250 difference, I'll settle for second best: it is the most musical, smooth, yet absolutely accurate amplifier I have ever heard. The low bass is nonexistent, but that's the speakers' fault. I look forward to listening to a real Ongaku some day, as well as other single-ended amps. KENNETH GOW Springfield, IL

FUN WITH RUSs

Editor:
I really enjoyed Russ Novak's review last November of the Sonic Frontiers SFL-2 [Vol.17 No.11]. Now that's the way to review audio equipment. This guy is sharp. He reminds me of the good old days of J. Gordon Holt when audio was fun! It still is, but you sure couldn't tell it by reading some of the unreal, way-overpriced, unnecessary stuff you find in most of the audio magazines today. I know—it's just business, right?

What I liked about RN's review was that he told me just what the SFL-2 was and was not doing. He talked about different tastes in sound equipment. He put things into perspective right off the bat by asking readers if they're wedded to that old tube sound. Do you depend on traditional tube sound to color or correct other things wrong with your system? He's right. Let's face it—most of us listen to what pleases us, not to what sounds right or what is accurate. Come on, be honest—I know I do. I like it right. But if it don't make me feel good, and if there's no fun, then they can have it. I have heard a lot of high-priced, right-sounding gear at shows and at dealers, just to end up walking away and never looking back. I like that old sweet, warm, laid-backish, tube-ish sound with that lush, killer transparency, you—are there quality. Man, it sounds so natural and real. (Read JGH's accuracy is pleasure review of the Conrad-Johnson PV5 in Vol.7 No.3, p.17.)

The only thing that matters to me is that I am having fun. JGH said to me last year at the Las Vegas CES, "Bill, as long as you're enjoy what you're doing and you're having fun, that's all that matters." I agree! I have had too many clean, mean, lean-machine preamps in my house, and for some reason they just did not want to be a part of my family. Preamps that just would not disappear—they would just sit there looking pretty and sounding good. No love, no emotion, no soul, leaving me cold and dissatisfied. I don't believe in lone-ranger preamps in my system.

Another thing I really liked about RN's review was that he compared the SFL-2 to three other top-dog preamps. We need more comparisons and follow-ups in reviews. Every review should be commented on by at least one or two other reviewers. It's been a long time since I was completely wrapped up in a review. RN never wandered off in space. He never wasted unnecessary ink talking about nothing that had nothing to do with the review. No filthy language. No wisecracks. My focus was so completely on what RN was talking about. For the first time, I wasn't even distracted by the prices. Don't get me wrong—I don't
Rotel is not a typical audio company. Unlike the corporate giants of the audio industry, Rotel is a family owned business. We don't make video recorders, bread makers, or electric pianos. Instead, we have spent the last thirty years building high fidelity components that meet two rigorous criteria — musical accuracy and honest value. While we benefit from low-cost production in our own Asian facilities, our design work remains in our R&D facilities in Britain, where an audiophile pursuit of perfection is a passion. Rotel engineers are, first and foremost, music lovers who labor over their new designs like proud parents. They listen to the results, then tweak and adjust until the new product meets exacting musical standards. All Rotel products are truly built from the inside out using premium parts. Components are hand selected for their sound quality and built by industry leading suppliers around the world.

**RB990.** "Peak current output was 211 watts, almost twice the value of any other amplifier in this survey! To use the term coined by Consumer Reports, this is a Best Buy."
   
   The Audio Critic (Aug 93)

**RB980.** "The inexpensive, frill-free Rotel does it all right of the mark when it comes to playing music. It lives up to its promise of power, but its capacity for blood and thunder doesn't make it an amp that impresses solely with its might. It's lusty, but also involving and musically revealing."

   What Hi-Fi? (Sep 93)

"...the RB980BX proved to be one of those products reviewers dream of...more than just another modestly priced amplifier, competent but uninspiring. The Rotel...got up on the high-end highwire without a net – and performed."

   Thomas J. Norton, Stereophile Vol. 15, No. 11, Nov. 1992

**RCD965LE.** "Sound quality was superb ... Clarity, transient detail, and high-level punch all were exemplary. In short, Rotel's RCD-965LE clearly delivers CD sound that approaches the highest standards of the day, for less – substantially less, in some instances – than many competitive alternatives."

   CD Review (Jan 94)

"...every aspect of the '965 has been optimized with a single goal in mind — sound quality. It is this preoccupation with the finest detail that is reflected in the player's overall performance. Nothing, but nothing, has been left to chance."

   What Hi-Fi? (Dec 91)
Krell’s patented, energy efficient Sustained Plateau Bias system is combined with a fully regulated power supply to create the finest audio amplifier in existence. The Krell Audio Standard— from the leader in high quality Class A amplification.

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mind paying top dollar for a good preamp, but a lot of preamps do not stack up to their price tags.

However, I almost passed out when I did not see the Audio Research LS5 in RN’s review. Wait! all you LS5 fan cats hear the LS7—you are going to get sick. ARC blew it. They made the LS7 too good. This is the best and cheapest ARC preamp. And, yes, it sounds better than the late, great SP-11 Mk.II, and should outsell it, too. It’s about time ARC got back to their roots. Anyway, nice review, Russ, and keep up the good work.

I also want to say goodbye and thanks to Debbie Fisher for all of her kind help and hard work. Also, I would like to say thanks to Corey Greenberg for all of the fun and wild reviews, though I don’t mind saying I am not going to miss all of that filthy language he spewed all over me. Good-bye, Corey, and good luck.

BILL GLENN
President, Quick-Mod, Ridgecrest, CA

LOOSE SCREWS
Editor:
In November 1994’s “Sam’s Space” [Vol.17 No.11], in connection with a speaker for a tubed 8Wpc single-ended amplifier, Mr. Tellig reports an improvement in tightening loose screws. Life is neither easy nor predictable. In discussing this tweak, Mr. Tellig opens (in all likelihood unconsciously) a Pandora’s box brimful of loose screws.

No few of which find their way into Jonathan Scull’s tweak-saturated, labyrinthine review of the Gryphon DM100 power amplifier, also in November. It’s interesting, is it not, that both Tellig and Scull find the M’Bozo Discs useful. These, of course, require no screw tightening. It doesn’t matter—the loose screws I have in mind are entirely metaphorical.

MIKE SILVERTON
Brooklyn, NY

ERRORS?
Editor:
As someone who has listened to the Gryphon DM100 power amplifier much more extensively than has Jonathan Scull, I would like to point out a couple of errors in his November ’94 review:

Page 119: Wrong.
Pages 120–124: Wrong.

I suggest you delete these errors, after which Scull’s may represent an accurate, albeit somewhat shorter, review of this fine product.

JOHN GIBBEL
Orange, CA

BLIND TESTING?
Editor:
I cannot recall a review in recent memory that was as trivial as Jonathan Scull’s review of the Gryphon DM100 (Stereophile, November ’94, p.119). If I can understand what Jonathan said in his “dissertation” on how not to review a product, he concluded that the DM100 simply did not sound good despite its impeccable test results and worldwide acclaim.

Such a conclusion only reminds me of a proverb my great-grandmother once told me:

“A blind rabbit and a blind snake met in a field. The snake asked, “What kind of animal are you?” The rabbit replied, “Why don’t you touch me and decide.” The snake did just that and then said, “You are very soft, have long ears, and have fur—you must be a rabbit.” The rabbit then felt the snake. The rabbit stated, “You are very smooth and slippery, and you have no ears—you must be an audio-equipment reviewer.”

EDDIE CHAN
Glen Cove, NY

ATMOSPHERE
Editor:
Careful examination of last October’s “Recommended Components” [Vol.17 No.10] reveals that it is haphazard, contradictory, and therefore defective. The decision to remove the Atma-Sphere MP-1 preamplifier is a good example. Steven Stone complained of switching inadequacies, but on the cover of the December ’93 issue, the CAT is plainly visible (as Component of the Year) with the exact same signal-switching system (compare to the photo of the MP-1 in the same issue), only fewer inputs! Similarly, reviews of the CAT and Jadis indicate that putting in good tubes is not enough for either preamplifier—in fact, they must be the right tubes (installed after-market). Yet the MP-1 gets docked for the same characteristic! The unprofessional style in which SS tore down the Atma-Sphere was an embarrassment to the magazine.) If Stereophile admits this contradiction and corrects it, you will avoid losing face.

Evan Roberts
Eau Claire, WI

ATM-SHERE
Editor:
One of the reasons I allowed my subscription to lapse earlier this year was the continued lack of some common denominator among the reviewing staff, manifested all too frequently by the seeming arbitrariness of component rankings in the semi-annual “Recommended Components” listings. Given the inherently idiosyncratic nature of the high-end reviewing process, one can easily appreciate the difficulty of establishing a sensible reviewing strategy with a disparate staff, so that, within the bounds of accepted journalistic behavior, certain allowances must be made for an individual reviewer’s professional style based on his biases and listening habits.

Occasionally, however, a reviewer is permitted, unintentionally or otherwise, to stray outside these limits, with potentially negative impact on an underserving manufacturer. There is no better example of this kind of high-end folly than the reckless treatment accorded the Atma-Sphere MP-1 preamplifier in the October issue by Steven Stone. There are some important issues connected to this Follow-Up in which I feel deserve serious reflection by both Mr. Stone and the Editor.

It is an unfortunate circumstance of this industry that the viability of many manufacturers who contribute to the industry’s advancement and well-being is so heavily dependent on the capriciousness of a single reviewer. It therefore becomes paramount for the reviewer to ensure that his reporting is exercised to a high professional standard. Furthermore, it is the responsibility of the editor to scrutinize the reporting of his staff for exactly the type of pernicious utterings foisted by Mr. Stone upon the readership.

In Mr. Stone’s narrative, we find a description of the considerable pain and anxiety of being a tubophile, inappropriately laced with a sprinkling of veiled hostility. The result of this one reviewer’s (has anyone else on your staff listened to the MP-1?) misgivings and second thoughts was the deletion of the MP-1 from “Recommended Components” with nary an explanation from the editor. One can only assume that it was based solely on Mr. Stone’s predilection for vast I/O capabilities to support A/V surround-sound, and his inability to deal with defective tubes. The absence of adequate rationale behind this action will no doubt foster bewilderment and, ultimately, a “can’t take a chance” attitude in the minds of readers who might have otherwise given this state-of-the-art product at least some thoughtful consideration against other candidates. Atma-Sphere deserves better treatment than this shabby display.

My experience with the MP-1, which I have owned for two years, does not mirror Mr. Stone’s. Though it did have some minor teething problems at the start, these were quickly resolved by Atma-Sphere, who have continued to demonstrate their commitment to the customer and the product by offering surprisingly cost-effective upgrades to
Finally, Revenge For Everything In Life Being One Big Compromise.

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With a depth and richness never before heard from compact discs. And now, the TL 1 has company. Introducing the TL 0 and the TL 2. The TL 0 is to the audio world as Michelangelo’s *David* is to the world of art. With a price tag of $17,500, it should be. On the other hand, the TL 2 is the less expensive alternative designed to open up the wonders of CD belt drive to almost anyone. But whichever model you choose, rest easy. You can be assured that you’ll never, ever feel like you could have done better. C.E.C. Available only at the finest audio dealers.

*PARASOUND*

It seems to me that many audiophiles, dealers, magazines (this one included), and others involved in the pursuit of "the absolute sound" (pardon the reference to the competing journal) get so involved in the minutiae of audio that they lose sight of those fundamental elements which either raise the audio experience to something approaching heavenly bliss, or doom it to frustrating mediocrity. These determinants of sound quality include: a) the listening room; b) compatibility of components within a given system; and c) the quality of the software (LPs, CDs, or tapes).

With regard to listening rooms, the great JGH has reminded us that if the room is "doggie doo," then the world's finest components will still produce "doggie doo" at our ears. (What a concept!) I have frequently had the experience of spending thousands of dollars and untold hours of effort in setting up a system in a poor listening environment, only to find it significantly bettered by a mid-fi system in an excellent room. Placing megabuck equipment augmented by every cone, dot, belt, and superwire in existence will not repair the damage done by faulty room acoustics.

Similarly, adding the "Class A Component of the Year" to many systems will often make things worse if that piece of equipment is sonically incompatible with the rest of the chain. The third determinate, the software, may be as troublesome as the room, and is frequently more frustrating, since many great performances, past and present, are recorded in execrable sound.

What's to be done about all this?

I think the manufacturer/magazine/dealer complex must be willing to educate and honestly advise the consumer. Many an esteemed "high-end" dealer is all too willing to sell a customer a 1m interconnect costing in excess of $1000, knowing full well that he has participated in creating the delusion that this purchase will lead to instant audio nirvana. Later, when the bloom is off the rose and reality sets in, the dealer reminds the customer of his "no-return" policy on cables. Magazines are equally at fault for perpetuating the myth that the "tweak of the month" will, like aspirin, be the drug that works wonders.

But perhaps audiophiles themselves are most to blame for failing to recognize what really counts most in building a satisfying system: In the final analysis, what truly matters is what you hear in your room, not what is asserted by rhapsodic magazine prose or greed-driven dealer exuberance.

JAMES L. REES
Greenville, NC

SUPREME PARAMETERS

Editor:
The venerable J. Gordon Holt, whom I regard as one of the finest and most honest audio critics ever to grace the pages of Stereophile or any other audio publication, has on several occasions made the points I am about to make. Nevertheless, they bear frequent repeating and re-emphasis. I am referring to the supreme importance of a few basic parameters in the audio equation.

Although some of us had misgivings, I gave the Atma-Sphere MP-1 the benefit of the doubt and listed it in the April 1994 "Recommended Components" on the basis of Steven Stone's enthusiastic advocacy in Vol.16 No.12. After SS had lived with the preamplifier for almost a year, however, the bloom was off the rose, as explained in his Follow-Up in Vol.17 No.10. Given SS's change of heart, to continue its listing in the October '94 "Recommended Components" seemed inappropriate. —JA
Welcome to the real world.

Increasingly people are turning to a place NHT has always called home, the real world. Where performance is paramount – and so are aesthetics, function and value. Where our design philosophy addresses the challenges of your daily life, not those of an audio laboratory.

That's why increasingly people are turning to NHT. From the legendary SuperZero, with performance totally out of proportion for its size, to the breakthrough Model 3.3, the ultimate speaker. If great audio is your whole world, explore NHT's corner of it.
**INDUSTRY UPDATE**

**US: Kristen Weitz**

Dealers promoting manufacturer and designer seminars should fax me (don’t call) the when, where, and who at (305) 983-6327 at least eight weeks before the month of the event—i.e., if you’re putting on something in March 1995, you should get the information to me by January 1, 1995. Mark the fax cover sheet “For the attention of Kristen Weitz—Dealer Bulletin Board.” Promoters of Hi-Fi Shows and audio societies promoting manufacturer visits should also fax me the details as soon as possible.

**California: Sound Perfection** announces the Grand Opening of their audio/video/Home Theater store at 700 El Camino Real, Menlo Park. Tel: (415) 323-1000. Fax: (415) 323-8228.

**Florida: Inner Ear Audio** (945 Main St., Safety Harbor) will present the work of Dove Maffeo, internationally acclaimed artist and furniture designer, in an exhibit entitled “Vista è Suono,” from Sunday November 6 through Friday December 23. Call (813) 797-1123 for more information.

**Georgia: On March 19, The Atlanta Audio Society** will host a loudspeaker seminar on the Probe Audio Labs product line, featuring the flagship Martinetti. Time is 2pm at the Hellenic Center in Atlanta. Call (404) 876-5659 for more information.

**Illinois: On January 22, Dennis Had of Cary Audio** will give a presentation to the Chicago Audio Society on single-ended amplification. For details, including meeting location, call (708) 382-8433 or (708) 583-3913, or E-mail to sysop@nybble.com or u24129@uicvm.uic.edu.

**Michigan: On Wednesday January 25, Overture Audio** (618 S. Main St., Ann Arbor) will host KEF Electronics America’s Joel Rosenblatt, who will discuss new developments in loudspeaker design and their application in home audio and Home Theater systems. Mr. Rosenblatt will also demonstrate new models in KEF’s Reference Series. Overture Audio will provide music, film, and refreshments. Call (313) 662-1812 or fax (313) 662-1928 for more information.

**Minnesota: Paragon Acoustics has moved to 2966 N. Cleveland Ave., Roseville. Tel: (800) 224-7599, (612) 631-2177. Fax: (612) 631-2192.**

**New York: Long Island retailer Select Sound** (6314 Northern Blvd., East Norwich) will present a series of Thursday seminars throughout the month of January. The store will also premiere new audio and Home Theater products introduced at the Winter Consumer Electronics Show. Representatives and designers will be on hand from B&W, Krell, Meridian, Pioneer Elite, Rotel, and Totem. Call store owner Rich Martinetti, (516) 624-2124, for scheduled dates and times.

**Fanfare International**—importer of Jadis Electronics, Siltech Cables, Reference 3A loudspeakers, Harmonix accessories, and lately the Plinius line of solid-state electronics from New Zealand—has authorized Northstar Leading The Way to be its exclusive distributor in the US.

**Oregon: On Tuesday January 31, Audio Video Environments, formerly Audio Adventure (19354 SW Bonnes Ferry Rd., Tualatin) will host David Skolnik of Green Mountain Audio. Time is 5:30pm–9:30pm. Call (503) 691-6025 for details.**

**Virginia: In January and February, Gifted Listener Audio** (5720 Pickwick Rd., Centreville) will host three Musical Evenings: On Wednesday January 18, William Peugh of Metaphor Acoustic Design will demonstrate the remarkable new Metaphor 2 loudspeaker; on Wednesday January 25, Linn Hi Fi’s Jan Donaldson will demonstrate the extraordinary possibilities of the Linn KNEKT full-house matrix system; and on Thursday February 2, Randy Patton, head of the Threshold Corporation, will show the new Threshold electronics and discuss Threshold’s future. All events will begin with a reception and light refreshment at 7pm, followed by the presentation at 8pm. Call (703) 818-8000 for more information.

**Washington: On Thursday February 2, Seattle’s Madison Audio** (909 Western Ave.) will host Green Mountain Audio’s David Skolnik, who will give a seminar on their speakers and show new products. Call (206) 292-9262 or fax (206) 343-7455 for more information.

**US: Larry Archibald**

October 15–18 were the dates, and San Francisco’s Fairmont Hotel the place, for hi-fi’s least-reported industry event: the Electronic Industries Association Fall Conference. This lack of attention is not unintentional—the Fall Conference is a members-only event, and only manufacturers of electronics and loudspeakers can be full members of the EIA—no software, and no magazines (though magazines can participate through very expensive associate membership). Don’t be too surprised if you see Stereophile come out with something like a signal-generator kit, just so we can join the EIA (though it won’t increase reporting of the Fall Conference, since all proceedings would be off the record).

Nor has there always been much to report. In the past, the Fall Conference has concerned trade issues of primary importance to the large-scale manufacturers who until recently made up the huge bulk of EIA members. This year was different. Thiel’s Kathy Gornik, member of the EIA for the past four years and a high-end liaison for many more, was named the chairperson of the EIA’s influential Audio Division. This is the first time that someone from the heart of high-end has enjoyed such influence at what is probably the world’s largest trade organization for consumer electronics.

Gornik’s predecessor in the two-year position was Robert Heiblim of Kinetics Holdings, the company which
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D.B. Keeler/AUDIO MAGAZINE

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Unmatched musical detail in a line of speakers from compact mini monitors to floor standing models.

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WorldRadioHistory
owns KEF and Celestion and is associated with Kinergetics Electronics. These are all high-end companies, but Heiblim began this tour of duty as head of the audio division when he worked for Denon, a company which does make high-end gear but most of whose products are considered upper mid-fi.

Gornik has long advocated far greater participation in the EIA by high-end companies, and has just as strongly championed the EIA when speaking to potential high-end members. She and Lew Johnson of Conrad-Johnson have single-handedly revived the Summer Show, now dubbed the CES Specialty Audio & Home Theater Show and scheduled for Father's Day Weekend (June 16–18, 1995) at Chicago's Palmer House. (This weekend choice is not the result of some perverse irony on the EIA's part. Finding adequate hotel space at a nice time of year at a good hotel at the last minute is no easy task; very frequently the only available dates are weekends when other people didn't take the space for some good reason—Father's Day, in this case.)

Gornik's and Johnson's instincts with respect to the Summer Show will stand them in good stead with the EIA. Within the last five months the EIA has had to cancel two major shows (the first Brazil Show, scheduled for August 1994, and the first interactive media show, scheduled for Philadelphia in May 1995), and oversaw its last Summer CES this past June.

The CES Specialty Audio Video Show was given a further boost by the other big news from the EIA Fall Conference: The Home Theater Industry Association (HTIA), of which Stereophile has been a member, worked out a merger with the EIA wherein all manufacturer members were able to join the EIA and sign up for a new Home Theater Subdivision, of which HTIA former president Peter Tribeman (Atlantic Technologies) is the chairperson. (Unfortunately, media members of HTIA, such as Audio/Video Interiors, Hachette, Curto, and Stereophile, were offered only the same associate membership in the EIA that had already been expensively open to them.) Consumer Electronics Group head honcho Gary Shapiro made it clear that Home Theater would receive renewed promotional attention from the EIA—even though the promotion of Home Theater has always been spearheaded by the EIA, many of whose current members produce Home Theater products.

There are only ten divisions within the EIA, so Kathy Gornik's position as Audio Division Chairperson carries significant clout as to disposition of the EIA's money. Nor is Gornik's tenure likely to be a solitary foray for high-end into the trade group: Joyce Fleming of McCormack takes over Gornik's role as head of the High-End Audio Subdivision, and Laura Hendershot of Counterpoint was appointed Deputy Chairperson of the Home Theater Subdivision (a subdivision of both the Audio and Video Divisions).

Five years ago, high-end companies used to complain that the EIA paid them no never mind. Nowadays, with 41% of the Audio Division's members clearly from the High End and the chairpersonship in high-end hands, things look different. *Vive la change.*

**US: Peter W. Mitchell**

The recent emergence of Home Theater as a major product category has had a predictable result: manufacturers formed a support group, the Home Theater Industry Association. Of course, Home Theater exhibits have also been a significant part of the Winter and Summer CESes. So when the HTIA lost the leadership of its executive director Ken Furst last summer, other HTIA officials opened discussions with the Electronic Industries Association, the organization that owns and operates the CES. As Larry Archibald reports above, the HTIA is being merged into the EIA, which in turn has established its own Home Theater division.

This division finally may address some long-overdue standards issues, such as the need for an industry-standard speaker connector that would simplify hookups, provide a reliable high-current connection, and guarantee correct polarity. (A Home Theater system involves 24 individual speaker–wire connections, and errors are hard to identify.)

Ordinarily, such organizational matters wouldn't be news. But this story is significant because of its likely impact on the Summer CES itself. Last summer, we thought we had attended our last CES in Chicago; as we reported last month (Vol.17 No.12), the Summer CES became a videogame show and was moving to Philadelphia. But game companies withdrew, and the entire '95 Show was canceled. Meanwhile, a handful of high-end audio companies, led by Thiel and Conrad-Johnson, organized a new CES Specialty Audio & Home Theater Show that promised to continue in Chicago where the '94 CES left off.

Initially, it appeared that the new Show would occupy only a few dozen rooms in Chicago's Palmer House for the weekend of June 17–19, 1995, and perhaps only a few dealers would bother to attend. But many video-related companies have been signing up for the new Show, particularly since the Philly CES was canceled, and the EIA's expanded commitment to Home Theater is likely to accelerate this trend. At the current rate, the new Show may expand to hundreds of exhibits, spilling over into other hotels and reestablishing the original audio/video roots of the Summer CES. Who knows? By June we may even be calling the new Show a CES!

**US: John Atkinson**

Those who preach doom 'n' gloom for the audio industry will be no doubt disappointed to learn that ex-factory audio component sales rose by 15% in September '94, to an all-time figure of $938 million. According to the EIA, audio sales in the US totaled $2.3 billion in the third quarter of 1994—a 16% increase compared with the same period in 1993.

**US: Peter W. Mitchell**

A convention in Los Angeles during October, called the World Media Expo, combined several annual broadcasting-related conferences: the NAB Radio Show, the Society of Motion Picture and Television Engineers conference, a Society of Broadcast Engineers conference, *et al.* Not surprisingly, there was much discussion of the ongoing testing of digital–radio systems and the evolution of standards for High-Definition Digital TV.

One report described two comparative listening tests to evaluate perceptual coders for the discrete five-channel surround-sound of European HDTV. In this test, the least-publicized contender achieved the largest number of high ratings. This was MPAC, the multichannel version of the PAC (Perceptual Audio Coder) that was developed at AT&T's Bell Laboratories. The major alternative candidates were Dolby AC-3 (already selected for American HDTV) and the Musicam/Surround system from Philips. The MPEG standards committee initially chose the Philips proposal as the principal candidate for European HDTV, with Dolby AC-3 as a backup. But there...
were questions about whether the performance of Musicam/Surround had been compromised in a quest for backward compatibility with the two-channel Musicam code used in digital radio. So the MPEG committee put its final decision on hold for a year in order to leave room for possible improvements and further evaluation.

The listening tests were held at Deutsche Telekom (DT) in Berlin and at the BBC in London. While the administrators of such tests try to maintain a high level of academic objectivity, this is also a high-stakes competition among large corporations. The engineers involved in the creation of the competing codecs (code/decode systems) know the limits of each other’s designs. So when they were invited to propose signals for the test, each contender proposed known “codec killers”—signals that each engineer knew would cause a competitor’s system to fail. While these signals were known to be exceptionally difficult to handle, they still were essentially musical in character—for example, tracks with harpsichord, drum and glockenspiel, and so on.

Though most of the ten signals in each test were known codec killers, one was a sample of “normal” program material nominated by Lucasfilm’s THX guru, Tomlinson Holman: a brief excerpt from Indiana Jones and the Last Crusade containing orchestral sound and a bit of dialog. A total of 45 experienced listeners ranked the performance of each codec on the 1–5 CCIR rating scale. Interestingly, according to Tom Holman, the film soundtrack revealed coding flaws as efficiently as many of the codec killers, exposing quantizing errors and unstable localization.

AT&T engineers summarized the results of these tests in the table shown below, which lists how many signals (out of 10) were judged to have been “transparently” coded, meaning that they scored an average of at least 4.5 points out of 5. The result for the three main contenders:

<table>
<thead>
<tr>
<th>Codec</th>
<th>DT</th>
<th>BBC</th>
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<tbody>
<tr>
<td>AT&amp;T</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Dolby</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Philips</td>
<td>1</td>
<td>0</td>
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When I first saw this table, I wasn’t surprised: in my August 1993 “Industry Update,” I described what I heard when I listened to two-channel versions of the Dolby (AC-2) and AT&T (PAC) systems. Neither was indistinguishable from the original sound, but PAC’s effect on the music was comparatively subtle. Unlike the other perceptual coders that I’ve heard, PAC did not alter musical timbres, add an obvious metallic glare, cause complex sounds to become more congested, or alter the apparent width or depth of the soundstage. But the five-channel codecs differ from their two-channel counterparts in important respects, so there’s no reason to assume that they would exhibit the same differences in sound.

The London and Berlin results indicate that AT&T’s MPAC, when handling difficult signals, is less likely than its competitors to be provoked into audible misbehavior. Does this mean that the AT&T system is dramatically superior overall? Not necessarily. One engineer who read the full report (which analyzed all of the test results in detail) remarked that, in terms of average performance scores, the codecs were more similar than different.

Another way to look at the preceding table is that there’s plenty of margin for improvement. All of the contenders continue to fail many tests, which confirms the conclusion that emerged from the Grand Alliance tests the previous year at Lucasfilm, in which AC-3 was selected as the US standard. Even the best codecs failed to provide audibly “transparent” reproduction of the original sound.

So I’ve been wondering whether we’re unilaterally locked into the choice of AC-3. If further tests were to reveal that AT&T’s MPAC really is the best—sounding five-channel codec, is there some way in which it could become the standard for American HDTV, and also for a future post-CD disc format for music recordings? Two answers seem likely:

1) The HDTV Grand Alliance worked under urgent pressure to adopt encoding standards last year, and to select transmission standards several months ago, in order to be able to submit the entire set of standards to the FCC this year for final testing and approval. The goal was to install HDTV transmitting equipment in time to broadcast the 1996 Atlanta Olympics, and to manufacture a million HDTV sets in time to meet the anticipated demand from people who will want to watch this popular event. But this ambitious schedule proved impossible to meet. Last fall, when developers were still testing different modulation schemes for HDTV broadcasting, it became clear that the new system won’t be ready in time for the Olympics. The events will be recorded in HDTV for future sale, but we won’t be watching live high-def broadcasts from Atlanta in our living rooms.

Meanwhile, broadcasters are becoming increasingly reluctant to rush into HDTV at all. Optimistically, HDTV could be launched as early as the end of 1996. Realistically, it may be delayed two or three years longer. My guess is that HDTV probably will be launched first via cable and satellite, because that won’t require FCC approval. HBO (and each of its competitors) will show movies in conventional form on one channel, and in high-def on another. For viewers beyond the reach of cable, RCA’s Digital Satellite System will allocate several channels to high-def, while the remaining channels will provide conventional TV.

In retrospect, it seems clear that the encoding standards for HDTV needn’t have been selected in such a hurry. Now that the urgent deadline pressure has relaxed, observers are exploring the possibility of scheduling another round of comparative listening tests in which the latest versions of AC-3, MPAC, and Musicam Surround could be re-evaluated.

If the final recommendation of the HDTV Grand Alliance is generally supported by the electronics industry, the FCC is likely to endorse the standard. But the FCC has the final say. If one part of the proposed standard is widely disputed—the selection of audio codec, for example—then the FCC could sponsor its own tests and select a different audio codec that employs the same bit-rate. (As I understand it, the “packet” structure of the proposed HDTV signal would allow a different audio codec to be substituted without affecting the remainder of the signal.) So, although Dolby AC-3 was the best-sounding of the coders in last year’s Grand Alliance tests, and the 384k version of AC-3 is now the proposed standard, this choice may not be final.

US: Allen St. John

“There is no better way in this world to lose something forever than to misfile it in a big library,” writes Norman Maclean in Young Men and Fire. And while I’m not comparing my CD collection to the Library of Congress, a recent trend in pop–CD graphics is driving me nuts: discs without the name of the album silkscreened on them. While this fashion statement seems to have started with the indie, recent inductees into the Artssy but Nameless Disc Club include mainstream artists like Bonnie Raitt, Liz Phair, Peter Case, They Might Be Giants, John Wesley Harding, R.E.M., and U2.

I know that in a perfect world this wouldn’t be an issue—discs would go straight from the jewelbox to the player drawer and back again. But if you’re like me, you’ve always got a couple of empty jewelboxes and a few stray discs lying around [Amen!—KW]. And if your
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A division of Threshold Corporation.
I've just received, directly from Ringmat Developments in the UK, the Mk.II version of the Ringmat 330 turntable mat (see Stereophile, Vol.17 No.5, p.137).1

This 9½" mat that looks like cork and paper (the manufacturer refers to it as "cotton flock") sure doesn't look like much for $64.95. Looks can be deceiving.

The original version (Mk.I) was good, too, but under certain circumstances—perhaps the climatic variations we experience in North America—the adhesive that bonds the cork rings to the, ah, cotton flock, would let go, setting the rings free. I glued them back on and gave the mat to my son. (The manufacturer became aware of this, didn't attempt to deny that a problem existed, and says the problem has been solved with a different adhesive used on the Mk.II. I applaud their forthrightness.)

Anyway, the Ringmat is the first mat that's really mattered on my AR turntable, and may very well work wonders with your 'table, too—AR or otherwise. Robert Deutsch liked it with his Linn, although I could tell that it caused a crisis of faith in that longtime follower of the Linn Church. (Will JA get up the nerve to try a Ringmat on his Linn, or will he feel Tiefenbullied? What are you waiting for, John? Ivor's permission?) The AR is just a turntable, not a religion; when the turntable was in production, the folks at AR cheerfully admitted that mats were a matter of personal taste, and a suitable area for experimentation.

Better than ever is what I have to report about the Mk.II.

The mat now has two cork rings on top, three on bottom—as opposed to the earlier version's two. The record rests only on the rings. The revised Ringmat results in much tighter bass, a more detailed sound overall—without the overetched quality that certain, usually hard, turntable mats often produce with the AR. There sure ain't no ringing from the Ringmat!

Now when people listen to the sound of my AR turntable—fitted with an SME 309 arm and Kiseki Blue Gold cartridge—their yaws, as Lars likes to say, drop. I swear to you that the resolution, tautness, and dynamic quality of my analog setup are very close to the best I've heard at any price.

The neat thing is that I got this great turntable sound simply by removing my old, thin, felt mat and installing the RINGMAT—A TEN-SECOND TWEAK!

The neat thing is that I got this great turntable sound simply by removing my old, thin, felt mat and installing the Ringmat—a ten-second tweak! And I have a non-tweaker's 'table: no air bearing, no pump, no arm outfitted with only the very best dental floss, no massive marble stand (just a Target turntable shelf), no clamp—nuttin'. Just play the record and smile.

Ringmat would have you further tweak the sound by playing with arm height, and then varying the arm height for each record (something which isn't feasible for me, considering the clumsy arm-height adjustment capability of the otherwise excellent SME 309). I did no such thing. To tell you the truth, I don't dare adjust the arm height, because I could never get it exactly back—and the sound is phenomenal exactly as is.

Buy a Ringmat and turn your AR into a killer 'table. It almost seems too good to be true. But don't just take my word for it. As Grandpa (Deduska) Lenin said, "Trust, but check." Buy a Ringmat Mk.II with a money-back guarantee, and verify the results for yourself. With the Ringmat available, I think it's as dumb to drop megabucks on a tweaky-'table as it is to buy super-expensive digital separates. Put your money where it matters (heh-heh): into a great amp or speakers.

Where it stands
In the May issue (Vol.17 No.5), I recommended the 19" Merrill Audio stands with the RA Labs Mini Reference speaker. These stands come 19", 24", or 28" high at suggested retail prices of $250 for the 19" and 24", and $275 for the 28".

What's the big deal, you say? Well, it's hard to find really solid stands—heavy, spiked stands you can fill with sand and/or lead shot—made in America. (Sound Anchors is another US manufacturer of high-quality stands.) Many of the best British-made stands are not available in North America; those that are tend to have high prices that reflect their transatlantic shipping costs, customs duties, brokers, currency conversion, etc.

New Golden Dragon KT88s
Previous versions of the Chinese KT88s (at least the ones which were widely

1 Distributed in the US by Something Worth Hearing, 50 Elmhurst St., Rochester, NY 14607. Tel: (716) 461-1295. Fax: (716) 484-3631.

2 Merrill Audio, 2125 Central Ave., Memphis, TN 38104. Tel: (901) 272-1410. Fax: (901) 726-9616. 3 Sound Anchors, 2835 Kirby Ave., Unit 110, Palm Bay, FL 32905. Tel./Fax: (407) 724-1237.
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available in North America) have not enjoyed the greatest reputation for reliability. I’ve had two of them self-imolate, after first turning bright cherry red. The sound quality of these Chinese KT88s may not have been top-drawer, either: typically uncontrolled in the bass (bass all over the place), and somewhat glary in the upper midrange.

Now comes a new—or newly available—version of the KT88, said to be a Dragon Golden exclusive. It differs from previous designs in several parameters. You can distinguish it from other Chinese KT88s by the taller glass (as in the M-O Valve Gold Lion) and the single getter on the top (the older Golden Dragon KT88s have two side getters and one on top). The new KT88s cost $120 a matched pair, or $248 for a matched quad (there’s labor involved in tube matching)—roughly $60 a tube. Not cheap, but not outrageous—particularly if the tubes last.

According to Kevin Hayes of Tubes by Design, distributor of the Golden Dragons, the new tube “appears to be far more reliable” than previous KT88s. We shall see. But several manufacturers have been raving to me about how the new tubes are surviving various torture tests; maybe we now have the output tube we’ve been waiting for.

I tried the tubes in my McIntosh 275 reissue, which was previously tubed with Golden Dragon’s so-called “KT88 Supers.” The KT88 Supers produced quite acceptable sound; the new KT88s are even better. Bass is tighter and better defined—not quite so blowy. The upper midrange has none of the residual glare I heard with the KT88 Supers. The overall sound is smoother and more delicate—closer to the sound of a good triode tube amp.

Sonically, I give them an enthusiastic thumbs up. These KT88s sound more delicate, detailed, and controlled than anything I’ve heard since a Jadis JA 80 tubed with M-O Valve Gold Lion KT88s. Unfortunately, it wasn’t mine.

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Along with Audio Research, Magnepan, Mark Levinson, and Threshold, loudspeaker manufacturer Infinity epitomizes the nascent High End that emerged in the early '70s. Infinity was founded in 1968 by three audio enthusiasts—Arnie Nudell, Cary Christie, and John Ulrich—two of whom were working for a defense contractor. Infinity was sold first to Electro/Audio Dynamics in the '70s, then to Harman International in the '80s. From its garage-operation roots, Infinity grew to a multi-million-dollar operation with feet planted in both the high-end and mass-market camps. In particular, its expensive IRS series of loudspeakers, combining dipole arrays of midrange and treble units with servo-controlled woofers, came to be seen as the highest of the High End. It seemed appropriate to accompany this issue's reviews of products designed by Cary Christie and Arnie Nudell with interviews with both men, as well as with John Ulrich.

—John Atkinson

Infinity co-founders Arnie Nudell, Cary Christie, and John Ulrich talk with Robert Harley, Thomas J. Norton, and John Atkinson

Arnie Nudell, by Robert Harley

Arnie Nudell is one of a handful of designers who could justifiably be called founding members of the high-end audio industry. Arnie co-founded Infinity in his garage in 1968 and recently joined forces with Paul McGowan, the co-founder of PS Audio, to create Genesis Technologies, the Colorado-based company formed to build ultra-high-end loudspeaker systems (see my review of their $22,000 Genesis II.5 loudspeaker system elsewhere in this issue.)

I visited the Genesis factory last September and spent some time with Arnie and Paul discussing loudspeaker and amplifier design, and high-quality music reproduction. I asked Arnie how he became involved in high-end audio.

Arnie Nudell: I was trained as a nuclear physicist and a laser physicist, but when I was very young—eight or nine years old—I started experimenting with various aspects of sound. I made my own loudspeakers, and even some of my own drivers. My mother wouldn't come into my bedroom because I forbade her to touch any of these monstrosities I put together.

I was also a semi-amateur musician. Music was a major part of my life. After being in the aerospace industry for seven years, I realized that, although the aerospace industry was great and physics was great, my first love was music. Along with the love for music was my love for audio equipment—specifically, designing loudspeakers. So it started for me at a very young age.

1 My talk with Paul McGowan will appear in the February Stereophile. —RH
Robert Harley: Is it true that you started Infinity in your garage?

Nudell: It's definitely a true story. What was actually occurring in my garage was not the formation of a company—at least I didn't think so at the time. I was running the laser lab at Litton Industries and was trying to make every kind of loudspeaker conceivable, including 4/3 Klipschorn.

One of my dreams was to make some kind of a servo system for the bass. There had been some past literature on it, but I had never seen anyone do it successfully. So John Ulrich—who also worked at Litton—and I got together and created a servo system for the bass which we actually thought would work. It was crude in those days compared to what we have now, but nevertheless it was quite satisfactory.

We decided to mate it with electrostatic drivers, which we considered state-of-the-art at the time. We bought some of them, designed the transformers and crossovers, and put it together with a servo bass system. The first test was against the best bass I'd previously heard, which was a 4/3 Klipschorn I had made. It had an 18" woofer in it, and fabulous bass. We put the Klipsch next to our first servo bass system, which looked like a dwarf next to this enormous 4/3 Klipsch.

We created our own systems because we didn't like very much what was out there.

—Arnie Nudell

The minute we compared the systems was when I saw religion. I realized that all the things I had been thinking for so long were absolutely right: that if you could control that woofer in an exact way, and you could measure the motion of that woofer immediately at any time, then feed that back to the amplifier, then you really had a terrific bass system. Better, in fact, than any I'd heard before.

The speaker was all done in my garage because that happened to be convenient at the time. When we put this first system together with the electrostatics, we decided we could make them in quantity. We could buy the parts and we knew how to do the servo woofer, so we started a company. This was before Infinity. We did it to get the speaker to some of the local high-end dealers to see what they thought of it and what their customers thought of it. A few dealers actually started selling those things.

The company was called NuTech Enterprises, but the speaker was called the Servo Statik. We sold so few that we could make them in the garage where they were designed. We were approached by an electronics representative firm—the largest in Southern California at the time—who wanted to manufacture our product. Within a year or so, Infinity was born, and the product was the Servo Statik.

The systems we created were for ourselves, not the basis of starting a company. We wanted them for our living rooms because we didn't like very much what was out there. I had double KLH 9s, matched with Bozak or Klipsch woofers—my own version of Klipsch woofers—but I didn't think the system was very good. That was the motivation to make the Servo Statik, not to start a company.

Harley: How did you and Paul McGowan end up together in 1989 to form Genesis Technologies in Minturn, Colorado, of all places?

Nudell: One of the reasons I left Infinity was that the time I got to spend on design—new materials, drivers, loudspeakers—was so small compared to the rest of my duties. I wasn't doing very much with the thing that really drove me forward, and that was a passion for reproducing music at its finest level.

Harley: You were a loudspeaker designer who wasn't designing loudspeakers.

Nudell: I am a loudspeaker designer, and that's what I do best. . . .

Paul and I were introduced [to each other] by Harry Pearson [founder/editor of The Absolute Sound] 18 years ago. For some reason, he thought that Paul and I might have a common interest and might like each other. Sure enough, we met—sat next to each other at one of Harry's parties—and from that day on we became very close friends.

Even when Paul was running PS Audio and I was running Infinity, we got together as often as we possibly could, although we lived about 300 miles apart. In fact, we had marathon weekends where all we would do is go out to dinner and talk about audio and how we were going to do this, and what was wrong with that. That continued for a very long time.

When I'd finally had enough of Infinity, I came out here to Vail because a friend and I had planned to be in Beaver Creek for skiing in the winter. I decided to come out here in the summer for two, three, or four weeks, relax, and decide what I really wanted to do. It turned out, oddly enough, that Paul was here at the same time, and I didn't know it.

Paul McGowan: My family and I were vacationing in Beaver Creek, and I knew nothing of the fact that Arnie was also there. One day, Harry Pearson called out of the blue—which was unusual, to say the least. Harry said, "Our friend Arnie has just left Infinity. He's just devastated—you've got
to help.” That didn’t sound like Arnie, but I asked where he was. Harry then told me he was in Beaver Creek. It turned out he was right across the street from me. I called Arnie, told him where I was, and we both looked out our windows and waved at each other.

Harry had painted this picture of Arnie being at Infinity all those years and of him being terribly distraught over the whole thing. But when I met Arnie for dinner that night, nothing could have been further from the truth. Arnie was up—he had all these tweeters lined up on the table, and the minute I walked through the door, he started railing at me that he’s going to start this new company, and the whole basis of the company is a tweeter. He said that if you have a wonderful tweeter, the rest of it falls into place.

We spent the whole night talking about it. We had a great time. In fact, the tweeter he showed me was the first version of the tweeter we currently use. Arnie was in a great mood, although he looked like he’d been run over by a truck. Running a $70-million-a-year company has its perils.

After that, we talked on the phone on a regular basis. Arnie asked me to work on a business plan for putting a company together. I did that in my spare time, just out of friendship for Arnie. Later, Arnie asked me if I’d like to start a company with him.

Nudell: Understand that, although I designed the first speakers in a condo in Beaver Creek, I had actually turned it into a laboratory. In fact, the living room was hilarious. I wish I had pictures of it. I had a computer, MLSSA, the dbx spectrum analyzer, and a custom switching system. I had state-of-the-art equipment for design.

McGowan: And a rug that was destroyed by soldering irons.

Harley: You started the new company with affordable speakers, working up to the flagship, $70,000 Genesis I. Why did you take this approach?

Nudell: At Infinity we started with a very expensive speaker, the Servo Statik, and brought some of the technology down to lower price levels. We’ve found that some of the most successful companies, be they audio or anything else, start with the highest technology. After people around the world acknowledge that this is the highest technology, then you bring that technology to more affordable prices.

When we started Genesis, we did it in reverse. It certainly worked okay, but our hearts weren’t in it. We knew clearly after a couple of years that it was the incorrect way of doing it.

Our first inclination, of starting at the top, is the correct direction—not just because we’re doing it now and we did it at Infinity, but also because it’s done by a lot of other successful companies.

end, and that at those kind of levels there isn’t anything new that would set people on fire. After hearing that kind of question over and over, Paul and I looked at each other and said, “Why aren’t we doing it? That’s where our hearts are, and we’re the best in the world at it; we should be doing it.”

It’s been a joy for us. As you can imagine, it’s been difficult designing these kinds of speakers when you’re looking for such magnitudes of perfection. I find it gratifying. However, the challenge is: Now that we’ve created these high-end loudspeakers, people don’t expect the lower models to be very different from the model above it. That is a formidable challenge. For example, even though the Genesis V we’ve introduced is much smaller, people wouldn’t expect it to have a soundstage that was truncated in any way. They want a soundstage that’s as big as that of the Genesis II or the II.5—which is huge. And if we don’t produce that, there’s something wrong.

The challenge becomes enormous: how do you do that in a narrow box that stands 40” high with different kinds of drivers? The drivers aren’t completely different—it still has a servo bass system and the ribbon tweeter—but many things are different. We’re starting to get feedback that we successfully did that. Instead of saying, “Why doesn’t it do this or that?”, they’re saying, “How did you guys do it? It sounds just about as big, and the imaging is as just about as deep, as a II.5.”

I don’t do it for the customer’s expectations, but for my expectations. Hey, the II.5 above it does all this stuff, now I have to make this little guy do almost that— or exactly that if I can. You shoot to make it do everything the II.5 does. But if you fall a little short, and it does, say, 85% to 90% of the model above it, you’ve succeeded.

Harley: Nearly all your designs throughout your career have been based on three technologies not universally adopted by the rest of the industry: dipolar radiation patterns, servo-driven woofers, and planar drivers. What are the technical and musical advantages of these design approaches?

Nudell: The ideal speaker would be a line-source dipole because of the way it interacts with the room. A line-source—if it’s narrow enough—has very wide horizontal dispersion, which is exactly what you want, but has no vertical dispersion whatsoever. So it comes out like a sheet of sound at every frequency. And of course there are no floor or ceiling bounces, which are some of the most severe problems in direct-radiating loudspeakers. The first floor-bounce kills the mid-bass, the ceiling kills some of the ambience in the room. And when you add the first side-wall bounce, all of a sudden you’re hearing a muddying combination of the room and the loudspeaker.

After people around the world acknowledge that this is the highest technology, then you bring that technology to more affordable prices.

—Arnie Nudell

The other answer is obvious. Paul’s and my interest really lies in the High End, in the state of the art of the reproduction of music. That’s where our passions are, and so that’s where we’re led. While we were making inexpensive loudspeakers, we were getting messages from all over the world encouraging us to make the best loudspeaker we knew how to make. They said, “Hey, you are some of the few guys in the world who could do it. Why don’t you go where your interest lies—at the very high end?”

They told us that there’s a dearth of product at the high

Stereophile, January 1995
Denon’s lifelong philosophy of “Design Integrity” has led us to constantly improve audio quality in all phases of the reproduction chain—including circuitry for Home Theater. As a result, off-the-shelf IC components like those used by our competitors, are no longer good enough for Denon’s AVR-2500 Audio/Video Receiver. The new Denon AVR-2500 features Dynamic Discrete Surround Circuitry, D·D·S·C, which employs discrete surround circuitry plus an 18-bit digital converter in the DSP stage. (Most competitors use lower bit converters.)

Just as discrete components allow an audio system to be optimized for better sound, Denon’s DDSC produces more accurate, more realistic surround sound by reducing Total Harmonic Distortion, by increasing Signal-to-Noise and minimizing DSP quantization noise.

Naturally, the Denon AVR-2500 also features the latest audio and FM circuitry, such as multi-zone capability for playing different programs in different parts of your home and personal memory fields for one-button recall of your favorite, custom tailored surround sound stages. The AVR-2500 and AVR-1500 also feature the RDS Smart Radio System, which lets broadcasters offer you additional, invaluable information, services and conveniences, either on the front panel or via On-Screen Display on the AVR-2500.

Denon AV Receivers: DSP surround sound, advanced features and uncompromised High Fidelity.
control over the bass. One of the main problems with the bass is that every bass driver, no matter how you design it, is heavy and has a lot of mass. According to Newton's Laws, it takes a lot of force to get this mass moving, and once it's moving, it doesn't like to stop moving. Of course, a woofer not only has to start moving, it has to stop, and go back and forth very quickly. This produces a problem I call "inertial distortion." Inertial distortion is a serious problem for woofers in a box, whether it be a reflex box—and I have very strong feelings about reflex boxes [laughs]—or a direct radiating box, or any other kind of box. There's simply no way the bass will follow the electrical signal. This isn't speculation. This is something you can put a microphone in front of and measure. You can see that there's no correlation with the signal. Not only does it ring when it starts, you can see the length of time before it starts, if you compare the woofer output to the input signal.

There are so many kinds of distortions in a woofer, and the only way to fix them is to put some kind of sensing element on it. We use accelerometers, which allow you to measure every point in that woofer's motion, and the instantaneous acceleration of that woofer. You then can take that accelerometer signal, feed it back to the input of the amplifier, and correct that woofer.

It's like putting feedback around an amplifier. I'm not saying that this is the best thing you can do for an amplifier, but if you do, you'll get 20dB less distortion—conventional distortion. The same thing happens when you put 20dB of feedback around a woofer—you get 20dB less distortion, which is a hell of a lot.

You'll also increase the bandwidth of the woofer such that you can have flat anechoic response. We know that you could get flat anechoic response if you used an accelerometer as your sensing element, and drove the woofer to constant acceleration. Constant acceleration equals constant sound-pressure level, and constant sound-pressure level is anechoically flat. So a servo system makes a woofer have low distortion and flat anechoic frequency response.

There's one more thing, which is probably the most important part of it all. If you design the woofer and servo amplifier correctly, you know exactly how much current it takes to make that woofer accelerate at the same rate as the musical signal. The mass of the woofer is almost zero when you apply the right kind of servo electronics. So, instead of dealing with this heavy thing [the woofer cone] that's obeying Newton's Laws and is way out of sync with everything else—the music and the rest of the system—you have a device that will follow the electrical signal almost perfectly. In fact, with any of our servo woofers, you can put in a 50Hz squarewave and get a 50Hz squarewave out—with the same risetime as the input signal. Now, conventional open-loop woofers [no servo drive] can't even come close to the risetime that is defined by their own bandwidth.

It always seemed logical that the servo woofer was the right thing to do. The first ones were crude, but as we developed them over the years—with cone materials, the kind of motor the system had—they improved tremendously.

One of the problems with servo woofers is that you are making the assumption that what the accelerometer is doing is what the cone is doing. And, of course, with the first cones we used, that wasn't true. The voice-coil would push so hard against the cone it would bend the cone. That caused some
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Dynaco's HLX 18/9 brings you classic Dynaco sound quality with advanced speaker technology and fresh design concepts. The satellite speakers contain a Kevlar 4” woofer and a 3/4” titanium tweeter. The subwoofer's 8” dual-voice coil, high-power driver produces deep, clean bass at high efficiency.

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problems, because if the cone was doing something funny, the accelerometer didn’t know what was happening. If the woofer started wobbling back and forth, the accelerometer wouldn’t know it because it only senses perpendicular motion, which you couldn’t correct for. So if you try and create a perfect piston in the band, where the cone doesn’t break up, doesn’t wobble, and can handle the power, then the accelerometer output will reflect exactly what the woofer itself is doing.

**THE ULTIMATE RESOLUTION OF A LOUDSPEAKER AT THE LOWEST VOLUME HAS TO BE JUST AS IMPRESSIVE AS THE RESOLUTION AT THE HIGHEST VOLUME.**

—Arnie Nudell

That’s why we designed the three-layer woofer made of metal, a damping material, and another layer of metal. We also used special spiders and alignment so there is no wobbling. There is one breakup mode at 6kHz, but we cut it off at 80kHz. There are no other aberrations, so the servo system works almost perfectly. There’s why, for the first time, Paul and I are happy with the fact that the transition between the woofer and midrange is almost seamless. You can’t tell. For the longest time—more than 20 years—you would say, “Well, there’s a little difference here.” Until now, there was always a reason why the transition wasn’t perfect.

It’s really happening now. To go back to your question of why I did these unusual things when other people were putting cone speakers together, the answer to that is simple. If you build a two-way, three-way, or four-way speaker—it doesn’t matter which—those drivers can be made of compressed horseshit so long as they are a perfect piston in the band in which you use them. You can have a myriad of dissimilar drivers, but so long as they perform as a perfect piston, and you can design a crossover, you should have a seamless, non-sounding loudspeaker. That’s a very difficult thing to do, but that’s the Holy Grail. People thought the Holy Grail was a full-range planar speaker. But planar speakers aren’t perfect pistons—they have their own problems.

With our speakers now, the tweeters are very narrow, have a very specific radiation pattern, and have excellent dispersion. And our midrange is the same way. Our midranges aren’t large panels because, at the lowest frequencies, they have perfect dispersion. When they cross over to the tweeter, they start to narrow in, and we’re out of them quickly and we don’t have the dispersion problems.

**McGowan:** A big problem was that the electronics often didn’t match the woofers. For years, Infinity let [their customers] use [their] own amplifiers. Who knew what the right power amplifier to use was?

**Nudell:** That’s right. Paul and I reasoned that every system we build will have a servo amplifier built exactly for the system—for the accelerometer, for the box, for everything.

**McGowan:** Once you get the woofer right, get an accelerometer on it, build the electronics right, build the cables right, and build everything as a tuned system, then you can have a seamless transition to the midrange and bass that sounds real. There’s a lot to it. Although people have worked on servo woofers for many years, we’re just now getting to the point where it’s starting to get correct.

**Harley:** One hallmark of your designs has been wide dynamic contrast. How important are dynamics in reproduced music?

**Nudell:** Critical. It was driven by my taste in music, which was always oriented toward the large orchestral works—Mahler, Bruckner, Beethoven. Most speakers failed miserably, not only in terms of triple forte, but of pianissimos. No loudspeaker came close. But much of the emotional impact and power of large orchestral music is in those dynamic differences—those are the contrasts that convey much of the emotion of the music. And I always felt that if a speaker couldn’t do it—if the system couldn’t do it—then much of the emotion of the music would be lost. That’s why dynamics are so important to me, and I think they’re important to Paul.

We decided when we took Genesis in the new direction, starting with the highest-end loudspeaker—the Genesis I—that we wouldn’t compromise on dynamic contrast. We wanted to make sure that the speakers—if the ancillary equipment could do it—would reproduce the triple fortès.

**Harley:** You didn’t want the loudspeaker to be the limiting factor in the system’s dynamic range.

**Nudell:** Exactly. On the other hand, the other end of the dynamic spectrum was just as hard. Any loudspeaker can reproduce piano, but very few in my and Paul’s judgment can reproduce pianissimo and have the same kind of imaging and the same kind of detail. If there’s a triangle off to the left and it’s triple piano, it shouldn’t be some diffuse sound, but a clearly defined image. If a musician hits a music stand, you know exactly where it is. The ultimate resolution of a loudspeaker at the lowest volume has to be just as impressive as the resolution at the highest volume. That was the goal.

**Harley:** How do you find digital to perform in this area?

**Nudell:** Just to set the record straight, Paul and I don’t find digital offensive these days. It’s improving at such a rate that certainly we can listen to music with it and design loudspeakers with it. We like its consistency. We’ve found that digital will go down to ppp—not quite to pp. The fffs on digital are now better than the fff on record. I’ll argue that with anybody, because I have the master tapes of the record. Digital has come a long way, and I have a lot of hope for it, because it’s the wave of the future.

**Harley:** What other qualities are important to you in reproduced music?

**Nudell:** It’s nice to have dynamic contrast, as you brought up, but there are several other items that are extremely important. Without them, dynamic contrast would mean nothing. In fact, dynamic contrast would be detrimental.

The first is harmonic structure. Every instrument and voice has a unique harmonic structure, and if the speaker or the amplifier doesn’t preserve that harmonic structure almost exactly, many of the other parameters are meaningless.

The distinction between an oboe and an English horn in a concert hall isn’t very hard to discern. They’re both double-reed instruments, but the English horn is slightly bigger and pitched a fifth below the oboe. On most hi-fi systems that don’t preserve harmonic integrity, you find that it’s harder to distinguish between an oboe and an English horn. They’re not distinct enough because the harmonic integrity of the loudspeaker isn’t allowing you to hear the harmonic structure of each of those instruments correctly. Preserving harmonic structure is the number-one goal.

Also, this notion of resolving space is extremely important to us. We all know that on some recordings there’s a tremendous amount of space between the instruments and tre-
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There are so many things about loudspeaker design we can’t measure. You really need an orchestra in your head to know what’s right.

—Arnie Nudell

Harley: How is loudspeaker design different now from how it was 25 years ago?

Nudell: In a certain sense, there’s a sameness to it—that’s the art part of it. Throughout the last 25 years, people have asked me to ascribe ratios to what part is art and what part is science. When I first answered that question, I said it was 50% art and 50% science. As time went on, and we got better and more accessible measuring equipment such as MLSSA, I started thinking maybe it was 70% science and 30% art. Now I’m back to the old 50:50 ratio.

Not that we have less equipment now—we have more. We can measure speakers to within a gnat’s ass, but the problem we’ve found is deciding what the hell all these measurements mean. We know what some of them mean, but some of the subtle things we do to high-end loudspeakers really don’t show up on any measurements. The scale now isn’t fine enough to see some of these very subtle things.

I also wonder what the hell on-axis frequency response means. You don’t listen on-axis. What you care about is the average hemisphere of sound that you’re going to get in the listening position. Are those speakers putting out spiky ragged crap, or are they smooth from the sides? And if you average them together, will the frequency response be smooth without garbage? That seems to make sense, and relates to energy as a function of frequency. The British seem to think it should fall off at 6dB per octave, but we don’t think that. We think energy should be constant as a function of frequency if you can disperse it. Dipoles get around some of that because they disperse the high frequencies enough around the room, and average it better.

Getting back to your question, roughing-in a loudspeaker is a lot easier now than it was 25 years ago. The measurement equipment we had then was very crude compared to what we have now. You try to optimize the measurements, but with every change, you’ve got to listen to it. There are so many things about loudspeaker design we can’t measure. You really need an orchestra in your head to know what’s right.

We can rough things in a lot quicker and get a project moving more quickly. Where a high-end speaker once took you two years, now it may only take eight or nine months, because you get that big jump initially.

But understanding all the parameters we’ve talked about—dynamic range, harmonic integrity, how ambience is re-created, the consequences of drivers not being in time, slow woofer—has to come from experience.

We have much better materials to work with because aerospace always needs new and fancy materials. We can form all kinds of drivers we could never have formed years ago. Sure, we made electrostats 25 years ago, but could we have made a titanium/silicon-carbide/aluminum dome? No. Could never have done that. Were there materials to make a planar tweeter that wasn’t electrostatic? No, because the magnetic materials weren’t there, the diaphragms weren’t thin enough, you couldn’t put the voice-coil on the diaphragm.

I’d say the biggest difference is that we have vastly more material science than we had 25 years ago.

Harley: But that hasn’t taken away the artistic aspects.

—Arnie Nudell

Stereophile, January 1995
When Cary Christie, Arnie Nudell, and John Ulrich founded Infinity Systems more than 25 years ago, high-end audio as we know it today didn't exist. Hi-fi was audio, though the reverse wasn't necessarily true.

Through the growth years, Infinity became a major force in the High End. Cary Christie is the only one of the original players still associated with Infinity, now part of Harman International. His relationship, however, is now as an independent designer and consultant with Christie Designs, Inc. I corralled him by phone on a clear fall day in Santa Fe, and a snowy one at his home near Lake Tahoe, Nevada, and asked him how Infinity had started.

Cary Christie: Infinity was really the result of a hobby—Arnie's hobby, John's hobby, and my hobby. All three of us were making hi-fis in one form or another. We met at a hi-fi store, and it turned out that I was doing something that were complementary to what John and Arnie were doing. In 1967, the three of us started building our first product, the Servo Statik 1, under the name of NuTech Enterprises.

The product was being sold at a hi-fi store when some funding people came along and said that they would like to finance the start of a hi-fi company. When we went to incorporate the company, [the name] NuTech was already taken, so we had to take our second choice [laughs].

Thomas J. Norton: I remember the first time I heard of the Servo Statik: $2000 for a pair of loudspeakers! Unheard of!

Cary Christie: A ton of money! I think in those days I bought my original, one-year-old Porsche 912—and this was back when I was super poor—for about $3000. You kind of lose perspective on those things. I guess it's a good thing to look forward to: "Gee, what's my money really worth today? What's it going to be worth in 20 years?"

Norton: Infinity championed the electrostatic through most of the '70s. What prompted you to go on to other designs like the "ice-cream cone" tweeter, then the EMIT [the ElectroMagnetic Induction Tweeter]? Was it price, complexity, reliability, or were you just convinced that you'd gone about as far as you could with electrostats?

Cary Christie: It was a little bit of all of the above. For example, the matching transformers that are used to step up the voltage from the amplifiers in electrostats had inconsistencies in them. When you listened to one transformer, then another transformer in, it would sound different. [Electrostats] were expensive; you had to buy supplies for the high voltage, the matching transformers, and the electrostats themselves. You could only afford to bring the technology down to a certain price point.

One of the things we discovered early on was that there aren't tons of people who have tons of money to spend on hi-fi. We had to make it somewhat more affordable. What we wanted to do was take the technological education that we had received from our more expensive products and bring it down to the less-expensive stuff so that people could afford to buy it. Electrostats obviously had a limitation there. There were also technical, dynamic problems with the product in terms of breakdown—how far, theoretically, you could go in terms of dynamic range before the product just wouldn't work anymore. Those were just limitations to the technology, no matter what we did to it.

We started fooling around with other ways, to try and see if we could eliminate some of those objections without removing the things that electrostats do very well—low distortion, high transient speeds. We wanted to get the best of both worlds, so we were always on the lookout for something new.

Norton: There was a flurry of design activity at Infinity in the late 80s.
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"70s and early '80s. In addition to loudspeakers, you came out with the Black Widow tonearm, a preamp, a class-A hybrid power amplifier using tubes and transistors that J. Gordon Holt felt combined the best aspects of both types of device. You were even working on an air-bearing turntable, as I recall. That must have been a time.

Christie: It was a fun time, actually. There were needs in a lot of areas in hi-fi. If you looked at the tonearms in those days, for example, they were all the big old SME 3009 kind of thing. The higher-compliance cartridges had come out, and nobody had done anything to improve on the tonearm itself so that it would work better with a cartridge like that.

BEFORE YOU DO SOMETHING REALLY REVOLUTIONARY, TAKE A LOOK AT YOUR FUNDAMENTAL BUILDING BLOCKS.

—Cary Christie

There were problems everywhere—perhaps "opportunities" would be a better word—in need of solutions. The solutions were very obvious because of the nature of the problems. We still do it today—not to as great an extent, and the solutions aren't as obvious, but we still do it.

Norton: One product that you spent a great deal of energy on but never actually released was a switch-mode amplifier. What was the promise about it that intrigued you, and why did you abandon it?

Christie: We left the digital for a couple of reasons. First, there were some technical problems with it—it was drawing on a lot of our resources. Also, the company itself was growing so quickly in the speaker area that we really couldn't continue to spread ourselves out as thin as we were. We concentrated on speakers because that was what the company was founded on, and that's where we had the biggest opportunities.

Norton: The IRS, introduced in the early '80s, is definitely one of the classic loudspeaker designs. How was it developed?

Christie: The IRS was really a Servo Statik I in more contemporary terms. By that I mean not the product itself, but the idea, which was: Let's look at everything that can be done with the technology that's available. Forget the associated costs, charge what we have to in order to break even on the product, and make the best loudspeaker we know how to make. [The IRS] incorporated things that we already had in our "developmental warehouse," if you will, in the areas of Electromagnetic Induction drivers, servo-control mechanisms, polypropylene cones, etc. So the Servo Statik I and the IRS have more in common than it at first may appear.

Norton: Over the years, where have your primary responsibilities and interests been concentrated in Infinity's operations?

Christie: Mostly in product development and internal operations—taking care of manufacturing and the internal affairs of the company. Arnie focused mainly on the outside activities. John, of course, left very early in the company's history, in 1978. Arnie and I basically ran the company through divided efforts. I particularly enjoyed the product-development area; Arnie was more of an outside kind of guy. He really liked people and doing the interviews and interfacing with the magazines. After Arnie left the company, of course, I had to assume more of the marketing and P&L responsibilities.

Norton: Except for the continued production of the IRS and one or two other designs, Infinity has been perceived as being less active recently in high-end development. How did this new burst of high-end activity, beginning with the IRS Epsilon, come about?

Christie: The Epsilon is a much more complicated device than it may appear to be. If you take the Epsilon apart, you'll notice there's an awful lot of new ideas inside. All the Electromagnetic Induction drivers have been improved.

This work actually began a number of years ago. Before we could do something like the Epsilon, we actually had to develop the fundamental driver parts. Even though, on the surface, there wasn't a lot of high-tech activity going on, there was a lot of that activity going on in the basic development of parts, in order to make something like the Epsilon.

We were also going through a recession during those years—I would say during the last four or five years. There was a tremendous growth requirement in what I call the "bread-and-butter" product—like the Infinitesimal 4, the Infinitesimal Micro, a couple of international reference lines—just a whole lot of product development. We were also trying to express ourselves in automotive; we did this with the digital amplifier again, because that's where we felt a digital amplifier would be most effective—in a car, where you need the efficiency. So there was an awful lot of high-tech development as well as just a tremendous amount of product development going on.

The Renaissance loudspeakers—our first attempt at monopolar planar radiators—came out four or five years ago, and were the first products to actually use the same driver technology that we have in the Epsilon. The midrange and the EMIT are the same drivers that we used in the Renaissance, [although] we've learned something since then as to how to use them. So there's activity going on.

There's [still] an IRS, but I think people today are more interested in smaller, more room-friendly types of products. We wanted to see if we could improve on the IRS, not just duplicate it, so what we wanted to do was develop the drivers first, then see if we could incorporate those in the Epsilon-type design, which would give IRS-type performance at a much more friendly price, and in a much more friendly size.

Norton: The last similarly priced design to the Epsilon, the Beta, used the earlier drivers?

Christie: Yes, the Beta and the IRS and all the products we built in those years used the original EMIT and EMIM technology. Of course, before you do something really revolutionary, you want to take a look at your fundamental building blocks. That's what had to be done. There was a great deal of room for improvement there, and that's where the development came in. Look at the technology of the EMIM and the EMIT, as described in the technical White Paper on the Epsilon, and you'll see the sophisticated development that had to occur. We had a lot to learn before we put those things together.

Norton: So you work from the design of the drive-units first, then conceptualize the whole system, rather than starting with the system and developing the drive-units that you need for it?

Christie: No, that's not quite right. The system itself is conceptualized from the standpoint of the objective. The objective is not a product per se, but a certain number of things that the product can achieve—a good, wide, flat polar response, better power handling and dynamic capabilities, lower distortion, etc.

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4 In Gordon's words, "This . . . is the amplifier for other designers to emulate, with the hope that someone may be able to equal its performance at a rather more affordable price."

Vol.4 No.5, p.20. (The Infinity HCA amplifier cost a massive $4000 back in 1979.)

—JA
THE DIVIDING LINE BETWEEN HIGH-END AUDIO AND HOME THEATER IS SOMETHING THAT'S MORE MADE UP BY THE MARKETING PEOPLE. I DON'T SEE IT.
—CARY CHRISTIE

These things all require accurate sound-reproduction capability. The dynamics of loud music place the same requirements on the system that a movie does. I believe that, ultimately, what we’re going to have is multichannel sound.

Remember in the early days, how we tried to get quad-raphonic to happen, and we couldn’t because, as an industry, we managed to confuse the public, and they decided to go out and buy golf balls? What happened is that we spent a lot of time as an industry fighting with each other and not enough time trying to sell what we do really well to the public.

With everybody going down to their local video store and renting a tape to play on their television, then finding out, “Gee, if I add more than the little 3” speaker in the bottom of my TV to this thing, it actually makes watching my movies better,” then we’ve excited interest in the hardware development of multichannel receivers. The multichannel receiver requires more than two speakers in the house. When you put more than two speakers in the house, you have a hardware setup that allows for more than two channels of stereo. So it’s kind of a different way to approach quad, if you will.

Now that you have more speakers and more amplification, and a willingness to put them in your home, you can start looking at the evolution of that into better and better multichannel sound. Ultimately, I think, we’re going to benefit in a pure audio form from the Home Theater part of the business. I don’t think everybody’s going to have—in fact, I’m positive that only a very microscopic number of people are going to have—a real high-end, separate, dedicated [Home] Theater, with loge seats and all that stuff. Most people are going to have their living room, in which there’s going to be their television and their audio system. They’re going to watch movies, listen to music, entertain their friends, and they’re going to have a good time. Home Theater and high-end audio will ultimately become one and the same.

**Norton:** Do you see dedicated Home Theater loudspeaker packages, like THX, penetrating the High End, or do you see a continued development of high-end loudspeakers which will also be used in Home Theater applications?

**Christie:** Some of the best sound I’ve ever heard from a movie has come out of my living room listening to The Abyss with the Epsilons in the front channels and some [Infinity] Moduluses in the rears.

**Norton:** Both speakers initially designed for high-end audio applications.

**Christie:** Designed for high-end applications, but it’s exactly the same system that I listen to my audio on. It’s the best audio I’ve ever heard. I don’t see the dividing line. The dividing line is something that’s more made up by the marketing people and by the way that we’re selling this to consumers—what the consumer is able to digest in terms of buying a five-channel receiver and some small speakers. But in reality, I believe that we’re going to be recording in multichannels, that all multichannel sound is going to be digital, and that HDTV, if it ever comes to pass, is going to have 5.1-channel [sound] along with the video. What people are going to have is a television set with more than two speakers. There’s just a lot more nested hardware in place today than there was when we went from mono to stereo.
The hi-tech Infinity Modulus of 1990.

Norton: Then you see the interest in multichannel and/or Home Theater applications as ultimately enhancing rather than detracting from interest in classic, two-channel audio?

Christie: Absolutely. I think that ultimately it’s going to give us more ability as audio designers to improve the musical experience. I think that some of the best pure-audio experiences I’ve had have been with a good stereo system in the front and left-minus-right ambience recovery for the rear channels—just enough so that it’s barely there. It becomes a more involving experience. As we learn to fool around with these recording techniques with more than two channels available, I think you’re going to find some very interesting discoveries. I think that’s fun. We’re adding some dimension to this thing we call “stereo.”

Norton: Besides the IRS Epsilon, what new high-end designs are coming from Infinity?

Christie: The Epsilon allows for an awful lot of possibilities. The basic drive-units are there. The things that we talked about with regard to multichannel are a fairly clear indication of what I think needs to be. You can let your imagination roam from there. I don’t believe that the old way of looking at the IRS—a couple of big speaker columns and a couple of screens—is going to be in Infinity’s future. But certainly variations on the Epsilon, and applications toward a multichannel version of a high-end system, I think, are possible.

I think the Epsilon is a remarkable product, and it really has nothing to do with ego. I think it does things that none of our products in the past have done, and it does things more accurately than anything else in the market today. And the reason it does so is gratifying, because we had theorized that it would, and we really didn’t know that it would until we got rid of the back wave off of the planar drivers. Now that we’ve done that, and are able to hear the nuances that are actually in the recording, it’s exciting thinking about what we’re going to be able to do with that.

John Ulrich: In the mid-’60s, Arnie Nudell and I were working in the laser laboratory at Litton Industries, developing a system to be used for ranging for bombing systems, where you point a 4.5-million-watt laser at a target with a mirror. I was the electronic engineer in the group, Arnie was the physicist, and there was another guy who was doing systems engineering. Arnie and the other guy were off working on making the laser switch work, which they were successful at—at that time it was very state-of-the-art to make these things really high-power—and my part was to design the electronics: the amplifiers that amplified the pulses, the power supplies, and the servo systems.

In an aircraft, you can’t use linear [conventional] amplifiers because they’re very inefficient; we were doing some of the very first servos and switching amplifiers. I was testing a system, just running the pointing mirror at 20Hz, and Arnie walks in. “God, that’s great!” he says. “Couldn’t we use that switching amp to drive a woofer?” “Well, of course,” I said.

Both of us had an interest in hi-fi. I had designed the amplifiers I had at home, and Arnie had been playing around with horns and things, so we both went off the library and got a copy of Acoustical Engineering, by Harry Olson. We started working on it, [not just to] make something for ourselves, but I had an interest in starting a business. . . We went to Gene Czerwinski [of Cerwin Vega] to get a woofer. We had him wind a second voice-coil on it, so we actually got the woofer and an amplifier working. It was very crude, but we got it working.

About the same time, I met two guys who worked at Atomics International who were going to build electrostatic panels. So we bought the panels from them, designed a crossover with a common bass unit, and put together the Servo Statik system. And that’s how we actually started Infinity. During the next year [while we were looking for people to invest in the company], we developed the Servo Statik 1, and sold a few systems that were so crude you wouldn’t believe it. But we did sell them. And we developed the 2000, which was a 12" woofer with electrostatic tweeters; then we developed another speaker, the 1000. We already had a product line in our minds. So we got a building out in Chatsworth, and I quit Litton in August of ’68. I have to tell you, the first day I was there I just sat at my desk—I didn’t know what the hell to do. I was an engineer, so I started designing more circuits! Finally, Arnie went nuts, and a week later he also quit Litton.

We started going out and calling on dealers, and from that point built the business up. That’s how it got going, using the Servo Statik technology to build the company.

John Atkinson: Was the woofer amplifier in the Servo Statik a switching design, then?
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Jack English, Stereophile,
Vol. 15, No. 7 (July, 1992)

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Ulrich: No, not at all. We used linear amplifiers, about 150 watts per channel, in the servo bass. We started out to do it with switching amplifiers, but it was just too much new technology to pump in all at once.

We showed the first full-range Infinity switching amplifiers, as far as I can remember, in 1974 at the CES. They were very rudimentary amplifiers—I think they were like 125 watts per channel—but they worked. Bill Johnson5 of Audio Research had his first vacuum-tube amps out, and they sounded different from the Phase Linear 400s and the other amplifiers that were out then. We didn’t say our amplifiers were better; we just said, “Look, transistor amps sound one way, vacuum-tube amps sound another, and our amps sound different from either of those other amps, because they’re working on a different principle.”

Atkinson: A PWM amplifier can be a very efficient amplifier.

Ulrich: Yes, it is. It’s the right way to build an amplifier. If you had perfect components, it would be a perfect amplifier. If the FET switches were perfect, without any on-resistance, and the integrating inductors didn’t have any loss in them, it would be 100% efficient. . .

Atkinson: All the power from the AC line goes into the load.

Ulrich: Exactly. It’s the only way you could do 100% efficiency. Ultimately, in the future, it’s the way amplifiers will be built; but it’s very, very difficult to do. And they’re not cheap.

And [a PWM amplifier] with 160V rails can put 125–135V into a speaker on real high transients—the snap of a drum, for example. So [a switching amplifier] can put a pretty clean, very-high-power transient into a speaker without a lot of screwy things going on.

Atkinson: You still need the power in the sense that the amplifier has to be able to supply the instantaneous current to maintain that voltage.

Ulrich: Yes, and that’s another thing that’s important. A switching amplifier is stupid about where it’s delivering current. If the output signal is down at -100V, following a bass note, for example, it can happen right at that moment that the drummer strikes the snare drum, asking for a positive pulse. In those circumstances, a linear amplifier would probably current-limit to protect its output devices, or just run out of gas. A switching amplifier doesn’t mind going from -100V all the way up to +100V, to deliver that kind of a pulse. So it sounds different in transient response.

Atkinson: Why is it you feel that PWM amps have never really been commercially successful?

Ulrich: Technically, it’s real hard to do. . . nobody else is doing it. I just talked to a patent attorney and asked him if anybody else was working on audio switching amplifiers. He said no, but some guys over at Infinity were building them about five or six years ago. I said, “That’s me!”

Atkinson: Sorry marketed a PWM amplifier, the TA-N88, in 1978.

We built things at Infinity the way we wanted to build things for ourselves.

—John Ulrich

What you can do [to make them less expensive] is to rectify the 60Hz AC line. With a couple of diodes, a couple of capacitors, you get ±160V DC rails. You make a switch by having two field-effect transistors, one connected to the +160 and one connected to the −160, and [modulate the width of the FETs’ output switching pulses with the audio signal]. We’re switching these days at 500kHz! The junction between those two FETs goes to a very small inductor, like 100 microhenries, that performs the integrating and smoothing [of the output pulses to give an audio-bandwidth analog output signal]. But driving the FET switches is harder than you imagine. You have to switch the FETs on with 15 amp pulses. And off. And that’s not easy to do. FETs [with their high gate capacitance] are much harder to drive than bipolar transistors.

As well as efficiency, PWM amplifiers have other advantages. In a practical linear amplifier, the delay time through the amplifier is pushing at least a half a microsecond—500 nanoseconds—to about 2000ns. Okay. In a PWM amp, the delay time though the loop is about 200ns! Now, as a practical matter, what that means is that the negative feedback loop is responsive to changes in the music several times faster than a linear amp typically is. Now, most people get around that by not having much loop feedback in the first place. But loop feedback, if you could use it, is very desirable; it’s just that you really can’t use it in linear amplifiers. So most designers who design amplifiers to sound good try to use as little negative feedback as they can.

Now, another thing is that if you watch music on an oscilloscope, power is not what’s important in an amplifier. What’s important is how much voltage you can put into a speaker.

5 Bill Johnson richly deserves his success . . . he builds beautiful equipment. He sticks with the old-world vacuum tubes and does a magnificent job with them. But those days are probably numbered.

—John Ulrich

Ulrich: Yeah, they used a FET switch. It was rather crude; they took a triangle into a comparator. It was clever, but it was low power—100 watts—and didn’t sound very good . . . The Infinity switching amplifiers had very mixed reviews—some people loved the sound while others hated it. The amplifiers were very controversial. They were also not the most reliable in the world. It wasn’t horrible, but they had problems—they were real sticky, and we’d have some amplifiers that would go out and come back and play ping-pong with us.

We sold quite a few of the Infinity switching amplifiers, then we came up with a preamplifier that we sold with it. Our success was that we really built things at Infinity the way we wanted to build things for ourselves.

Atkinson: When did you finish the relationship with Infinity?

Ulrich: 1979. We all sold our stock in ’74 to Eastern Air Devices, who then became Electro/Audio Dynamics . . . The guys at EAD were building motors—it was more of an industrial kind of a company—and wanted to get into the audio business. It turned out they really weren’t that good at it . . . but they helped us credit-wise, and they helped us with a management structure. In those early days, we had a lot of problems with the company. See, Arnie and I couldn’t decide who was going to be president, so we flipped a coin. I won the coin toss, so the first year I was president, then he was president. Every year we alternated. Well, that’s no way to run a company; finally, EAD said, you guys figure out who’s going to be president. I decided that I’d rather work on my amps, so Arnie became the permanent president. At the end of my contract, I went out to do other things.

6 This may have been true in 1987, but there have been a few in-car PWM amplifiers sent to market in the last few years, including one from Infinity.

—JA
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s I've said before, writing for a monthly magazine is like living in a time warp. A “lead time” of about two months elapses from the time we scribblers must deliver our articles to Santa Fe to the day the magazine arrives in your mailbox. Stereophile's lead time is actually relatively short; at many magazines, it can be three or even four months. Every month our hard-working editors read, edit, correct, and organize the often nearly 200,000 words of each issue (the equivalent of a book!); the text is typeset; layout people arrange text, photos, and ads on an average of about 250 pages; the printer prints about 25 million pages, weighing about 60 tons, and binds them into magazines; and the post office delivers them to your door.

As I write these words, the November issue has just arrived in my mailbox. I particularly enjoyed Kristen Weitz's “Getting Real” feature. Discovering inexpensive components that produce satisfying sound is the second-most fun I know in hi-fi (after enjoying the music, of course), and I'm delighted that Stereophile has a new writer who can focus on the important entry-level market. But as I read Kristen's November column (and Sam Tellig's, too), I couldn't resist the temptation to add some footnotes.

I applaud the selection of the $230/pair NHT SuperZeros with subwoofer as the core of Kristen's $2000 reference system, though I prefer to combine the SuperZeros with a cylindrical Hsu Research subwoofer rather than NHT's sub. With either sub, the SuperZero is a best-buy, delivering amazingly uncolored sound and a wonderfully spacious soundstage at a bargain price. It's not surprising that the RA Labs Mini Reference didn't sound as impressive as the SuperZero/sub combination—there's a 5:1 difference in price. And the RA wasn't designed to match the NHT sub.

Kristen's comment that the $69 Grado SR60 headphones are “unbelievably uncomfortable” deserves a footnote. I just returned from recording a concert in Boston, where an old friend recently bought the SR60s. I compared the Grados with the superbly accurate $330 Etymotic Research ER-4S ear–canal 'phones. While the sound of the $69 Grados is less refined, both designs share the same essential midrange accuracy—a rare quality in headphones. The SR60s also have a built-in bass boost that flatters many recordings. The Grados, like the SuperZeros, are one of the great bargains in audio today; but the discomfort problem is real.

THE GRADO SR60S ARE ONE OF THE GREAT BARGAINS IN AUDIO TODAY.

My piano-tuning friend dealt with the comfort issue in two ways. The earpieces clamped onto the sides of his wide skull with too much pressure, so he bent back the “ball” (the curved metal piece that goes over the top of the head), straightening it slightly to reduce its clamping pressure. Then, following a sales clerk's advice, he replaced the original black Grado earpads with the large yellow foam pads that are sold as replacement pads for Sennheiser 'phones. The Sennheiser pads are a good fit on the Grado earpieces. Now his SR60s are quite comfortable, with light pressure distributed over the entire outer ear.

Finally, Kristen wondered about some of the sonic details that she hears in headphones. Why aren't they equally audible through loudspeakers? Is this a limitation in the CD player? The amplifier? The speakers? Probably none of these. It has always been true that certain aspects of a recording are heard much more vividly through headphones than through speakers. In part this is because each ear hears the output from both speakers, and in part it's because the sound in an acoustically “live” room becomes somewhat blended as it's reflected around within the space.

To improve the clarity of the presentation through speakers located 10' away from you, try sitting closer to them (or move the speakers closer to your chair). That way you'll hear more of their direct sound and less of the blended reflected energy that's bouncing around in the room. As JA says, “Placement, placement, and placement are the three most important things in speaker setup!”

Placement is also important for absorbing materials. To reduce strong reflections, treat the room's boundary surfaces at the primary mirror–image locations. To find these locations, sit in your normal stereo seat and have a friend slide a flat mirror along each wall and ceiling surface until you see the speaker's image in the mirror. At each mirror location, install something that will obstruct, scatter, or absorb sound.

Another suggestion: try a surround hookup. Some of the subtle details that seem obscure in loudspeakers probably were recorded with a phase difference between the stereo channels. An ambient-sound decoder may pull such details out of the mix and locate them somewhere else in the soundfield. Take care: when ambient-sound channels are turned up too loud, they cloud the entire presentation. At the correct (nearly subliminal) volume level, you hear nothing at all coming from the surround speakers, but the extracted ambience adds an impression of depth and three-dimensionality to the stereo soundstage. It's a psychoacoustic trick—you don't hear a hall surrounding you, just an impression that the front stereo image has become more realistic and spacious.

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EXPLORING THE NEARFIELD

When I read Sam Tellig's November column about single-ended tube amplifiers, I felt like Marlon Brando in Streetcar: alone in the street and screaming "Stella!" I wanted to shout, "Sam! You didn't finish the story!" The usual difficulty with a 7W amp is the need to seek out a high-efficiency speaker, such as a horn design, in order to minimize amplifier clipping and dynamic compression. With a typically insensitive (85dB) British mini-monitor, dynamics would be severely limited.

As Sam noted, you can assist a 7W amp by using it in a small bedroom instead of a large living room with a vaulted ceiling. But to really solve the problem of dynamics, let's take this process to its logical conclusion: "nearfield" listening. Conventional speakers need dozens (or hundreds) of watts, because they're located eight or ten feet away from you, and their acoustic output must fill all 4000 cubic feet of your room. With nearfield listening, on the other hand, the speaker doesn't need to fill the room—indeed, you don't want it to. Nearfield speakers are located quite close to you—literally within arm's length—so you hear their direct output with little or no room interaction.

Since Kristen Weitz wondered about a difference in clarity between loudspeaker sound and headphone presentation, perhaps this is an appropriate time to remind ourselves that relationships between transducers and listeners actually can be classified into four distinct situations, two of which are familiar and two of which are seldom discussed but deserve further exploration: farfield, nearfield, headphone, and earphone, the first and last of which are well-known to everyone.

A note for language purists: these terms are incorrect. Strictly speaking, "nearfield" and "farfield" have meaning only in a reflection-free environment; their definitions involve the size of the driver, the wavelength of the sound being generated, and the distance. Even engineers confuse near- and farfields with the direct and reverberant fields of sound in a normally reflective listening room. Adding further to the confusion, loudspeaker reviewers from JA to Julian Hirsch use a technique called "nearfield measurement," which was invented a decade ago by Don Keele, long before he became a senior reviewer at Audio. By placing a microphone nearly in contact with the woofer cone, you avoid room interaction, and actually obtain a measure of the woofer's farfield anechoic response. For this discussion, and in the spirit of Alice, words will mean just what we pay them to, and no more.

EVEN ENGINES CONFUSE NEAR- AND FARFIELDS WITH THE DIRECT AND REVERBERANT FIELDS OF SOUND IN A NORMALLY REFLECTIVE LISTENING ROOM.

"Farfield" listening is the conventional arrangement for loudspeakers—in the opposite half of the room, eight or ten feet away from the listener. At low and middle frequencies, both speakers fill the room with their sound, and the listener is in the reverberant field where the intensity of the sound remains approximately constant as you move about. Standing waves dominate the low-frequency response. At high frequencies, the speaker's radiation pattern may become sufficiently directional that the listener is in the direct field. Even so, each ear hears both speakers, and reflections contribute to what we hear. Result: Although the recording may have captured the entire hemispherical soundfield in front of the microphones, this soundfield collapses into the 60° angle between the speakers. And, as Kristen observed in her November column, many details become obscured.

That's one extreme. The opposite extreme is provided by earphone (or "headphone") listening. In this case, miniature loudspeakers are clamped onto the sides of the head, or even inserted into the ear canals. There's no room interaction. Neither is there bass feel—a complete lack of tactile bass waves striking the skin. To make up for this, many headphones have exaggerated midbass output. On the positive side, since each ear hears only its respective channel, there's no cross-channel blending. Clarity is absolute, with spacious highs and vivid left/right separation.

But earphone listening deprives the ear/brain system of most of its normal directional cues, so the stereo image tends to reside mainly in the cranium, often wrapping around the back of the skull. This occurs because our ability to resolve front/back uncertainty depends on small movements of the head, which alter the cancellations caused by reflections in the pinnae (outer ears). Without those pinna effects, the soundstage goes with you when you turn your head, counter to real life. This impairs the realism of the imaging, even with those dummy-head binaural recordings that do contain some pinna cues. So, while headphone listening is vividly clear, it's also ultimately unnatural.

"Nearfield" is a made-up word, not original with me, for a setup that combines the benefits of nearfield listening with the vivid left–right separation of earphones. Small speakers are located just a foot or two away on each side of the head, usually mounted on the frame of a chair, so that the listener sits between them. This is basically a way of getting the spatial qualities of earphones with much greater physical comfort for long-term listening. I don't like headphone imaging, so I don't recommend nearphones either; but give it a try and decide for yourself.

I do enthusiastically recommend nearfield listening. Nearfield and nearfield setups are similar: the speakers are mounted at ear level, about two feet away, but with one essential difference: nearfield speakers are in front, and each ear hears both speakers. And normal pinna cues function, even when you turn your head, so stereo imaging is conventional.

Actually, nearfield speaker imaging is even better than normal speaker imaging. At a listening distance of only two or three feet, you are entirely in the speaker's direct field. At most frequencies, image-smearing room reflections are 10–20dB lower in level than the direct sound. Since you don't hear the blending of both channels in the room's reverberant field, the stereo image produced by the direct field of each speaker is vividly clear, pre-
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ciscely focused, layered in depth, and surrounded by stage-area reflections. These qualities of soundstage imaging, which audiophiles struggle to achieve at a conventional listening distance, are very easy to hear in a nearfield setup.

Vividly clear imaging is what first attracted me to nearfield monitoring about 15 years ago, when I was recording concerts nearly every week. Using a spaced pair of mikes to capture an orchestra plus a center mike to focus on a vocal or instrumental solo, I found it difficult to judge the relative mixing level of the accent mike via headphones. Full-size speakers were a pain to carry around, and were affected by control-room acoustics. A nearfield setup (a 10W Heathkit amp and two small speakers at arm’s length in front of me) solved the problem, providing splendid imaging with virtually no room contribution.

Many other engineers discovered the same solution, but they often call it "closefield" monitoring to avoid arguments about definitions. In most recording studios, it has become standard practice to have large monitor speakers on the front wall plus a pair of small speakers sitting on the mixing console. Actually, this is a poor location, because reflections off the console surface produce strong colorations.

The speakers that I used, remarkably, were 5" full-range drivers in white plastic enclosures, sold as the speaker half of the classic Advent table radio. As with most car-radio speakers, the 5" driver had a broad peak around 1.5kHz, which Henry Kloss compensated for with a passive built-in notch filter, yielding nearly flat on-axis response from about 100Hz–10kHz. It’s amazing how easy it is to get good sound from a cheap speaker if power-handling and off-axis response don’t matter.

At a conventional listening distance, this speaker had a rather mellow tonal balance, which is what you should look for when selecting speakers for nearfield use. Most speakers, including the Super-Zeros, are much too bright when heard up-close. Studio engineers who use the Yamaha NS-10 as a nearfield monitor often add a Kleenex tissue in front of the tweeter to tame its excess brightness. But the tissue both reflects and absorbs energy, and the reflections produce ragged treble. If you can’t find a compact speaker that sounds neutral when heard from a close distance, equalization or tone controls might help.

I’ve been emphasizing only two benefits of nearfield listening: wonderfully spacious and detailed stereo imaging, and the ability to achieve satisfying dynamics with a small amplifier (such as the single-ended tube designs that Sam Tellig praised). Other benefits also deserve mention:

1) Even at high perceived sound levels, nearfield speakers don’t produce the congestion and distortion that many speakers generate when they strain to fill a large room with a loud climax.

2) The direct sound from a good driver is remarkably uncolored. Normally, you don’t get to hear such accurate sound because of the muddying effect of room reflections.

3) With no need to fill the room with sound, you can enjoy subjectively high sound levels without disturbing your neighbors.

4) Without the large peaks and valleys that standing waves add to normal speaker sound, nearfield bass has a natural, effortless quality that you may not have experienced before.

Of course, nearfield bass also tends to be limited by the need to use a small speaker. In a large speaker system, the output from widely spaced drivers may not integrate into a coherent waveform until several feet away. Nearfield speakers usually are single-driver systems, coaxials (such as the KEF and Tannoy designs, whose tweeter is nestled within the woofer’s voice-coil), or compact two-way systems.

Incidentally, if you want to add room-shaking deep bass to either a nearfield setup or a conventional speaker system, consider the new HRSW12V powered subwoofer from Hsu Research ($800 including 150W amp and 24dB/octave electronic crossover). Most subwoofers are designed to be placed near your main speakers, but Hsu’s instructions specify installation near (or behind) your chair, putting you in the woofer’s nearfield. Thus located, this woofer achieves a combination of extremely quick speed and gut-massaging bass impact that I have seldom experienced from any subwoofer.
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BUILDING
THE HI-FI HOUSE

Thomas J. Norton

A nyone who’s ever looked for it knows how rare audio-friendly living space is. Perhaps someday an enterprising developer will build Audiophile Acres—a whole subdivision of audio houses or soundproofed condos that’ll meet these needs—then stand by while hordes of long-suffering audiophiles stampede the sales office, frantically waving down-payments in their sweaty hands.

I can see the salivating now over those extra-large, sound-proofed dens or, spouses permitting, optimally dimensioned living rooms with separate, sonically isolated family rooms where the kids can watch Looney Tunes to their hearts’ content without derailing an eagerly anticipated listening session. Barbecue discussions, instead of revolving around the great plays in last week’s televised showdown between the Snail Darters and the Spotted Owls, would be replaced by endless arguments about last weekend’s listening sessions or, in a remote, esoteric corner of the development, discussions of the musical merits of the latest recordings. The community center would host presentations by visiting audio manufacturers and local and touring music groups.

There would, of course, be the inevitable snags. The audiophile developer would probably enact strange neighborhood covenants: “Only tube electronics permitted” (the DO Clause); or “Digital playback must be specifically approved on a case-by-case basis, so as not to create a nuisance” (the TAS Exclusion); or “Surround-Sound and Home Theaters not authorized” (the two-channels-forever sub-paragraph).

There would also be the old problem of keeping up with the Joneses. “Honey, Bill and Clara next door just bought new Studio Grands. We’ll never be able to show our face in this neighborhood again.” Or the ever-popular “My dad’s system can blow away your dad’s system.” The subdivision would become surrounded by retail establishments; the local mall, the J. Gordon Holt Galleria, would be anchored by high-end superstores. Inevitably, of course, would come the megaplex record retailers and consumer electronics chains—the beginnings of suburban blight.

Until such a community is developed, however, most audiophiles must settle for a compromised listening situation—most home designers and builders know nothing about room modes, and just enough about acoustics to be dangerous. The typical audiophile usually has to settle, however reluctantly, for a less than optimum listening space.

When I finally sold my previous home in California’s sluggish real-estate market (a year after moving to Santa Fe) and could at last begin looking seriously for a new house, I knew precisely what I wanted, and wasn’t prepared to accept less. I needed a separate, generously sized, properly proportioned listening room to which I could retreat in privacy—a place away from household traffic flow, and, preferably, one that was sonically well-isolated from the rest of the house. JA has such a place. RH built one—though he’s just moved out of the hills and into Albuquerque proper. JE and LL are both able to retreat to their basement lairs. DO, for crying out loud, has a whole listening house in addition to the one he lives in. I was willing to settle for a mere dedicated, isolated room.

When I researched the Santa Fe real-estate market for a new abode, however, I couldn’t find what I was looking for. No suitable houses were available, and I had no desire to wait months or years for one to turn up at a price mere humans could afford.

Building a house from the ground up had never been my first choice. But it appeared do-able, so I took the plunge and invested in an appropriate piece of land. It wasn’t cheap, but neither was it in the more expensive part of town, where comparable lots were selling for two to three times as much. At just over an acre, my parcel offered reasonable isolation from neighbors while still being close to town and only about five miles from the Stereophile offices. Equally important, a lot of this size allowed for flexibility in the floor plan, especially since subdivision restrictions limited construction to single-storey dwellings. A one-storey house does, however, have advantages when an isolated listening room is required—you don’t have to worry about annoying the people upstairs—but disadvantages in cost, as any builder will tell you.

The rest of the house was designed around the listening room, which I wanted large enough to accommodate a loudspeaker setup on either a long or short wall. The long-wall setup, in particular, required sufficient room width to allow both listener and loudspeakers to be placed well out from both the front and back walls while still providing a reasonable listening distance.

A MATTER OF MODES
Chapter 11 of F. Alton Everest’s The Master Handbook of Acoustics (Tab Books) proved quite useful in determining optimal room dimensions. I settled on a 1.0:1.6:2.33 (H:W:D) room

M OST HOME DESIGNERS AND BUILDERS KNOW JUST ENOUGH ABOUT ACOUSTICS TO BE DANGEROUS.
A 10' ceiling would mean a 16'-wide room—good, but a little less than what I wanted. An 11' ceiling resulted in a 17.6'-wide by 25.6'-long room. I cheated a bit and rounded the last two dimensions up to the nearest foot, for overall room dimensions of 11' high by 18' wide by 26' long (fig. 1).

Room modes result from a buildup of sound pressure within a room at the frequencies that are functions of the room's dimensions. Modes cause problems primarily in the bass—below about 250Hz. They also exist at higher frequencies, but only in the bass are they isolated enough to cause significant audible aberrations. There are three main types of room modes: axial, tangential, and radial. Of the three, the axial modes—those occurring between opposite walls—are the strongest and most potentially troublesome.

Calculating the axial modes for a given rectangular room is simple, though a little tedious: simply divide 5651 by the room length, then repeat for the width and height. Next, list all of the possible whole–integer multiples of these frequencies, up to about 250Hz. Put all of these frequencies in ascending order, and voilà!, you have a list of your room's axial modes.

But it's best to avoid a pileup of modes at a specific frequency, or two very closely spaced frequencies. For the room dimensions I chose, there were no pileups up to 250Hz (fig. 2), though two modes in the midbass are spaced by 2Hz (64Hz and 66Hz). There are other close modal spacings around 150Hz, 200Hz, and 205Hz. Calculating the modes for a number of other suitable room dimensions, however, revealed that no combinations were noticeably better than this, and almost all were far worse. There are no perfect dimensional ratios for a small room—and even fairly large domestic rooms such as this one are "small" relative to bass wavelengths; there's only good, bad, and worse. The dimensions I picked hold promise of being among the good ones.

Long after my house dimensions were in, ah, concrete, an interesting three–part article appeared in Speaker Builder magazine on building a listening room: "What Makes Your Room Hi-Fi?" by Joseph Saluzzi, in issues Six’92, One’93, and Two’93. In the first of these, Saluzzi also tries to determine optimal dimensions for a listening room.

1 Your homework is to figure out where this number came from. The velocity of sound equals frequency times wavelength; the velocity of sound at sea level is about 1130ft/second. Standing waves build up where a half cycle of sound at a given frequency, or multiples of it, fits into a given space. Got it now? If you don't, don't worry. You don't need to understand the derivation to do the math.

His nephew developed a far more efficient method than I had available—a computer program which calculates the modes and the standard deviation between them, recalculates the modes for every 1" increment of dimensional change, and rejects dimensions with mode pileups. A less elaborate program, "Modes for your Abodes," which prompts the user to input room dimensions and calculates and sorts the modes by frequency or mode type, is available through Old Colony Sound Laboratory.2 I haven't tried it—my building days are over for now, thank you very much, but it could save you considerable work and tedium when trying to zero-in on desirable room dimensions. You could also use it to analyze your existing room.

CATHEDRAL CEILINGS

All of the methods I'm aware of for analyzing the modes of a prospective or existing room assume a closed, rectangular space with rigid walls. A sloped ceiling complicates the calculations; you'll still be able to calculate the modes for the room's length and width, but what do you do about the height? I have never seen this addressed in the references available to me, but it would seem intuitive that, instead of discrete modes related to a specific ceiling height and multiples of this mode, you'll have an infinite number of much smaller, probably negligible modes distributed according to the variation of ceiling height, running from the minimum to the maximum height.

One disadvantage here is that there will now be no strong, distinct "height" modes to help fill in and smooth out the width and length modes. Since modes can't be eliminated, the only other alternative is to spread them out as evenly as possible. "Gaps" in the modal coverage cause the remaining modes to stick out more. With a cathedral ceiling, the width and length modes could result in the room having a spotier bass response than it would have with a flat ceiling. A sloped ceiling will, however, improve the diffusion characteristics of the listening room, "opening up" the sound. I've enjoyed music in rooms that have one-way sloped ceilings that work quite well, but I avoided this design for my room because of its essentially unpredictable results. By the way, when you get to the popular "open plan" living space, there's no reliable way to predict the result.

The result of all these philosophical and mathematical thoughts was plain: the dedicated listening room at Casa

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1 Your homework is to figure out where this number came from. The velocity of sound equals frequency times wavelength; the velocity of sound at sea level is about 1130ft/second. Standing waves build up where a half cycle of sound at a given frequency, or multiples of it, fits into a given space. Got it now? If you don't, don't worry. You don't need to understand the derivation to do the math.

2 P.O. Box 243, Peterborough, NH 03458-0243. Tel: (603) 924-6371.
Norton would be rectangular with a high, flat ceiling.

**ISOLATION**

Next, I needed to consider acoustic isolation—keeping noise from the rest of the house out of the listening room, and keeping music in it. Perfect isolation within an integral, one-piece structure is nearly impossible, of course, at least not without resorting to drastic measures. But there are a few *almost* sensible possibilities.

One of the listening room’s long walls is shared with the garage. That, plus the outside walls which occupy perhaps one-quarter of the room’s perimeter, take care of more than half the problem. For the two walls adjoining other living spaces, I used an insulated, double-stud construction consisting of two 2" by 4" stud walls, each with its own separate footing, separated by a small air space to keep them from touching each other.

When wallboarded on both room sides and insulated, the result is a break in the structural continuity between the listening room’s walls and the walls of adjoining rooms which dramatically reduces sound transmission. And while, contrary to popular belief, insulation within the wall space does very little to minimize transmission of sound, it *does* limit wall-cavity resonances, which *can* reduce the effective isolation at those resonant frequencies. Such insulation should be loosely packed, as dense packing would have the effect of coupling the two sides of the wall—the very thing we’re trying to avoid.

Unfortunately, construction practices required that my

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3 Another technique, simpler, less expensive, and nearly as effective, is to use staggered 2x4 studs on a 2x6 or larger footer, so that no one stud makes contact with both wall surfaces—though the footers do. I opted for the more elaborate construction; had I chosen the other and been disappointed, it’d have been too late to go back.

isolating double walls be attached at the top. I did request that the builder extend the double walls all the way to the roof line (with typical Santa Fe flat-roof construction, that’s about 18” above the ceiling) to prevent the sound from bypassing the walls through the attic space. Unfortunately, he failed to understand or follow this specification.

To minimize sound transmission through the attic, I asked that a 1"-thick barrier consisting of two thicknesses of Sheetrock be glued and screwed into the trusses in the attic space which separated the listening room from the adjoining rooms. The builder, who by now was sure I was crazy, complied—at least for one of the walls. On the other, the attic structure was complex enough that I wanted to do it myself to ensure that it was done right. I spent many a chilly March afternoon cutting Sheetrock into small enough spaces to fit the gaps, gluing it into place in a double layer, then using silicone caulk to fill in any gaps. I also used silicone caulk to fill problematic-looking gaps in the pre-Sheetrocked walls, and used expandable aerosol foam (nasty stuff) to fill larger gaps.

The house was to have in-floor heating, so noise isolation here wasn’t a problem. However, a roof-mounted swamp cooler feeding the rooms via air ducts threatened to be. The ducts couldn’t be lined—the cooler would cause moisture absorption in any insulated lining. I ran a completely separate duct from the listening room to the cooler—a distance of about 25’—so that any sound traveling from another room would have to go all the way back to the cooler through its own duct, then another 25’ to get to the listening room.

A room’s door often defeats attempts at sound isolation. Fortunately, the layout of my house allowed for two doors between the listening room and the other common areas of the house—one in the room itself, another in an adjoining

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hallway. For the hallway, I chose a double-glass door intended for outdoor use, with full, weather-stripped frame and threshold. The door to the listening room is a normal interior door with a gap at the bottom. So far, it's been more than adequate; but it could be changed to a heavy, solid-core door with a seal at the bottom if further isolation is ever needed.

The large windows in the room are of double-paned, insulated glass. Because of the relatively isolated nature of the house, I thought more elaborate window treatment would be unnecessary; so far, this judgment has proven correct.

**Mechanics**

The house was designed to be constructed of normal wood frame and drywall on a slab foundation—no concrete block, plaster, adobe, or basement. For the walls of the house I specified 16" stud centers throughout, 2x4s for the inside walls, 2x6s for the outside. The added cost here is trivial as a percentage of the total. If you don't specify this, your builder may be tempted to use 24" centers if local codes allow it—for builders of entire subdivisions, the savings quickly escalate for every stud saved. Every time I cut loose with a bass-laden recording or listen to the dinosaurs in *Jurassic Park* boogie through my living room *cum* Home Theater (discussed in Vol. 17 No. 5, pp. 98–99), I'm thankful I demanded the more solid construction.

**Fireplaces Severely Limit Your Flexibility in System Setup.**

Although I wasn't able to afford adobe and hand-troweled plaster (both less common even in Santa Fe than they used to be; they're expensive), I still wanted solid walls in the listening room—not too rigid, because that can also cause problems, but more solid than the typical ½" Sheetrock. I therefore specified double Sheetrock (1" thick total) for the listening room, glued and screwed to the studs. But the builder misread my plans, and only double-Sheetrocked those walls adjoining other interior spaces; the windowed, short, front wall and long wall adjoining the garage were of ½" Sheetrock. The already-in-place window framing precluded adding to this. But at least these exterior walls were on 2x6 studs. I'd also specified several crosspieces to be placed between the studs, to spread out the inevitable resonant characteristics of the wall cavities.

A few additional features were included: Two separate 30A electrical circuits were run for powering the equipment, with more outlets than are usually furnished in a room of this size. I also ran several empty plastic 4"-diameter conduits under the slab floor for unobtrusive cable runs; so far I haven't used these much, but I'm glad they're there (except for the nut driver I recently dropped into one of the holes).

While I don't anticipate using surround-sound in this room any time soon, I also ran some leftover cable from my living-room/Home Theater in the walls of the listening room from the most likely equipment-rack location to the most likely locations for surround speakers.

Santa Fe is a fireplace-builder's heaven, but I never even considered putting one in the listening room, as fireplaces severely limit your flexibility in system setup. I do have a fireplace in my living-room/Home Theater, but it was carefully situated to allow at least one decent audio/video arrangement.

My listening room has a large window on one of the short walls, two smaller ones near the corners of the adjoining long walls, and several skylights to lighten the back of the room. The back of the room—about 5' of the room's length—is tiled, and doubles as an open hallway to the garage. Since it's raised one step, it has an overall ceiling height that's about 6' lower than the rest of the room.

Ah, yes—ceiling height. I visited my construction site after the stud walls had been put up, but (mercifully) before the roof was in place, and had the uncomfortable feeling that the walls in the listening room were too high. They were. The builder had misread the plans (he argued that they were ambiguous) and built the walls 9' too high in three of the rooms, including the listening room!

The good news is that I got taller ceilings in my living/Home Theater room and master bedroom; the bad news is that lowering the listening-room ceiling cost me bucks. But it worked out okay. The builder had actually shortened the room width and length by a few inches than planned (among other things, he apparently didn't allow for the thickness of the Sheetrock, as I had requested). When I recalculated the modes for the new width, I found that an 11' 4"-high ceiling was actually better than the originally planned 11', so I had it adjusted accordingly—which cost me nothing extra.

It might appear as if the builder made some royal foul-ups, but he actually did a very fine job, overall, and I would use him again. A glitch-free build is probably unheard of. Construction tolerances are something you'll have to live with.

**Moral:** Insisting on tolerances to a small fraction of an inch isn't practical. Half an inch won't likely be that important acoustically, but will run up the cost considerably and cause friction with your builder. Be precise in the planning stages, however—accounting for wall thicknesses, etc.—to avoid misunderstandings or compounded errors.

And when you draw up your plans, don't use terms like "Dedicated Listening Room" or "Home Theater." "Media Room" is probably okay; "Recreation Room" (my term) or "Bonus Room" are probably even better. "Listening Room" or "Home Theater" are liable to raise flags with the bank or city planning commission—they might wonder if you're planning to have people pay to see concerts or movies in your home. Really.

**A Word About Architects...**

I was fortunate to find an architect who could work with me in satisfying my requirements, though I gave him little latitude on the floor plan. Your architect will undoubtedly come up with some interesting ideas—it's your job to keep them from messing up your plans for a good listening room. Remember, few builders or architects know much about sound transmission or acoustics. Nor have many acousticians designed small spaces—the requirements of a concert hall, arena, or even a recording studio are different from those of a listening room. The best way to get what you want is to educate yourself.

Also remember that one of the architect's goals in designing a house is outside symmetry and "curb appeal" (he or she will later want to drive by with other prospective clients). This will certainly be important to you as well, but remember that an outside symmetry of windows may result in an asymmetrical or awkward window arrangement or other layout quirk in the listening room. Don't let this happen; it's almost always possible to satisfy both of these requirements with a little planning—even if you have to put the listening room in the back of the house.
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Barry Willis, Stereophile®
*Vol. 17, No. 8, Aug. 1994
THE MORE YOU KNOW ABOUT DESIGNING A LISTENING ROOM, THE EASIER IT'll BE TO SCREEN THOSE WHO'LL ASSIST YOU WITH IT.

THE LAST MILE

Listening room and house were finally finished and ready for the last step—acoustical treatment. I didn't acoustically treat this room according to any scientific “calculation” or cookbook recommendations. The only way to really optimize a listening space is to experiment, and address the known, treatable problems common to all rooms. The only way to control room modes, for example, is through proper room dimensions and, to a much lesser degree, loudspeaker placement. Flutter echo—that zingy quality you hear when you clap your hands—can be easily controlled with distributed absorption and diffusion, as can the overall liveliness of the room.

I wanted the room treatments I used to be as placement-flexible as possible. Books, records, and furniture make fine absorbers and diffusers of sound, but what do you do if you want to place those new loudspeakers against the wall with the heavy desk, books, and Aunt Hortense's antique sideboard? This is a one-time headache for the typical audiophile, but a major handicap for a reviewer. I opted for three easily movable listening chairs, the equipment racks, and three smaller, wooden storage cabinets. Still pending are LP and CD shelves, which will be built into corners unlikely to be used for equipment or loudspeakers.

The wall-to-wall carpet in my listening room is currently a medium-weight Berber style with a raised pattern of squares small enough to be of some assistance in moving things a few inches here or there. The windows' vertical blinds are of fairly heavy cloth. Several acoustic panels from Acoustic Sciences Corporation (the Tube Trap folks) are placed high on the side walls to cut down on flutter echoes, and three additional panels of a different design (one of them homemade) are hung a few feet out from the short, windowed wall. Several Tube Traps and similar devices from Acoustic Solutions are strategically placed around the room, along with a pair of ASC Shadow Casters—selectively absorbing and diffusing panels designed to control side-wall reflections but which can also be put to a number of other good acoustical uses—which can be moved about depending on the loudspeaker setup.

Two three-paneled room-divider-style absorptive panels manufactured by MSB can also be easily moved into or out of the room, as needed. Several large artificial plants provide some diffusion, though an array of RPG Diffusers and Abfuscus do the bulk of this job on one otherwise rather live short wall. The ceiling is done Santa Fe style: shaved log beams, called vigas, with wood planking above for the bulk of the room (the area over the tiled, open hallway is Sheetrocked). This is more dispersive than a smooth ceiling.

I've used a number of loudspeaker setups in this room, and the one I currently favor is with the loudspeakers placed out from the walls flanking one corner, firing almost across a diagonal. This is remarkably effective in minimizing modal problems (remember, even well-designed rooms have some modes).

The “feel” of the room now seems almost ideal—neither too alive nor too dead. The space sounds remarkably open; the music seems able to “breathe” there—the very opposite of a claustrophobic, cramped sound. I'll continue experimenting with the acoustics—who ever heard of a satisfied audiophile?—but this is a solid baseline from which to work.

Should you consider such a project? If you can afford it, by all means, yes—the rewards are definitely worth it. You don't necessarily have to build a whole house to get the listening room of your dreams—add a room or modify an existing space. But go into it with your eyes open.

---

OTHER REFERENCES

In addition to this article, I recommend that you read two other articles about the listening room recently published in Stereophile: J. Gordon Holt's "In Search of the Hi-Fi House" (April 1990, Vol.13 No.4), and my own "Room Enough" (October 1991, Vol.14 No.10). Robert Harley's recently released book, The Complete Guide to High-End Audio—published by Acapella Press, (800) 848-5099—also contains a good chapter on acoustics, which goes into considerably more detail on room problems and their treatment than is possible here.

If you want to delve more deeply into the subject, F. Alton Everest's interesting and relatively easy to understand The Master Handbook of Acoustics is an indispensable reference. Published by Tab Books, The Master Handbook may be a bit difficult to find locally, but it's available through mail order from Old Colony Sound Laboratory or the Audio Advisor.

—Thomas J. Norton
THE SIMILARITIES END HERE.

Tube Line Stage Preampier Comparison Chart:

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*The information contained in this chart has been sourced from manufacturer brochures, reviews and physical examinations. It is accurate to the best of our knowledge. Sonic Frontiers, Inc. makes no warranty, either expressed or implied, as to the accuracy of this chart. Manufacturer specifications are subject to change. Contact them directly to confirm.

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No One Way to Play
BARBARA JAHN TALKS WITH CONDUCTOR RAYMOND LEPPARD

English conductor Raymond Leppard first came to musical prominence as a chorale scholar at Trinity College, Cambridge, in 1945. He soon succeeded Boris Ord as conductor of the University Madrigal Society. He composed, played, and directed music for Footlight Productions, appeared as piano soloist, principal viola, and occasional conductor of the University Musical Society, and became Principal Conductor of the Cambridge Philharmonic Society.

In 1952, Leppard was elected Research Scholar with a special interest in early 17th-century Italian opera. The following year he formed the Leppard Chamber Orchestra, making his first appearance at Glyndebourne in 1954 as assistant conductor and harpsichord player. Four years later, Leppard became a lecturer at Trinity College, and was appointed Music Director of the English Chamber Orchestra—a position he held for 11 years. He then spent several years as musical director of the BBC Northern Symphony Orchestra.

Raymond Leppard has made scores of recordings over the years, for Sony, Angel/EMI, Erato, London, Argo, and Philips, among many others. (J. Gordon Holt named Leppard’s recent recording of Vaughan Williams’s Sinfonia antarctica, for EMI Classics, a “Record To Die For” in the February 1994 Stereophile.)

Recently, in taking on the Musical Directorship of the Indianapolis Symphony, Leppard decided to divide his time more evenly between England and the States. I asked him about this.

Barbara Jahn: You left England in 1976. Why did you decide to do so when you were such a luminary in the field of early music?

Raymond Leppard: One never does anything for one reason. My parents had died recently, so I could do something. I had been several times to America and liked it very much, and although I was doing a lot of early music with the English Chamber Orchestra and at Glyndebourne, I’d already become old-fashioned in that area; the authentic movement was really underway and very successful, and I badly needed a change. I’d been to Santa Fe [to conduct at the Santa Fe Opera] almost every summer for several years and enjoyed it enormously. I’d gone down and worked with the New Orleans, St. Louis, and Houston orchestras regularly. I’d already gotten a sense that I could very easily slip into a non—early—music world, and it just seemed the right thing to do. I really didn’t think much more about it.

Jahn: And you had no specific position to go to?

Leppard: I had nothing but a very, very good agent who I discussed it with, and she was very enthusiastic. It worked straight away. I was working hard from the very beginning; from the economic point of view it was a perfectly sound decision. I was enjoying the music in England, but I was so typecast. And it still comes up all the time—I can’t quite escape from it; I suppose I never will.

Jahn: I was at University when your recording of Cavalli’s La Calisto came out on LP. I remember hearing the opening of Act II on the radio, and being absolutely stunned; I saved up for weeks to buy it. You really were an inspiration, introducing music that nobody had ever heard before.

Leppard: They were wonderful times. I wouldn’t have missed that world for anything, because working on those operas was one of the most rewarding things you could imagine.

Jahn: It was certainly a landmark in my musical development, and must have been for thousands of others, too. How did you feel when others took up the authentic movement?

Leppard: Well, the critics, having been very enthusiastic about the Monteverdi and Cavalli revivals, got a whiff of Harmonicon and those musicians in France, Germany, and Austria, and it was a bit discouraging to be seen as out—of—date. But I didn’t need or want to do battle over all that; there is no one way to play any sort of music, and so I was very much for it. But that didn’t matter as much as the fact that I really needed a change and couldn’t escape from it. My seven years [on non—Baroque repertoire] with the BBC Northern and 20th—century opera at Glyndebourne didn’t do a damn thing to change this typecasting.

Jahn: Do you think people wanted to see this change? Or did they want you to continue in early music but change your approach?

Leppard: I wonder. The ECO simply wasn’t the right instrument for that, nor is it now. [The English Chamber Orchestra uses 20th—century instruments.—BJ]

Jahn: Musicians are specially trained on authentic instruments now.

Leppard: Absolutely, and they’re doing wonderful work. But in those early days, there was some perfectly appalling playing—so out—of—tune and scratchy. There were certain aspects, certain sorts of style, that I thought dreadful. There was a sort of wah—wah style—every note had a crescendo and a decrescendo on it.

Jahn: Like Frans Brüggen’s recorder playing.

Leppard: It was absolutely extraordinary, but it infected quite a lot of people. They wanted to try it out.

Jahn: I agree. It had a great influence on me, although I was never quite sure that I liked it.

Leppard: It was fascinating to listen to—like being musically seasick. But by and large, nowadays, these modern players have become so expert and play so well—in—tune. I’ve listened to them over the years and learned an awful lot about articulation, phrasing, dynamics, and so forth. There’s no question that they’ve contributed a great deal to one’s understanding. For me, it’s been most revealing about Haydn, Mozart, and Beethoven—that period—because the question of articulation is crucial. But you still hear Klemperer and people of that generation—and, indeed, the unthinking people of my generation—phrasing and articulating Beethoven as if it were Brahms.

Jahn: I believe you do a large amount of classical repertoire with the Indianapolis Orchestra. I imagine you put these findings into practice.

Leppard: That’s exactly what’s happened. And the nice thing is that the Orchestra itself has got caught up in it. They are interested in how it affects the early Romanticism, too. It’s a striking thought, if you let it permeate right in, that the people who played for Beethoven actually played for Haydn, and they didn’t play for Brahms. You have to think of how those Viennese players were when Beethoven heard them; he couldn’t have changed a style of playing.

Jahn: But hearing this music on authentic instruments has brought

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home to me how it extended the boundaries of almost everything, not least the instruments. It sounds as if it's trying to burst out of its skin, and the instruments are only just coping. I find that very exciting.

Jahn: I wonder whether we are living in a time when we lack imagination, or if we are just more inquisitive. Museums in England have become much more intent on explaining everything to us—helping us to return to a particular time with the aid of commentaries, videos, smells, and sounds, rather than merely showing us artifacts. Isn't that what the authentic-instrument movement is doing—attempting to establish the period by reproducing as closely as possible the conditions of performance? It helps us to understand what was heard, even though we'll never be able to listen with 18th-century ears.

Leppard: I think it's been tremendously valuable, but I don't think it means it's the only way to do it. It's evidence of a current philosophy. When I grew up, people didn't go to museums in the thousands and millions that go now. So you ask yourself, "Why?" I think we can't get over the thought that bombs or germ warfare could destroy us in two seconds, and that's undermined an awful lot of the old philosophies and has made the past much more valuable. Because if you can respond to something of the past, then it means that that value has persisted, and that's a sense of confirmation that we are going to go on—we are not going to destroy ourselves.

That's why people are crazy to go and find things now, and museums have responded by making themselves much more seductive. But they are also lowering standards, because they are appealing to the lowest common denominator all the time. There was a time, as you say, when you'd go into a museum and you'd see a costume of 1820 and you'd then have to reconstruct the setting; without that, you wouldn't get much out of it. Now they are spoonfeeding us all. There are pros and cons, it seems to me.

But I think I know about the content of Bach without having to go through the authentic-instrument rigmarole. If I were to perform a B-minor Mass now, I would use all the accumulated knowledge that I've gained from listening to earlier-instrument performance, but I would prefer to translate that, as far as I could, into 20th-century terms of playing. Because finally the whole process of authenticity aspires to a sort of purity that can't actually be obtained. Everything conspires against it, and I'm a profound believer in compromise—it is something never to be turned away from, but is something to be embraced and profited by. I don't believe you can pursue purity in life or music or anything else. We really can't aspire to the condition of the Virgin Mary—it doesn't work. [laughs]

Jahn: Of course, the wonderful thing about music is that it doesn't exist as a museum piece. It exists as a score that only comes to life—

Leppard: —when you sound it.

Jahn: And composers must inevitably have adapted their performances to accommodate the forces available to them at the time.

Leppard: Sure, any composer would. But I'm not advocating that you play the B-minor Mass with an orchestra of 100. Yet Handel himself used huge forces on occasions. Just a few years after his lifetime, in a commemoration, Burney describes...how many thousands of people? An absolutely huge chorus. The history of *Actis and Galatea* is exactly a case in point: He describes a huge number, yet it was originally written for seven or eight players and five singers. That's all that's actually come down to us in manuscript, so it's a terrible problem when you start performing.

Jahn: So, in America, you too must make the most of what is available to you and sell your own orchestra, the Indianapolis, in the most attractive package possible.

Leppard: You might just as well pack up if you don't! It's a major business supporting an Orchestra—there's virtually no State money.

Jahn: Inventive programming, to draw your audience in, sounds a really good idea.

Leppard: Good gosh—terribly! The American system is very salutary, and it's given rise to a race of young composers who are being made to write music that can be performed within the schedule of a symphony; and what they write must be extremely practical, and must communicate. It may be difficult, but the good ones will say something that will grab an audience who'll want to come back and hear it again. Whereas in England...

Jahn: ...there is a lot of self-indulgence.

Leppard: I think so. And I think it's a waste of some major talents that we have. I find that true of Max Davies, Birtwistle—they are living in a cloud-cuckooland, whereas the young American composer has to toe the line to make it work. He has to say what he can in that limited amount of time, and if he doesn't communicate, he doesn't get another commission.

Jahn: Your composer-in-residence is David Ott.

Leppard: He's very bright, and his is a very particular style—you can recognize it. It's rather simple—not unlike, in its own time, Berlioz's music. It's a very strange gift, but he certainly communicates. We did three Beethoven concerts recently, and in each one of them I put some music written about Beethoven from another period. We had Liszt's orchestration of the slow movement of the "Archduke" Trio, and we did Corigliano's *Fantasy* on the slow movement of Beethoven 7, and then we commissioned the third piece from David about the Clara songs in *Egmont*; we did *Egmont* with narration in the first half, then David's pieces, which only lasted ten minutes, but they were terribly successful.

Jahn: We could do with that kind of thing in England.

Leppard: Surely. We also give eight "Studio" concerts a year, we open by taking, say, Shostakovich's First Violin Concerto, and I take a movement apart. With Beethoven's Fifth, I scored out a lot of the sketches—a lot of work, but it amused and very much intrigued people. We play a work to finish the first half, and in the second we play the work we've analyzed. We find this tremendously popular—the response is astonishing. People want that sort of education, and I think it's very important; we neglect it in England. It is our business to teach and make insight deeper. I can't see a reason for not doing it. It's not profound, but it gives the listener so much more.

**Authenticity Aspires to a Purity That Can't Be Obtained. It Doesn't Work to Aspire to the Condition of the Virgin Mary.**

Jahn: It's encouraging that people still want to learn.

Leppard: Isn't it? [laughs] I sometimes do a ballet in the first half—*Daphnis*, or *Act 1 of Romeo and Juliet*, or *Sleeping Beauty*—and I record a narration so that people know where they are. We even use lighting on stage.

Jahn: For *Daphnis*?

Leppard: Yes, it really was wonderful. Dawn actually was
Jahn: I suppose you could do that with colors in Messiah.
Leppard: Yes, absolutely; there are endless possibilities. But I have a feeling that London would be snooty about it.

Jahn: What is your Indianapolis audience like?
Leppard: It was an older audience. Our marketing people went into it; youngsters at school would come, and then, when they got married and had families, they would drop out—they probably couldn’t afford it. Then, in their mid-to late 40s, they’d start coming again and stay with us. Now the “Studio” concerts are bringing the young marrieds in—it isn’t the most expensive of nights, so it doesn’t cost them so much.

Jahn: Can you give chamber-music concerts too?
Leppard: Oh, yes. Within the Orchestra we have three groups who have a tremendous following. We encourage them by advertising in our programs; obviously, the more there is, the better.

Jahn: What is your hall?
Leppard: The Circle Theatre. It’s an old cinema that originally had stage shows, too—it’s about 70 years old, I think. They put boarding over all the seats in the stalls, and it’s really a stunningly good sound for recording. The orchestra is comfortable because it’s where they normally play.

Jahn: What are your future recording plans?
Leppard: We don’t have any. We shall have to leave Koss [Classics] if distribution doesn’t improve.

Jahn: Is the orchestra of like mind?
Leppard: Yes, they are very keen to get moving. The orchestral situation is such that you just can’t stay still—if you do, you sink.

Jahn: Does your audience buy your recordings?
Leppard: Yes, we sell an awful lot. Just to give you an idea of how loyal they are: We have an annual fund which largely comes from firms, but also from individuals; we raise $4,500,000 each year. We have an endowment of sixty-million dollar which all invested—locked away, nobody can touch it. We use the income. But some orchestras are badly in debt and are folding, like New Orleans. I’m giving them a week in September; they’re trying to raise their heads again, but unless you’ve got backing, it’s a very short-term life.

Jahn: So the ISO is safe?
Leppard: It’s never safe, but it’s certainly comfortable—it’s one of the few that is actually playing in the black. But we’re lucky because we’re smaller—only 87 or 88 in number.

Jahn: Are you happy in Indianapolis? Will you stay?
Leppard: [laughs] I don’t know. I’m enjoying Indianapolis because there’s such a lot of work still to be done. The excitement in watching its development is similar to what I felt with the ECO. And they’re excite, which is good. There is a great sense of endeavor. They are wonderfully good about doing things—they are very giving people. Even our local critic gives us money!

Jahn: He must be happy!
Leppard: That’s Americans—they’re great givers.

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Whenever anyone marvels at the enormous Genesis II.5 loudspeakers in my house, I'm quick to tell them that the II.5 is the smallest, least expensive loudspeaker made by Genesis Technologies. In fact, the company makes two larger speaker systems, the $33,000 Genesis II and the $70,000 Genesis I.1

Building such ambitious loudspeakers as the Genesis products is a risky proposition. Big loudspeakers often fail miserably—any flaw seems to be magnified by the loudspeaker's lofty aspirations—the bigger they are, the harder they fall. Moreover, the criteria for what constitutes good performance rises proportionally with the loudspeaker's price. For several tens of thousands of dollars, the loudspeaker had better deliver the musical goods.

I thus took delivery of the $22,000, half-ton Genesis II.5 system with a combination of excitement and trepidation. The excitement was over the prospect of having a world-class loudspeaker in my home; the trepidation was the very real possibility that the II.5 would have some unacceptable shortcoming. Because a loudspeaker of this ambition requires several months to fully evaluate (and because they're so hard to move), I knew the Genesis II.5s would dominate my system for some time.

The question was whether the II.5 would become a monstrosity I wanted out of my room as soon as possible, or a product that would become an essential part of my musical life. There would likely be no middle ground.

Description

For your $22 grand you get two 6'-tall, 28"-wide panels with integral twin dynamic bass drivers and a woofer power amplifier. The II.5 is a tall, thin panel in which three 1" round planar tweeters are mounted to the inside edge of a 4" ribbon midrange unit. This panel is flanked on either side by curved rosewood-finished "wings" that define the II.5's shape and size. A sealed box attached to the bottom rear of this assembly holds two 12" woofers—one front-firing, one rear-firing. The entire system rests on a flat, triangular-shaped platform. A narrow black grille covers the drivers, with a separate grille covering the rear-firing woofer.

The system has two controls on the rear of the woofer enclosure: one adjusts the midrange crossover frequency to the tweeters, the other controls the level of the single rear-firing tweeter. Input is via a pair of high-quality binding posts.

The II.5's woofer enclosure also has a Neutrik input jack for connecting the woofers to the Genesis servo amplifier, which is included with the system. (Servo-driven woofers are explained below.) Note that the Genesis woofer amplifier doesn't include the crossover for the midrange and tweeters. Instead, you connect the woofer amplifier to the II.5 via the dedicated cable, and drive the midrange and tweeters directly with an amplifier of your choosing. Your preamp, however, must have two stereo outputs: one pair to drive the woofer amplifier, one pair to drive the midrange/tweeter amplifier.

The Genesis is a true dipolar design, radiating energy to the front and rear of the loudspeaker. There is a single rear-firing tweeter to complement the ribbon midrange's inherent dipolar nature. Dipoles radiate sound in a cardi-
oid (heart-shaped) pattern both to the front and rear of the panel, producing a null at the sides.

Because the ribbon midrange is a line source, it has a very narrow vertical dispersion; it, radiates very little energy above and below it. The result is less reflected energy from the floor and ceiling. Dipoles are also different in that they require space behind them to work their best—the II.5s need to be placed well out into the room for optimum performance. Moreover, compared with a point-source box loudspeaker, the rear wall's acoustic properties have a greater influence on how a dipole will sound in the room.

As with Arnie Nudell's first loudspeaker design—the Servo Statik I of 25 years ago—the II.5 uses servo-driven woofers. A woofer servo operates by comparing the drive signal sent to the woofer with the woofer's actual motion. An accelerometer attached to the woofer's voice-coil sends a signal back to the servo amplifier via a custom cable supplied with the II.5. Differences between the drive signal and woofer motion are a form of distortion, and can be corrected electrically by modifying the drive signal. In essence, the servo system forces the woofer to behave in a predetermined way. In the II.5, only one woofer carries an accelerometer, with the amplifier assuming both woofers are behaving identically?

A servo system can also extend a woofer's low-frequency cutoff point, regardless of the enclosure size. Indeed, the II.5's woofer enclosure seems far too small for a pair of 12" drivers. In fact, the Genesis woofer in its enclosure has a resonance frequency of 70Hz. Without a servo system, the low-frequency extension would be severely compromised (a sealed enclosure produces a roll-off of 12dB/octave below resonance). As the woofer begins to roll off naturally, however, the servo system simply drives the woofer harder and harder to increase the system's extension. This is how the II.5 can achieve a -3dB point of 16Hz from such a small box.

This technique places extraordinary demands on the woofer and the power amplifier driving it, particularly at very low frequencies—the lower the frequency, the more current the servo amplifier must force through the woofer's voice-coil to produce an equivalent sound-pressure level. The II.5's woofers, designed by Arnie Nudell specifically for these rigorous conditions, are made of two aluminum cones bonded together with a damping compound. This "tri-laminate" design is reportedly so stiff that the cone is virtually impervious to flexing. With a whopping 2"-diameter voice-coil and a 30-lb magnet, the driver can produce excursions of a full inch. To further increase bass output, the II.5 system uses a total of four of these servo-driven woofers.

The midrange is a 4'-tall ribbon driver made from a 0.001"-thick layer of Kapton. The term "ribbon" as applied to the Genesis midrange is actually a misnomer; in a true ribbon, current flows through the diaphragm itself. The more correct term for the Genesis midrange is "planar magnetic," a design in which a conductor is bonded to the diaphragm. Despite the semantic distinction, the Genesis ribbon has all the advantages conferred by such low moving mass—primarily excellent transient ability.

Although the II.5's tweeter looks at first glance like a conventional dome tweeter, the driver is a custom flat-ribbon type designed by Arnie Nudell. This tweeter, used throughout the Genesis line, has a 0.0001"-thick diaphragm on which a conductor has been etched. As with the midrange, the Genesis tweeter is more properly called a planar magnetic driver.

Three tweeters are used in a vertical array to approximate the midrange ribbon's line-source radiation pattern. The top two tweeters roll off at 8kHz, with the bottom tweeter run out past 20kHz. The rear tweeter is wired out of phase (as you'd expect in a dipole), and thus helps propel more high-frequency energy into the room. The rear-firing tweeter has an acoustical output equal to that of the three front-firing tweeters combined. The bigger Genesis II uses 12 tweeters on the front, the Genesis I uses 20. In addition to approximating the ribbon's line-source radiation pattern, using multiple tweeters increases the system's dynamic range, clarity during loud passages, and sense of scale on musical climaxes. With the treble energy distributed over so many tweeters, the excursion of each of them is minuscule—they simply don't have to work as hard. Using more than one but less than many tweeters will, however, produce a strong lobing effect which will radically change the tonal balance at different listening heights.

The crossover frequency between the woofers and ribbon midrange is user-selectable from 70Hz to 125Hz via the remote control (the nominal setting is 85Hz). Note that this adjustment doesn't change the ribbon's low-frequency point, but only how far up the woofer goes. No matter what the crossover frequency, the woofers roll off at 12dB/octave to the midrange. The midrange cuts off at 4.2kHz with a second-order slope.

As you'd expect from a loudspeaker with this sophisticated a driver complement, the II.5's crossover is first-rate. The capacitors are custom-made foil-on-plastic film types (they weigh about ten times what a similarly sized conventional metallized film-type cap weighs), and use copper leads. The inductors are a unique copper foil type with multiple taps. These multiple taps provide a means of contouring the midrange's high-frequency rolloff to match the listening room's acoustic character. The II.5's rear-panel switch simply selects a different tap off the inductor—no additional components in the signal path.

The wings of the enclosure, which are made of 1.5" MDF and laminated with plantation-grown Brazilian rosewood, reinforce the midrange driver's acoustic output between 100Hz and 500Hz. The baffle on which the drivers are mounted is also 1.5" MDF, and the woofer enclosure is braced 1" MDF. Although you may be tempted to move the II.5s by grabbing their wings, you should push instead on the woofer enclosure.

The II.5's finish quality is absolutely gorgeous. The rosewood wings are beautifully made, and put the II.5 among the best-finished loudspeakers I've seen. In addition, the veneers on the four rosewood panels are cut from the same piece of wood to ensure that the grain matches—an expensive touch. However, the II.5 looks better from the front than the rear, which holds the black-painted MDF woofer enclosure.

Paul McGowan designed the servo amplifier. It has balanced and single-ended inputs, and a pair of custom jacks for connecting the 30' woofer cable to the II.5s. This cable, made by AudioQuest and terminated with Swiss-made Neutrik connectors, delivers power to the woofers and returns the accelerometer output to the amplifier. The servo system was designed around this cable, which is essentially removed from the equation by the servo action.

A front-panel LED display shows the amplifier's operating conditions. You can change the woofer drive level, system low-frequency extension, woofer high-pass frequency, and woofer phase (in 5°...
amplifier's circuitry, the developed very
When experienced review engineering ful
native large, limiting supply achieve channel.

The all–discrete amplifier uses a total of six pairs of 30A bipolar transistors to achieve a power output of 400W RMS/ channel. The power transformer is a large, 1.2kVA toroidal type. A unique limiter circuit senses when the power-supply rails begin to droop, then begins limiting the signal so the amplifier isn't overdriven. This is an innovative alterna
tive to protection circuits in series with the audio signal.

Overall, the Genesis II.5 is a serious engineering effort. The custom ribbon drive-units, servo-driven woofers, powerul servo amplifier, and gorgeous woodwork all reflect a commitment to making a world-class loudspeaker. The Gene
sis II.5 is the antithesis of crank-'em-out cones in boxes.

PROBLEMS

Despite this impressive build quality, I experi
cenced several problems with the review samples. First, an output transis
tor in the servo amplifier wasn't bolted to the heatsink, causing the amplifier to shut down after the first hour of use. When the transistor burned, it took out the rest of the output transistors for that channel. The second servo amplifier ran very hot, and shut down after playing for long periods at high playback levels. However, this happened only on hot days; I kept a fan handy for cooling down the amplifier during breaks in the listening.

Next, the left loudspeaker suddenly developed less treble energy than that of the right loudspeaker. The problem was a bad solder joint on a capacitor, which I fixed. Finally, about two months into the auditioning, an intermittent oscillation developed in the woofer's servo circuitry, making the woofers go crazy. Under Paul McGowan's instructions, I changed a resistor in the servo circuit (from 68k ohms to 75k ohms), which

fixed the problem. This was apparently a delicate aspect of the design, because the resistor was socketed for easy replace
ment. This woofer servo instability and the amplifier's tendency to shut down were particularly annoying, occasion
ing Musica interruptus at the most inop
portune moments.

These bugs have reportedly been cor
rected in later production (I got one of the first pairs made)—the servo amplifier now has larger heatsinks located inside the chassis, and the servo loop has been stabilized. Nonetheless, I would not have been happy had I spent $22,000 and experienced these problems.

SYSTEM

At the time of writing, I've been using II.5s for the past five months, auditioning them with a variety of equipment. With
out question, the best amplifiers for the II.5s were the superb Audio Research VT150 tubed monoblocks (reviewed in Vol.17 No.8). When relieved of driving the woofers, the VT150s could really sing. It was almost as if these products were made for each other: the II.5s were particularly adept at resolving things the VT150s do so well—eg. depth, space, truth in timbre, and layering. After trying solid-state amplifiers, I recommend tubes for the II.5.

Preamplifiers included the Sonic Frontiers SFL–2, Audio Research LSS and LSS Mk.II, and the Mark Levinson No.38. The analog front-end consisted of a Well Tempered turntable and Lary Pederson's highly modified WTA, fitted with an AudioQuest AQ7000nxsx car
tridge. The turntable sits on a Marigo Turntable Isolation System and Motor Terminat
or Kit, then on the sand-and
lead-shot-filled Merrill Stable Table. The

turntable is further improved by the Black Damped Platter, a Marigo turntable mat, and a Marigo Well–Damped Arm Clamp. The turntable output feeds the superb Vendetta Research SCP2B phono stage.

Digital sources included the Adcom GDA–600, Mark Levinson No.30 and No30.5, Sonic Frontiers SPD–2, and the HDCD–fitted Pink Triangle DaCapo (reviewed elsewhere in this issue). The transport was primarily a Mark Levinson No.31, connected via an Audio Alchemy DTI Pro and/or Sonic Frontiers Ultragi
terBug. Digital interconnects included AudioQuest Diamond x3 (balanced),
NBS, WonderLink balanced, Ensemble DigiFlux, and generic ST-type optical cables. At the request of Genesis, Trans
parent Audio sent me a pair of their Ultra
cables for the II.5s, along with two pairs of balanced interconnects. Other inter
connects included AudioQuest Dia
mond and the newest iteration of TARA Labs RSC (both balanced). Unbalanced interconnects were Magnan Type V and
Monster Cable's Sigma.

Because I recently moved, I had the opportunity to hear the II.5s in two rooms. My old room was 14.5' by 21', with a high, sloped ceiling. The new room is 21' long, 17' wide, with one side open to the rest of the house. The ceiling isn't vaulted, but has two recesses that give it three slightly different heights. The new room is much more live acous
tically, which I've found to improve soundstaging. In addition, the larger size allowed the II.5s to develop deeper bass.

On the down side, the new room's bass isn't as smooth or articulate as that of my previous room, which was built from scratch with optimum dimensional ratios for room–mode distribution. Loudspeaker placement is more critical for bass coupling in the new room, but the soundstage is wider and deeper, partic
ularly with diopes. Adding absorptive material behind the II.5s greatly improved their soundstaging, and ASC's Tower Traps in the corners and behind the loudspeakers smoothed the bass and increased soundstage width and depth.

MUSIC

With the II.5s properly tweaked in, their sound was absolutely stunning. This loudspeaker does things only hinted at by conventional designs—even those costing several tens of dollars. In every listening session, I heard things in my favorite music that went unres
olved by lesser loudspeakers.

The dynamics of the II.5s are unlike any I've heard from other loudspeakers. The II.5s were able to handle huge dynamic contrasts, with a sense of effort
lessness on musical peaks. It's not just that the II.5s played loudly, but they were able to resolve the smallest of musical details and present the crescendos of a symphony orchestra at full tilt with life
like levels. Moreover, the II.5s presented a sense of immediacy, slam, and sheer physical force that made listening to music a visceral experience—just like you get from the live event.

What's more, the II.5s didn't sound strained, congealed, or flat when pushed hard. Rather, they reproduced the most demanding passages with such ease that it seemed they weren't even being stretched. At no time did the II.5s show any sign of reaching their dynamic

4 The problem of the servo amplifier shutting down dis
appeared when the ambient temperature was lower than
70°F, and should be solved altogether by the revised amplier's external heatsinks.

5 Jason Bloom of Apogee recently set up a pair of his $1995 Slant 6 loudspeakers in the new room. Watch for a full review of this promising dipolar dynamic/ribbon hybrid.
The limits—even with such very challenging recordings as Pomp and Pipes (Reference RR-58CD) played back at high levels. These loudspeakers were made for full-scale orchestral music played loudly.

The wide dynamic window in which the music could express itself was greatly enhanced by the II.5's bass performance. Until you've heard four 12" servo-driven woofers with 800W behind them, you don't know what you're missing. The bass had unbelievable extension, power, authority, and, importantly, control. It's not that difficult to achieve high sound-pressure levels in the bass, but making that bass tight, controlled, and articulate is another story. The II.5s not only produced very high output at the lowest frequencies, but were punchy, quick, and had an excellent sense of pitch. Listen, for example, to the organ-pedal tones on Requiem (Reference RR-57CD) or Pomp and Pipes to hear how the II.5s don't just generate low frequencies, but musical notes.

The II.5s also excelled on music in which the kickdrum and bass guitar work together to drive the rhythm. So often, the kickdrum's dynamic envelope gets lost in the mush at the bottom end. Through the II.5s, the drum's transient attack cut through the bass line, greatly adding to the music's rhythmic intensity. I could feel the impact of bass drum through the listening seat and in my gut. The II.5s weren't as quick and articulate as other loudspeakers that have a slightly underdamped alignment, but their sense of weight and authority made up for this shortcoming.

Fortunately, the user has considerable control over the II.5's bass via the woofer amplifier's remote control. By adjusting the woofer level, how far up in frequency the woofer is driven, and the bottom-end extension, you can dial in a wide variety of bass presentations to match your room, tastes, and musical preferences. Raising the crossover frequency adds midbass fullness, but sounds bloated if set too high; with the crossover frequency set too low, the midbass is lean, the low bass disproportionately strong. This crossover-frequency adjustment is critical to achieving good integration between the dynamic woofers and midrange ribbon.

The woofer-level control has fine enough gradations to match the bass level with the rest of the spectrum. These three controls interact with each other and with the room and loudspeaker positions to produce a large variability in the system's low-frequency reproduction. Moreover, the woofer high-pass control allows one to adjust the bass extension from 16Hz to 32Hz; it's possible to roll off the extreme bottom end to match the bass and midbass. The optimum settings can only be determined by experimentation: be prepared to spend lots of time getting the bass of the II.5 just right.

One criticism of the Infinity IRS [designed by Arnie Nuell with Cary Christie—Ed.] was that it made every instrument sound big. Yes, the IRS conveyed the size and scale of an orchestra better than any other loudspeaker, but it also exaggerated the apparent sizes of voices and acoustic guitars, flutes, and other small instruments. Fortunately, the II.5s have a much wider range of image size. The acid test for me is Sheffield's stunning direct-to-disc Michael Neuman, Classical Guitarist LP (Sheffield Lab 10). When reproduced correctly, this recording has an uncanny ability to make you think a guitar is actually in the listening room. The instrument should be a compact image exactly between the loudspeakers, surrounded by a gentle acoustic. The II.5s were remarkable in their ability to throw a perfectly focused, pinpoint image between the loudspeakers.

Another recording that reveals bloated images is Michael Newman's and Laura Oltman's Tango Suite! Music for Two Guitars (MusicMasters 7071-1-C). Through the II.5s, the two guitars were perfectly proportioned, appearing as tight images between the loudspeakers. Al DiMeola's, John McLaughlin's, and Paco DeLucia's Friday Night in San Francisco (Columbia CK 37152)—another great, but very different, acoustic guitar recording—has much more space and ambience than the other records, and the images tend to be bigger. The II.5s beautifully portrayed the spatial differences between these recordings. The guitars on Friday Night bloomed within the recorded acoustic, with a huge sense of the ambient halo surrounding the images.

Overall, I was impressed by the Genesis's ability to present a wide range of image size—from the compact image of acoustic guitar to the vast space captured on Keith Johnson's superb Reference recordings of performances made in the Meyerson Symphony Center in Dallas. The soundstage was always well-focused and coherent, and consistently contained a wealth of information about a recording's spatial characteristics.

The II.5 provided the most realistic reproduction of acoustic guitar I've heard to date. It's so difficult for dynamic drivers to reproduce the steep leading-edge transient of this instrument. The usual result is a removal of the edge one hears from the live instrument. Conversely, the II.5's ribbon drivers not only correctly conveyed the suddenness of the transients, but didn't hang over to interfere with the sound produced by the body of the guitar.

Similarly, Latin-flavored music was more exciting and upbeat when the percussion was reproduced without the transient slowness inherent in many loudspeakers. What was most remarkable, however, was that this transient speed, zip, and detail never sounded etched or analytical. Some loudspeakers achieve a quick and detailed sound by hyping transients—a quick recipe for a headache and listener fatigue. The II.5 was anything but forward, hyped, etched, or analytical. Instead, transient detail was presented in a natural and unfatiguing way—like you hear from live music. The II.5's sense of vividness without etch was unprecedented in my experience.

These qualities helped to produce a sense of realism of instrumental timbre. The fine inner detail that contains so much information about the instrument's sound was beautifully resolved by the II.5. This palpability of timbre was best expressed by my brother Steve after listening to Frank Zappa's Yellow Shark (Barking Pumpkin R2 71600): "It sounds like the bass clarinet are in the living room." (Steve has a degree in music composition.)

The II.5's remarkable transient ability combined with its explosive dynamics to fully realize the impact of a drum kit. Listen to the terrific snare-drum sound on Michael Ruff's Speaking in Melodies (Sheffield Lab CD-35), particularly on track 11. The instrument's huge sense of snap and punch on the II.5 sounded more like the live instrument than I've previously heard from any other loudspeaker system. Also, the drums on John McLaughlin's "Belo Horizonte," from his Qué Alegría LP (Verve 837 280-1), started and stopped so suddenly, and had such wide dynamics, that I almost forgot I was listening to loudspeakers.

The soundstage of the II.5 system was absolutely spectacular—wide, deep, layered, and transparent. In fact, when the II.5s were tweaked just right, and fed by topnotch source components and amplification, they produced the most spectacular soundstaging I've heard from a hi-fi system. The sense of a huge acoustic existing in space before me was so real that I found myself instantly accepting this artificial reality. Some loudspeakers make you work a little to believe their illusion of soundstaging; the II.5s compelled me to believe I had been transported to the original acoustic event. For example, the voices on Requiem floated
in air within the acoustic space, totally detached from the two electromechanical contrivances that reproduced them.

Moreover, the II.5's resolved space to an extremely fine degree. The spatial relationships between instruments, discrete reflections, and reverberation were portrayed with razor-sharp resolution. Every aspect of the sound was laid out before me with clarity and precision.

Some of the credit for the wonderful sound I was getting goes to the source and amplification components, particularly the Audio Research VT150 monoblocks and Mark Levinson No.30.5/31 DAC/transport combination.

Caveats
As much as I liked the II.5s, I must list a few caveats for potential purchasers. First, the II.5's tonal balance changed considerably with listening height. A normal listening axis 36° from the floor resulted in a treble rolloff and lack of air and extension. You need a fairly high seat to get the best from these speakers. You can compensate for this treble rolloff with a slight toe-in (or by tipping the loudspeakers forward slightly), but the result isn't as good as no toe-in and a listening height of at least 40°.

Second, the II.5's ability to reproduce frequencies down to 16Hz reveals any spurious low-frequency noises in a recording. Thumps, door closings, and air conditioners not even heard on other loudspeakers suddenly become distractingly audible through the II.5s. A good example occurs at 1:49 into "Dog Breath Variations," from Zappa's The Yellow Shark. Raising the II.5's low-frequency limit (from the remote control) to 25Hz still produced deep bass, but ameliorated some of the distracting noise. Interestingly, the outer edge of the soundstage space contracted slightly when the bottom half-octave was removed.

Another difficulty that arose from the II.5's tremendous ability to deliver lots of very low bass was that the room could become overloaded. Resonances became more pronounced, making loudspeaker positioning much more critical. The smaller the room, the greater the problem. In my moderate-sized room, the II.5s had some lumpsiness that I couldn't get rid of. ASC's Tower Traps helped considerably, but I never got as smooth a bass reproduction in my new room as I used to in my old room. Extensive experimentation with loudspeaker placement is essential to getting the smoothest bass from the II.5.

Measurements
John Atkinson measured the II.5s in my new listening room—a much easier proposition, given the system's weight, than trucking it to the test lab in Santa Fe—and was therefore only able to perform a limited set of measurements. The II.5's impedance magnitude and phase angle are shown in fig.1. Note that this plot is of the midrange and tweeter section only—not the woofers. The minimum impedance is 3 ohms through the top octave, with a slightly higher 3.8 ohms or greater through the rest of the band. The combination of the phase-angle and the impedance magnitude in the crossover region to the woofer is fairly demanding but should not cause high-quality amplifiers any problems. Below 100Hz, we can see the impedance rise as a result of the high-pass crossover elements. Overall, the II.5 presents a moderately easy load for the amplifier because the power amplifier is relieved of the burden of driving the woofers.

Fig.2 shows the nearfield responses of the woofer and midrange. The effect of the woofer amplifier's low-pass adjustment can be seen as the two divergent traces in the woofer response. This is a fairly wide range of adjustment, changing the woofer's output by a full 6dB at 100Hz. This is exactly what I'd expect from the listening: increasing the woofers' high-pass frequency added midbass, but if set too high produced less good integration between the point-source woofer and hemispherical midrange. Measured in the nearfield, the ribbon midrange appears to peak at the lower end of its passband, exhibiting a 3dB rise just before it rolls off. This could well be a measurement artifact. Note, however, the woofer's astonishing bass extension, with sub-20Hz response.

The II.5's response measured at a distance of 45°, a height of 46°, and 10° off the axis on the tweeter side, is shown in fig.3. (The II.5's response on the central tweeter axis, not shown, features a null at the crossover between the midrange and tweeters. The outputs of the ribbon and tweeter array actually add in phase to the side, the normal listening position with no toe-in, with a smooth transition between them.) The excess treble will be less evident at a normal listening axis of 42°--44°—the II.5 sounds as though it has too much treble if you sit too high (which is difficult to do).

Moreover, the apparent depression through the entire midrange is a function of the necessarily close measurement distance. Although the woofer and tweeter obey the inverse square law (a reduction in sound-pressure level of 6dB for each doubling of distance away from the source), the line-source ribbon midrange's cylindrical radiation pattern causes an output drop of only 3dB with each doubling of distance. Consequently, the II.5's midrange balance will be distance-dependent. Note that this measurement was taken at a distance of only 45°—far closer than any practical listening distance—due to the need to suppress the contribution of the room as much as possible.

The II.5's significant variation in tonal balance with listening height is confirmed by fig.4, the II.5's response change up and down the vertical axis. The response on the 46°--high axis (the center tweeter) has been subtracted from all the curves, thus appearing to be a flat line; the other plots are therefore the deviation from the 46° response. The traces are, from top to bottom, measured at 54°, 50°, 46°, 42°, and 38°. As you move below 44°, the mid--treble drops, giving a dull balance. I sat on pillows to get the correct treble balance, which brought my ears...
up to about 44". Two inches here make a big difference. Interestingly, listening height affects the mid-treble, not the top octaves as you'd expect.

What is most important is how the speaker measures at my listening seat. JA took the in-room response for each II.5 at my listening position with the speaker controls set at their normal listening positions. The average of the two curves is shown in fig.5. (The in-room balance of the pair was very closely matched throughout the midrange and treble.) The response is smooth and flat, but with an overall tendency toward an up tilted bass and a downtilted treble. Loudspeakers that measure flat tend to be too bright, in my experience. The curve could be summed up as "flat, with lots of bass," which corresponds to my overall impression of the II.5.

Fig.6 is the II.5's impulse response measured on the center tweeter axis at a distance of 1m. The II.5's non-time-coherent nature is confirmed by fig.7, the step response. The tweeter's output (the first spike) leads that of the midrange (the second hump), which is also significantly ahead of the woofer.

The cumulative spectral-decay, or waterfall, plot (fig.8) is excellent. The loudspeaker decays very quickly and cleanly. A slight resonance can be seen at 1500Hz, but this is inconsequential. This is one of the better waterfall plots I've seen.

Finally, I caution you about reading too much into the shapes of the curves presented here. The II.5 is very different from conventional loudspeakers, and its measured performance will change radically with the test setup. Of all the measurements presented, fig.5 comes the closest to representing the loudspeaker's perceived balance.

CONCLUSION

The Genesis II.5 loudspeaker system restored to reproduced music many elements missing from the presentations of other loudspeakers. Specifically, the II.5's dynamics, bass power, extension, and ability to play loudly without strain were simply astounding. Quite apart from these qualities, the II.5 excelled at presenting natural timbres, fine musical detail, and portraying transients with life-like speed and zip. The II.5 was remarkable in that the sound was vivid and highly detailed without being etched—a rare balance. Finally, the II.5's soundstaging was spectacular.

On the down side, the II.5's prodigious bass output can overload many rooms. The bass had a tendency to be weighty and lumpy rather than lean and tight. Careful placement—and optimum tuning of the woofer amplifier controls—is essential to minimizing the II.5's potential bass liabilities. A high listening position is also a must: the typical 36° listening height is just too low for the II.5 unless you sit a long way away.

Nonetheless, the Genesis II.5's unique musical abilities put it at the top of my list of under-$30,000 loudspeakers. In my opinion, these speakers are significantly better in many respects than some highly regarded products in the $15,000–$20,000 price range. If you're shopping for $15,000 loudspeakers, you must audition the II.5 and consider revising your budget. Considering what they do musically, the II.5s are a bargain.

The Genesis II.5s have been a musical revelation for me. This loudspeaker will keep you riveted to the listening seat, playing record after record, CD after CD. If you can afford them (along with the level of source components and amplification needed to realize their full potential), you may come to regard the Genesis II.5 as I did: as an essential part of your musical life.

Stereophile, January 1995
The once-doing infinitely and past per and The Infinity take where building consultant Molded planted. One years, has 1" in its ready-to-crank the Infinity, as Christie and Infinity have been working on for the past several years.

The Epsilon is a massive yet sleek one-box loudspeaker which makes use of updated drive-units that echo longstanding Infinity design concepts: planar drivers and servo-controlled woofers. Its 150 lbs per side seemed like more as we unboxed and wrestled it into my listening room. The Epsilon doesn't take up much floor space, and looked reasonably sleek once in its ready-to-crank position, but it definitely doesn't take easily to being moved once it's set up—and this has as much to do with sound as with size.

Design
The Epsilon's bass chores are handled by a heavy-duty 12" driver with a 3-lb ceramic magnet, over-large (8") spider, 1.5"-long voice-coil, and greater-than-1" peak-to-peak excursion capability. The cone is composed of Injection Molded Graphite—a combination of oriented graphite fibers and polypropylene which, according to Infinity, provides an optimum blend of strength, rigidity, mass, and damping. This driver is mounted in a relatively small sealed enclosure. To get the desired extension and low-bass distortion, a servo feedback network is used. But while an amplifier is an integral part of most servo subwoofer designs (as in Velodyne, Genesis, Mirage, and earlier Infinity designs), the Epsilon requires separate woofer amplification. This is a mixed blessing, as we shall see.

The Epsilon system includes both a Servo Control Unit (SCU) and cables to link the SCU to a special input on the back of the speaker cabinet. This in turn is connected to an internal servo network which is linked to an accelerometer mounted at the apex of the woofer's cone. The accelerometer senses the motion of the cone, which is then compared with the amplifier output. If the two disagree, a correction signal is generated by the servo, which not only lowers bass distortion, but boosts the bass output to correct for the typical low-bass rolloff found in any real-world loudspeaker/cabinet configuration.

The system preamplifier's outputs are connected to the SCU inputs; outputs from the latter feed the amplifiers for the woofer and the top-end sections of each loudspeaker (fig.1). The Epsilons must be bi-amped, therefore. The signal destined for the woofer amplifier is low-pass-filtered and modified within the SCU, as called for by the Servo Control system. The full-range and unmodified top-end amplifier also passes through the SCU, but only as a hookup convenience. The crossovers for the upper-range drivers are passive, and located within the Epsilon's enclosure.

The upper-range drivers that take over from this Servo-Controlled woofer at 150Hz are similar in design to the EMITs (ElectroMagnetic Induction Tweeter) and EMIMs (ElectroMagnetic Induction midrange) of past Infinity high-end designs. But both the drivers and their applications have undergone considerable refinement and modification. Their diaphragms are made of laminates of polyimide film, pressure-sensitive adhesive (with damping properties), and an etched, aluminum voice-coil. The
EMIT and L-EMIT drivers are about 1½ times the thickness of a human hair; those of the EMIT are less than half that. The EMIT also incorporates a specially developed fabric acoustic filter for smooth horizontal-dispersion characteristics.

Though many audiophiles are fans of dipole–radiating loudspeakers, this type of design has its problems: placement sensitivity, dipolar cancellation of low frequencies, and frequency-response anomalies resulting from the rear radiation as it bounces off the front wall, then combines in a time-delayed fashion with the output from the front. Infinity avoids or minimizes these problems by absorbing the rear radiation of the naturally dipolar EMITs and EMIMs—a technique they first used in the Renaissance loudspeakers. The entire top half of the cabinet, above the sealed-subwoofer enclosure, is an open baffle filled with absorbing material designed both to damp the rear radiation and prevent it from reflecting through the thin, low-mass laminate diaphragms. The sole exception to the monopolar, front-radiating design is in the mid- and upper treble; a second EMIT is mounted at the top and rear of the enclosure to enhance the speaker’s power response in the upper two octaves.

The Epsilon’s cabinet is substantial. The woofer enclosure is made of high-density fiberboard: 1” thick, except for its 3”–thick (!) front baffle, a thinner, vertical extension of which is used to mount the remaining mid- and upper-range drivers. This sub–baffle is moderately sculpted and covered with acoustic felt to minimize diffraction. The front baffle is framed in an attractive Santosa Palmander wood finish resembling rosewood. The grillecloth isn’t readily removable.

According to Infinity, premium–quality parts and high–quality internal cabling are used in the crossover network. Each driver has its own isolated, glass–epoxy crossover circuit board. A unique aspect of the Epsilon’s design is the use of two 9V batteries per loudspeaker to bias the output circuits of a series/parallel set of capacitors in the tweeter network; this is said to noticeably improve the top end. The battery bias is applied through a high (5 megohm) resistor, limiting the demand on the batteries. As a result, the batteries’ active life expectancy is equivalent to their shelf life—about two years.

The Epsilon’s rear panel has two pairs of top–quality WBT input jacks, and control switches to adjust the relative balance of the EMITs (three positions) and EMIMs (two positions each). The audible effect of these controls—specified as no more than 1dB—is subtle but significant. Less subtle but no less important are the three controls provided on the SCU for overall woofer level, bass contour, and midbass contour.

The Epsilon’s large, adjustable feet cover equally heavy-duty spikes, which should be used except where there’s risk of damage to tile or wood floors. Large locking rings, which secure the feet or spikes after the loudspeaker is leveled, are the best-thought-out such devices I’ve ever seen.

SETUP

Connecting all the pieces of the Epsilon system—SCU, amplifiers, and loudspeakers—while a bit complex, is fairly straightforward. Nevertheless, you must know with absolute certainty the polarity of the amplifiers driving the subwoofers—whether or not they invert phase or, in the case of the balanced hookup, which pin is referenced as positive. A switch on the back of the SCU is set by the user or installer to correspond to the non-inverting or inverting nature of the woofer amplifiers. If set incorrectly, the feedback loop won’t operate properly, possibly resulting in damage to the loudspeaker, the amplifier, or both.

Needless to say, the gains of the left and right upper–range amplifiers must be closely matched; the same is true for the woofer amps. But it’s also important that the gains of the woofer and upper–range amplifiers be within 6dB of each other, or adjustable to within that range. Controls on the SCU can compensate for up to 6dB of gain difference between these amps, but no more. In addition, the voltage gain of the woofer amplifiers must also be within the 21–39dB range for proper setup—which includes almost all available power amps.

I encountered four problems in my efforts to get all of this right. First, the manual states that you can use any combination of balanced and unbalanced cables. Specifically, it should be possible to run balanced cables from the preamp to the SCU and unbalanced cables from the SCU to the amplifiers (or vice versa). Not so. When I first set up the Epsilons, I used exactly that configuration, and the bass was oppressively dominant. What was probably happening was that the internally bypassed connection for the top–end amplifiers was linking only one leg of the SCU’s balanced input to its unbalanced output, negating any balanced–link gain advantage there. At the same time, the SCU’s low–pass, active woofer circuitry was making full use of the potential 6dB–greater gain available with a balanced input. I cured the problem by using an all-balanced setup.

I originally intended to use two KSA-300Ses to drive the Epsilons, but the second problem resulted from my attempt to use a Krell KSA-300S to drive the woofers. In the Krell, the output stage’s bias current is adjusted to progressively higher plateaus, depending on

1 The current running through this flat, etched voice–coil inductors with magnets placed on both sides of the film to cause the diaphragm to vibrate.

2 While the woofer amplifiers will likely be different from the upper–range amplifiers, I can’t imagine anyone paying $14,000 for these loudspeakers and then using different amplifiers on the left and right channels.
demands of the program material. Circuitry within the amplifier "anticipates," almost instantaneously, the need to raise the bias. The woofer servo feedback loop, however, was immediately forcing the bias level on the Krell bass amp up to its maximum level, accompanied by alarming excursions of the woofer cones. It's possible that the action of the servo circuitry was hyperactively triggering the sensing circuits in the Krell that adjust its bias upward. I understand that Infinity is working with Krell to fix this incompatibility.

For most of my listening, therefore, I used a pair of Classé M-700 monoblocks to drive the Epsilons' woofers—and here encountered the third problem. After setting up the SCU for the appropriate gain using the rear-panel control, as described in the owner's manual, I fired up the system, only to be greeted by a crescendoing squall from the woofers. I killed the power to the amps before any damage was done. The problem was cured by backing off the SCU's rear-panel control by several decibels below the recommended value.

A fourth problem—the source of which I hadn't yet determined at the time of writing—involved externally triggered transient spikes in the woofer circuitry, which I discovered when I turned on the fluorescent lights in the kitchen and heard a pop from the Epsilons' woofers in the listening room—15' away, and on a different electrical circuit. I dashed into the listening room and found the woofers pumping back and forth in large (but fortunately progressively damped) excursions. I noted the same phenomenon when I turned on the overhead fan or plugged in a lamp in the listening room itself; and, to a lesser degree, when I touched the equipment rack and disipated a small static charge. In the year that I've been using this listening room I've never encountered any such power or static-related problems.

All of this means that you should be prepared to lean a bit more heavily than usual on your dealer in choosing appropriate associated components for use with the Epsilons, and in setting the whole thing up. In fact, my most serious reservations about the speakers are about this very complexity of setup. None of these "problems" would likely exist had the system been designed and furnished with a dedicated bass amplifier.

This would, of course, result in an increase in price, and the amplifiers would have to be designed to handle high sound levels in a large room. While Infinity's decision to allow the user to provide the bass amplifiers is defendable, there's no denying that it puts significant demands on users and dealers if the system is to perform as designed.

**SYSTEM**

I listened to the Epsilons with the Krell KPS-20i CD transport feeding a Mark Levinson No.35 D/A converter through Kimber AGDL digital coaxial cable. TARA Labs Master RSC (unbalanced) connected the Levinson converter to a Rowland Consummate preamp. Amplifiers were a Krell KSA-300S stereo amplifier for the midrange and top end, and a pair of Classé M-700 monoblocks for the bass. I briefly used an NAD 208 and Krell KSA-300S for the bass, and a pair of Pass Laboratories Aleph 0 monoblocks for the mids and highs—when I was able to try them away from DO, whose review of them will appear in an upcoming issue. Interconnects and speaker cables included balanced Monster M-1500 from preamp to SCU, balanced Cardas Hexlink from SCU to top-end amp, balanced Aural Symphonics from SCU to bass amps, and Monster M1.5 from amps to loudspeakers. The M1.5 alternated on the top end with a pair of Monster Sigma loudspeaker cables.

**SOUND**

The hardest loudspeaker to review is the one that's difficult to criticize. The Epsilon is, for the most part, hard to review.

Compared with the Energy Veritas v2.8, the Infinity sounded less airy, open, and spacious. The Energy sounds more majestic, with greater "bloom"—certainly due at least in part to its more-than-generous bottom end—and every bit as dynamic as the Epsilon; perhaps even more so. The NHT 3.3 has, subjectively, the deepest, most potent, extreme bass of the speakers that have spent time in my listening room. The Epsilon does have some dynamic limitations at the very bottom end on the most demanding program material, a point upon which I will shortly expand.

Yet it's the Epsilon to which I would turn, without question, if I wanted to know what's going on in a recording— and if I wanted the most accurate, uncolored bass and midrange, and the cleanest, most pristine, least "electronic"-sounding treble. Thanks to its wide range of available adjustments (particularly for the bass), the Epsilon is the most likely of the three speakers to sound its best in a variety of rooms.

I haven't always been a fan of Infinity using planar midranges and tweeters in their loudspeakers. I've always liked the generally open, exciting, punchy sound, but hadn't particularly cared for the usually too-crisp, etched quality. The latter is not a quality of the Epsilons. In fact, when I heard the prototypes at last year's Winter CES, I was underwhelmed. If anything, they were too closed-in and lacking in openness. I'm happy to report that this is also not evident in the production version.

From the upper bass to the top treble, the Epsilon's balance was just about spot-on. Instrumental textures and timbres flowed naturally and easily. For example, the dynamics on David Buechner's superb recording of Gershwin solo piano works (Connoisseur Society CD 4191) were first-rate, the balance had just the right degree of warmth, and the whole was wrapped in the natural acoustic of the recording. The top-end balance was close to perfect, with a realistic but not overdone sparkle. From the natural woodwinds and brass on Stravinsky's *Elong Concerto* (Reference RR-55CD) and the metallic, crisp percussion and more gutsy brass of the Eastman Wind Ensemble on the Mercury Living Presence *Hands Across the Sea* album to the clean, thrilling buzz and snap of guitar strings on David Wilcox's *Home Again* (A&M 75021 5357 2), the Epsilons presented a wealth of natural, unhyped detail.

Voice was also extremely well-served by the Epsilon's natural, uncolored midrange. From Mary Black to Cyndee Peters, Gordon Lightfoot to the King's Singers, the presentation was realistic and convincing. Not that all such recordings are beyond criticism over the Infinitys. The Epsilons didn't exaggerate excessive sibilance, but neither did they hide it. For example, for all its well-deserved audiophile popularity, I find that Holly Cole's voice on *Don't Smoke in Bed* (Manhattan B212Z-81198) hews too closely to the well-worn "eat the microphone" syndrome; though far from the worst I've heard, the sibilants are just too hot. The Epsilons brought this out, but without adding any apparent editorial comment of their own. Nor were all male vocals free of chestiness. Again, on the best recordings, where the miking has been done with some intelligence, the balance of the Epsilons was excellent.

The Epsilons' soundstage was wide and reasonably deep. I've heard more precise soundstaging from small, narrow-baffled boxes, but the spatial perspective of the Epsilons, if not absolutely pinpoint, was nevertheless realistic. When I began my listening, I aimed the Epsilons almost straight ahead, with only a small toe-in. The soundstage was wide enough, but lacked the sort of specificity I prefer. I ended up toeing them in con-
Epsilons considerably, despite Infinity's claim that the Epsilons are less likely than other loudspeakers to need this. As usual, this too-increased the center-stage focus at some sacrifice to soundstage size—a tradeoff that I don't mind. In this context, however, image width and depth were fine—especially on recordings recorded with an ear toward a believably layered, dimensional sound (eg, the Connoisseur Gershwin disc, and the Sneakers soundtrack, Columbia CK 53146).

The Epsilons driven by the Pass Aleph 0 single-ended, solid-state monoblocks continued to sound remarkable. While my auditioning with the Alephs was too brief for me to state definitively whether I preferred them to the Krell KSA-300S in this application—the Krell certainly left little to be desired—the former did appear to be incredibly fine amplifiers. They do run very hot, however—one shut down twice after several hours of use—but were easily reset by merely being turned off, then on again. Perhaps setting them up side-by-side resulted in a bit too much heat buildup, though they otherwise had plenty of ventilation.

The overall performance of the Epsilons, from the upper bass to the top of the treble, was nothing less than superb. If I could criticize anything, it might be that slight lack of spaciousness at the very top of the treble range. But the Energy Veritas v2.8s produce enough space to let the Starship Enterprise reach warp speed; had I not been listening to them extensively just prior to the Epsilons, it's unlikely that I'd have thought this quality worthy of comment.

**THE BASS, THE BASS**

At its best, the bass performance of the Epsilon was absolutely stunning. With the best material, it combined tightness with extension in an extremely rare manner. I found no better example of this than the Patriot Games soundtrack (RCA 66051-2), on which the Epsilons sounded wondrous—I don't know any other word to describe them. As before, the top end was clean and detailed without any artificiality not present in the recording, and the midrange was open, transparent, and uncolored.

I've heard this recording numerous times—occasionally with more deep-bass extension to below, say, 30Hz—but never have I heard it with this much tightness and sheer punch. The first drum whacks in "Attack on Ryan's House" set me back in my chair. The Epsilon simply excelled at this sort of percussive impact. Bass drum on the best recordings had an all-too-rare clarity that was a delight to hear.

The Epsilon's very clean-sounding bottom region may appeal to listeners who have avoided large loudspeakers in the past because of their perceived "big," exaggerated bass. Properly set up, the Epsilon didn't suffer from this. It did have a touch of warmth on much material, but just enough to keep the sound from becoming lean and antisepic.

Though the Epsilon's bass extension was plenty deep, it wasn't quite the equal of the NHT 3.3's, which is otherwise unable to match the Epsilon's low-frequency definition. Though the NHTs were no longer available to me for direct comparison, I do recall their bottom end being somewhat more potent in Jean Guillou's organ adaptation of Musorgsky's Pictures at an Exhibition (Dorian DOR-90117). The Epsilon had plenty of power from 30Hz up, but that guttural growl I recall from the NHT—at least on organ—was slightly subdued. Nevertheless, the Epsilon's bass was undeniably extended: my chair—sitting on a slab floor—was vibrating. On the stunningly recorded Rutter Requiem (Reference RR-57CD), the bottom organ pedals, while subtle, nevertheless made a more potent, dramatic statement through the Epsilons than through the Energy v2.8s.

The bass controls on the Servo Control Unit contributed significantly to the effectiveness of the Epsilon's bass. Used in concert, they helped establish a proper system balance. I tweaked them over a wide range of material, then pretty much left them alone. I turned back the mid-bass contour a few decibels, and the low-bass contour up a bit to equalize the amount. This gave me the best combination of tight mid- and upper bass and low-end extension.

In another room, or at a different position within the same room, I would expect the optimum settings to be different. The same goes for the overall bass level, which for me worked best at 0dB (despite a difference in gain between the Krell and Classé amplifiers). Proper setting of overall bass balance is critical to one's total perception of a system's sound; it's difficult with most loudspeakers to adequately control this. While changing the placement helps, it's rarely enough.) Such controls as those on the Infinity—Okay, it's equalization. So what?—helped tremendously in getting things right.

There was a drawback to the Epsilon's bass: It needed all of the power I could feed it. Remember, the servo network functions, for all intents and purposes, as a bass equalizer. According to a figure in Infinity's own White Paper on the Epsilon project, this results in a bass boost of 8dB at 30Hz, and 17dB at 20Hz. In the latter case, all else being equal, a 200W demand in an unequalized system would translate to 10,000W in a system with this much bass boost! Fortunately, there's little program material with flat response to 20Hz. At a more reasonable 30Hz, the Epsilon's required 8dB boost still translated to nearly 1300W to satisfy the equivalent of a normal system's 200W demand.

Before settling on the Classé M-700 amplifiers, but after the bass episode with the Krell, I tried driving the bottom end of the Epsilons with an NAD 208, which puts out a specified short-term power of 750Wpc into 4 ohms. It worked fine until serious demands were made of it, after which it gave up, turning the opening drum strokes on the Jurassic Park soundtrack (MCA MCAD-10859), for example, into a flatulent T-Rex. And while the Classé sailed through this passage with nary a problem, it still ran out of steam on some material—even with its rated 1400W capability (into 4 ohms). In the climax to Weinberger's Polka and Fugue from Schwanda the Bagpiper, on Pomp & Pipes (Reference RR-58CD), the bass in the left channel abruptly fell apart on the most challenging passage. To be fair, the Energy Veritas v2.8 had also had difficulty traversing this track, but the breakup there had been a little less obvious.

For those looking to use the Epsilons in an audio/video system, the sustained bass thud from the falling boulder in Aliadin's "Cave of Wonders" scene (if you've seen it, you know what I'm referring to) caused a breakup that made me lunge for the volume control—again, in the left channel. Though the Epsilons survived to fight another day, I can't say the same for my nerves. This exceptionally difficult test was traversed without incident at the same or higher level (in a larger space) by the B&W THX subwoofer. The B&Ws (evaluated in a different room, it must be emphasized) can't match the tightness or punch of the Epsilons' woofer (though they're nonetheless commendable in these qualities), but do appear to be less susceptible to dynamic-range limitations on killer video sound-effects and very challenging music passages.

Remember how a servo system operates? As the driver enclosure system tries to give up producing sound below the system resonance (in the case of the Epsilon's sealed-cabinet system, dropping off at a rate of 12dB/octave), the servo says don't stop! and increases the drive level to the woofer to compensate—thus the
heavy low-frequency boost typical of a servo design in a normal-size enclosure. Clearly, if nothing is done and the program material continues to demand high levels of low frequencies, a servo system will either run out of available amplifier power, or the driver will destroy itself trying to respond to the servo's demands.

Obviously, a servo system must incorporate low-frequency limits to keep this from happening; below a certain frequency, it simply ceases asking for more. If not carefully chosen, these limits can get you into trouble. I once heard even the IRS—an early version—overload on the cannon shots from Telarc's version of the Overture 1812 at an admittedly high level in a large CES demo room. And that design has how many low-frequency drive-units...?

The Epsilon has a high-pass filter in the SCU's bass channel to provide the necessary limiting, but the above observations tell me that the limits chosen may be insufficient. An outboard subwoofer would solve the problem, and, again, the Epsilon will handle with ease 99% of the material fed into it. But we expect that last 1% from $14,000/pair speakers—especially when less expensive systems will deliver it.

The Epsilons did have excellent bass qualities, but when they ran out of headroom, they did so abruptly and jarringly. All of this reinforces the case for using a dedicated amplifier with a bass servo system. With a careful balancing act, the designer can then trade off bass extension, (known) amplifier power, cone excursion, system sensitivity, and limiting to obtain the desired results within the capabilities of the chosen system design. Requiring the user to provide the bass amplifier puts an important aspect of the design beyond the designer's control.

Nevertheless, used within its still generous limits, the quality of the Epsilon's bass was outstanding.

MEASUREMENTS
JA measured the Infinity Epsilon and provided me with the results after my auditioning was complete.

The sensitivity of the Infinity Epsilon measured effectively to specification at a calculated 85.5dB/W/m (B-weighted). The impedance of its woofer section (fig.2) indicates a cabinet tuned to about 38Hz. The load is relatively benign, never dropping below 4 ohms. However, the inevitable rise in impedance at resonance requires me to modify slightly a couple of statements I made in the main text of the review. Note that, between 20Hz and 30Hz, the impedance varies between just over 5 ohms and 9 ohms. This means that the power available from an amplifier will be less than the latter's 4 ohm rating—which may partially explain the amplifier/Epsilon combination's unfulfilled demand for more power in the low-bass region on particularly demanding material. Note also the small ripples in the response above 100Hz—these are usually indicative of cabinet resonances.

The impedance of the upper-range drivers (fig.3), however, does drop below 4 ohms. In particular, the dip to 2.8 ohms just above 200Hz, combined with a significantly capacitive phase angle in this region, makes the Epsilon a challenging load for its upper-range amplifier. Low-powered tube amplifiers, or any amplifier uncomfortable with a load dropping below 4 ohms, should not apply.

Fig.4 shows the FFT, nearfield responses of the woofer (left) and L-EMIM (right). The curve also shows the action of the woofer and midbass controls. The action of the former is quite subtle (though more significant as you get on the steep slope of the curve below about 30Hz), giving -6dB points ranging from 24Hz to 26Hz with a slight change in the amount of energy prior to the rolloff. The midbass contour control gives a boost or cut of up to 3dB but covers quite a narrow frequency range. This, though, is in a region where room resonant problems are common. The acoustic crossover to the L-EMIM, at 150Hz, is as specified.

The overall combined frequency response of the Infinity Epsilon, averaged across a 30° horizontal window, is shown in fig.5. Here, the response below 312Hz is the complex sum of the nearfield outputs of the woofer and the L-EMIM; the response above 312Hz was taken at 45° at a height of 37", my seated ear height. The response holds up remarkably well to below 30Hz, and is extremely smooth across the full frequency range. The shallow depression centered at about 5-6kHz, combined with the rolloff above 10kHz, may explain my comments about the slight lack of "air" in the Epsilon's subjective performance. Otherwise, there is little here to criticize. As JA said, this is an impressively engineered speaker.

The action of the L-EMIM, EMIM, and EMIT level switches with the Epsilon's on-axis response subtracted, shown in fig.6, is very subtle—consistent with Infinity's specifications. The effects of the controls were, however, audible.

The horizontal and vertical response families are not shown here. The hori-
zontal response was noncritical within a ±10° window. The off-axis vertical responses, relative to the response on the 37° axis, were very smooth. Sitting considerably lower resulted in a dip at about 3.5kHz (the crossover region between the H-EMIM and the L-EMIM); sitting higher brought up the treble region somewhat. This only became evident at heights above 45°—an impractically high listening height (unless you listen on a bar stool).

The impulse response on the L-EMIM axis is shown in fig.7. Ringing is notably absent here, though it's evident that the system is not time-aligned. The latter is clearer in fig.8 (the step response taken at the same location). There's a slight delay between the arrival times of the EMIT and the EMIM, followed in another millisecond or so by the L-EMIM, and another 3ms later by the woofer. All the drive-units appear to be connected with the same (positive) acoustic polarity.

Finally, the cumulative spectral-decay, or waterfall, plot is shown in fig.9. The behavior here is excellent, particularly at the top of the range, where there's almost no visible hash. (Ignore the ridge just below 16kHz, which is due to our measurement computer's screen.) A bit of resonant behavior is evident in the low and mid-treble, but this is relatively innocuous, being very low in level.

This is a first-rate set of measurements—certainly among the best we've measured, and consistent with the Epsilon's superb listening quality.

**Conclusion**

The Epsilon were difficult to criticize. Certainly, I would stack them up against any of the other Class A contenders, though, because of the deep-bass limits on their bass dynamic-range capabilities, they'd have to go in the "Restricted-LF" category. Whether or not that limitation is due to available amplifier power or system limits becomes a moot point when 1400W doesn't seem to be quite enough power.

Nevertheless, the Epsilon can't be ignored—it definitely belongs in Class A. And for those unable to afford them, less expensive siblings using much of the same technology will certainly follow. In the meantime, Disneyland may no longer have E-ticket rides, but Infinity sure does: the Epsilon.
"O h, I really hate those things." Deirdre, my buddy at the bookstore, declared passionately when she learned I'd been listening to headphones a lot lately. Eager to hear a non-audiophile's rationale, I asked why. "Because the sound all comes from here," she explained, pointing at her head. "I mean, deep inside your head. I find it creepy." I'd dropped by the shop looking for books on the auditory system, because I was trying to understand that very phenomenon. I left without any books, but with the realization that we audio nerds aren't the only observant folks listening out there.

SUMMER IN THE CITY

It had originally seemed so simple. Summer was coming, which in New York means heat, humidity, and their accompanying demon: air-conditioner noise. Flailing wildly about for products to audition that wouldn't raise the ambient room temperature (no big tube amps, please) and that would be able to compete with fan and compressor noises, I thought: headphones. But everybody, audiophile or not, recognizes the inherent problem with "phones—Deirdre nailed it right smack on the head. In terms of presenting a realistic acoustic environment, not only do they leave a lot to be desired, they're unnatural.

This led me to my next idea: why not look at a product designed to ameliorate the problem? Something like the HeadRoom stuff that's always being advertised in the various audio magazines. It turns out HeadRoom offers a variety of HeadRoom components—and raw parts for DIYers—all based on the same circuit. They offer Little HeadRooms for the budget-minded, portable models for on-the-go listening, and a no-holds-barred Home HeadRoom unit. Well, my mama didn't raise no fools (actually she did, but I vote for the other guy)—I asked for the top-of-the-line Home HeadRoom.

The Home HeadRoom's extruded aluminum box is 12" long, 6.7" wide, and stands 2.4" tall on its rubber feet. Front-panel layout is straightforward: a volume knob, two ¼" headphone jacks, and two switches: Proc/Bypass, which engages the Image Processor, and Filter/Off, which activates a high-pass filter. The rear sports an on/off power switch, IEC power-cord socket, and two pairs of high-quality female RCA jacks—one for source input, the other (controlled by the volume pot) taking signal out. This last feature means that the Home HeadRoom can be used as a single-source preamp—a feature sure to interest budget-minded system-builders with a headphone jones.

Slipping the unit out of its case reveals an unusually bare circuit board, but don't interpret this as an example of a manufacturer deceiving consumers with a too-big box. The circuit paths are well-spaced to avoid interference, and individual components are sited to minimize unwanted interactions. Parts quality on the Home HeadRoom is high—amazingly so, in light of its price. The Home HeadRoom also has a high-quality Avel Lindberg toroidal transformer, Kimber Kable PB1 internal wiring, power filtration at the AC power-entry module providing transient suppression, and the signal conductors are pseudo-Litz stranded. Pretty impressive.

While we're on the subject of high quality, I should mention that the documentation for the HeadRoom products is exceptional. A White Paper clearly explains the problems inherent in headphone listening, as well as HeadRoom's approach to solving them; the owner's manual is detailed, clear, and amusing.

As a writer, I know of no higher compliment than a heartfelt "Damn, I wish I'd said that!" And I do.

Auditions were performed with a variety of headphones: Sennheiser HD580s (reviewed last month), Etymotic ER-4s, Grado SR80s, and Beyerdynamic DT 911s. Associated equipment included Arcam Delta 250/Black Box 50 and Micromega Drive2/DAC transport/DAC combos, my Linn Sondek LP12/Ittok/Audio-Technica ML-170 rig played through the phono section of the Conrad-Johnson EV20SE, Transparent Audio Music Link Reference interconnects, and Transparent Audio Digital Link and MIT Terminator 3 coax digital cables. And yes, since you ask, it did seem pretty weird to connect the Home HeadRoom to an interconnect that costs nearly four times as much as the amp does.

WITHIN YOU WITHOUT YOU

But why do we need HeadRoom, if all that imaging information exists on the recording? When listening to a stereo recording through headphones, any part of the signal which is contained only in one channel is perceived by the brain as originating in that ear (and in headphone listening, the brain is only off by about an inch). At the same time, any information contained in both channels is summed and appears to come from between the earspeakers. The result is that left-center-of-head/right-ear sound pattern which Deirdre, and the rest of us, know and hate. What happened to all the spatial information contained in the

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**Power rating:** 0.5W. Current capacity: not specified. Frequency response: 20Hz–20kHz, ±0.5dB–1kHz. Measured input impedance: 873kΩ at 1kHz. Measured output impedance: 0.25 ohms at 1kHz. THD: 0.0029%. IMD: 0.0021%. Crosstalk: 62.9dB. S/N ratio: 89.7dB at 1kHz. Dimensions: 6.7" W by 2.4" H by 12" D. Weight: 4 lbs.

**Serial number of unit reviewed:** 94001001. Price: $599. Approximate number of dealers: direct only. Manufacturer: HeadRoom Corp., P.O. Box 53949, Bozeman, MT 59715. Tel: (800) 828-8164 (domestic), (406) 587-9466 (international). Fax: (406) 587-9484.
recording?
At the risk of reading like a Tom Clancy novel, I need to interrupt the narrative for a brief technical description of the human auditory system.1 Not all of it—that would be the purview of a much longer article. No, what we need to look at, to determine why headphones don’t image well, are the outside parts of the hearing system—the ears and the spacing device that separates them: the head.

Our arrangement of ears as sensors in a spaced array has developed as a means of localizing sounds—or, more properly, their sources. When something on your far left makes a sound, you hear that sound with both ears. However, the left ear, being closer, receives that signal incrementally earlier than the right ear, and the brain interprets this difference (known as Inter-Aural Time Difference, or ITD) to establish the location of the sound, primarily in the left-to-right continuum. The sound in the near ear is also somewhat louder, since it’s closer and the off-ear is in the head’s acoustic shadow—an effect known as Inter-Ear Amplitude Difference (IAD). [ITD dominates our perception of direction below about 700Hz; IAD dominates direction perception above about 2kHz.—Ed.]
The folds and ridges of the outer ear, known as the pinna, also have an effect. Just as we hear each sound twice (left ear + right ear) on a gross body level, we hear each sound twice (at least) within each ear. The pinna acts as a funnel, catching and directing sounds toward the ear canal. But the funnel isn’t smooth, and the interaction between the contours of the pinna and the frequency component of a sound creates yet another location cue that the brain relies upon—as up/down information. In fact, the part of the pinna called the concha, the large curved ridge nearest the ear canal, could be seen as an organic notch filter whose dropout center varies in frequency based on the elevation of the sound source.2

Another crucial component in the localization system is head movement. The brain relies upon triangulation for fine placement of acoustic events. This is why we cock our heads toward noises—it’s not just an attempt to place our stronger ear closer. Lock your head in a vise and spatial cues become more diffuse; front and back may even reverse locations on your mental map.

So it’s easy to see why strapping on a pair of headphones—which removes IAD, ITD, concha reflections, and head movement from the equation—totally destroys the illusion of imaging. We have lost essential components of our spatial recovery system. Do the HeadRoom products solve these problems and restore all the missing spatial information? No, not completely. But neither does the Convolutron, NASA’s attempt at simulating localization cues through headsets—and it costs exponentially more than $599.3

To their credit, the folks at HeadRoom don’t pretend to have achieved a complete fix. Rather, they claim to “lateralize” headphone sound, to give a more realistic sense of lateral spread and thus avoid that annoying left-ear/right-center-of-head/right-ear signature. The HeadRoom Image Processor adds a sense of depth as well.
The result is more coherent, subtly truer to the reality of listening to music without ‘phones.

WHAT’S GOIN’ ON
Before we tackle the whys and wherefores of the HeadRoom’s performance, I need to apologize for the shocking language that I must, of necessity, employ: phrases like time-delay, equalization, and notch-filtration. The very idea of installing a device that utilizes such signal-mangling is enough to make an audio purist shudder with revulsion. Well, get over it, Buckie, because there’s nothing natural or unadulterated about stereophonic sound in the first place. Stereo ain’t the real thing—it’s a gimmick. We like it because it works well. I think that’s the basis on which to judge the Home HeadRoom: How well does it do what it does?
First, in an attempt to cure the hard-left/hard-right image location caused when each ear is isolated from signals contained in the other channel, a judicious amount of signal is “bled” into the opposite side. So left-channel info is mixed into the right, and vice versa. If you attempt to monitor this by throwing

1 Hearing is a remarkably complex sensory system that translates airborne vibration into mechanical motion in order to agitate a liquid medium that moves hair-like sensors that send neural impulses to the brain. It’s a process that involves equalization, some tricky impedance matching, and mechanical amplification, in a system that Diane Ackerman, in A Natural History of the Senses, likens to “a contraption some ingenious plumber has put together from spare parts.”

2 To see just how finely attuned we are to the shapes of our ears and concha, try affixing a small wad of Blu-Tack—or similar material—to yours, thus altering its unique profile. Then take a walk in the park, trying to guess the location of the sounds you encounter. The results will amaze you.

3 The Convolutron synthesizes out-of-head imaging so that flight simulators create a true VR (Virtual Reality) environment for pilot training. The system is hideously expensive (maybe not all that ridiculous by high-end standards, although we’re talking governmental budgets here), requires specialized parallel processors, needs to be calibrated for each user in an anechoic chamber, and is effectively not for sale—although rumor has it that Disney looked at it and found it either not effective enough or impractical for use at their theme parks.

4 If you’re the sort who requires numbers to comprehend this process, the time delay is approximately 300μs and the attenuation is 14dB.
in the response curve that manifests itself at around 2kHz.

HeadRoom's crossfeed circuit produces a similar dip in an ingeniously simple way: the delayed signal, when mixed back into itself, creates a notch at a frequency equal to half the cycle time of the delay. By choosing the delay time judiciously, HeadRoom has managed to simulate the naturally generated notch in IAD. Elegant.

CH—CH—CH—CHANGES
Effective, too. The Home HeadRoom spreads the sound out—instead of using tiny portions of your head to re-create the music, the sound seems to come from a huge, wide space within and in front of your head. No, it ain't the real thing—hell, it ain't even stereo. But it ain't bad. It turns a messy and unnatural necessity—headphone listening, for privacy or out of consideration—into a distinctly pleasant experience.

One of the most thrilling CDs that I've heard recently is the Dave Grisman/Tony Rice Tone Poems (Acoustic Disc ACDS-10, reviewed in this issue), a collection of 17 songs played on 17 different pairs of vintage instruments. This album celebrates the minute differences in tone and projection that these unique guitars and mandolins bring to the performances. Played without the HeadRoom, but through a high-quality headphone amp, the performers were jammed into the middle of my skull, on top of each other. Reverberation surrounded the image, being part of the sound but not organic to it. Through the Home HeadRoom, Grisman and Rice were no longer standing on top of one another, but near each other. The room acoustic was better integrated with the instrumental tone, although close listening still revealed how closely miked the instruments were. The duets sounded more immediate, less artificial.

Sam Pilafian, tuba player for the Empire Brass, also leads a jazz group, Travelin' Light. Specializing in Dixieland–tinged music redolent of the '20s and '30s, the sextet performs an exuberantly silly "Jingle Bells" on Christmas with Travelin' Light (Telarc CD–83330). The song opens with guitarist Frank Vignola vamping a Bo Diddley riff on banjo over a veritable battery of percussion instruments that fill the stage. Pilafian blasts in on tuba, carrying the melodic line, swinging into a syncopated stop–time romp through the no-longer–hokey carol. I can't listen to the piece without grinning—and I'm a Christmas grump.

Normally through headsets, the banjo player sits in my right ear, the cowbells etc. come from both sides, and the tuba fills a small space in the center of my head. Switching on the Image Processor spread the sound out very satisfactorily from one side to the other. The players didn't just form a straight line from one earpiece to the other through the center of my brainpan; they moved forward in a semicircle, facing me, while still inside my skull—if that makes any sense. The Processor restored information sufficiently to allow my brain to perform its localization equations and to synthesize spatial locations in a way that—while not totally convincing—felt right.

I perceived this time after time, running comparisons between the HeadRoom unit and unprocessed inputs. Moreover, the better and more natural the recording in the first place, the more noticeable the difference. While this startled me, it makes sense. Some recordings have so much pan-potted and multi-miked information on them that they're effectively multi-channel mono. While I still preferred these when played through the HeadRoom, there was no way for the unit to make them sound realistic. Un-gimmicked recordings, like many of the Cheskeys, classic RCAs, Blue Notes, and those on various other smaller labels, showed phenomenal improvement through HeadRoom processing.

From disc to disc I always found the processed sound an improvement, even where the effect on imaging was vanishingly slight. But the true worth of the HeadRoom circuit will be revealed with extended listening—I don't want to underestimate its importance by stressing the subtle nature of the change. It's a cumulative benefit, reducing listening fatigue by a substantial margin. In fact, I suspect that subtlety is one of the most reliable indicators of the correctness of the processing—your brain isn't screaming "Something's happening here!" at you. That's why I could listen hour after hour, with noticeably less effort.

The HeadRoom sports a switchable filter, boosting the mid–treble by just under 3dB, to compensate for one final by–product of the imaging process: mono information, when fed back onto itself in the delay process, suffers from a comb–filter effect—a series of notches in the frequency response that are the result of the circuit's inability to replicate the ear's sophistication in sorting out the near–earoff–ear differential. Because the comb–filter changes its notch points as a direct result of the ratio of mono to summed information, there's no constant value to adjust for. We hear this as a softening, or darkening, of the sound.

HeadRoom includes the Filter switch to give you some control over this situation; but to tell you the truth, it drove me nuts. With the sound changing from disc to disc and, in some cases, from track to track, I found myself obsessing over what were rather small differences. For my peace of mind, I finally determined to just set the damn thing and then pretend that it didn't exist. You can decide for yourself how essential it is. Most CDs are too bright anyway. Yeah, that's the ticket.

CHEAP THRILLS
I put off trying the Home HeadRoom as a single–source preamplifier until late in the auditioning process. I had fallen into the trap of thinking of it as a headphone amp/processor; and while I could see that it filled a marketing niche as a preamplifier, I didn't take its potential seriously. Wrong again, honey. It blew me away with its power, accuracy, and finesse.

I plugged the Home HeadRoom into my reference system, replacing the $6000 Conrad–Johnson Evolution 20 SE, driving a C–J Premier Eleven A and Martin–Logan Ariaques. No, it didn't embarrass the megabuck preamp—but, even in direct comparisons, the Home HeadRoom sounded pretty damn good. The overall sound was less precisely focused, the top end was a bit coarser, and imaging was less holographic; but instrumental placement was specific, depth was good, and the image was unwavering. Bass response was impressive, and there were gobs and gobs of gain. Wow.

Again, further reflection rubbed my nose in my preconceptions. Like the exemplary Melos SHA–1, the Home HeadRoom was designed to control moving–coil transducers with impedances varying from 32 ohms to 600 ohms and with sensitivities that vary by up to 27dB. High–sensitivity headphones reveal circuit noises, and low–sensitivity 'phones demand high current and voltage delivery. Compared to all that, how hard is it to drive a line–level output?

Jimmie Vaughan's marvelous Strange Pleasure (Epic EK 57202), testament to his artistic rebirth and redemption in the wake of his brother Stevie Ray's tragic death, is filled with textures: vocal harmonies, a Hammond B–3 organ, and every variety of Stratocaster tonal color. The Home HeadRoom gave me a direct connection to Vaughan's sanctified down–home spirituality on "(Everybody's Got) Sweet Soul Vibe," as the gospel chorus set the groove with deep "Hmm–hmm–hmms" underpinning Jimmie's mellow crooning solo on his
Strat/Leslie combo. Throughout the record, the unit allowed subtle textural differences and tonal voicings to sound forth definitively.

I'M SO GLAD
As a high-quality headphone amp, an ambience-restoration device, and a high-quality minimalist preamp, the Home HeadRoom performs on an unusually elevated level. I would consider $599 a fair price for any unit that performed one of those functions as well as this one does. But this triple-threat assault gives a whole new meaning to affordable state-of-the-art, and makes the decision a virtual no-brainer (totally leaving aside the cushion of HeadRoom's satisfaction-guaranteed refund policy).

All I wanted was to stay cool this summer—but I'm not relinquishing this unit. If you're looking for versatility and good sound—either on 'phones or as a building block toward an affordable system—you'll probably hold on tight, too.

—Wes Phillips

MEASUREMENTS FROM TJD
All of the measurements on the Home HeadRoom were made from its rear-panel outputs. Except for slightly longer internal leads connecting these to the output circuits of the amplifier, the rear outputs duplicate the front headphone outputs. The measurements were made only in the bypass mode; JA thoroughly investigated the action of HeadRoom's crossfeed circuitry in his review of the portable HeadRoom amplifiers in January '94 (Vol.17 No.1, p.163), so I didn't repeat it here. In any event, the response of this circuitry will vary depending on the specific headphones for which the user's Home HeadRoom is optimized.

The Home HeadRoom's input impedance measured a very high—and excellent—873k ohms. Its output impedance was 0.25 ohms at 1kHz and 20kHz, decreasing slightly to 0.22 ohms at 20Hz. Its maximum gain into 100k ohms measured 15.7dB. DC offset was 1.3mV in the left channel, unmeasurable in the right. We normally make our Signal/Noise measurement with shorted inputs, though using that procedure with the HeadRoom actually degraded the S/N by almost 23dB compared with the 84.5dB reading obtained with open inputs (unweighted 22Hz–22kHz, ref. 1V). The Home HeadRoom is noninverting from its inputs to its outputs.

Fig.1 shows the frequency response of the Home HeadRoom driven from its balanced inputs at 1V output into a 100k ohm load. The response is similar to that measured for the portable HeadRoom, as is the response shown with the filter circuit engaged. Note that if the Home HeadRoom is used as a single-input line stage, the high-frequency rolloff will certainly be audible as a slight softening or sweetening of the response—a mild HF equalization, if you will—the desirability of which will depend upon the system. The 10kHz squarewave in fig.2 shows the rounded leading edge consistent with a high-frequency rolloff; the 1kHz squarewave (not shown) had only the slightest rounding at the front edge.

The bypass-mode crosstalk shown in fig.3 indicates almost identical performance between channels. We've measured lower levels of crosstalk in other products, the levels obtained here, even at their worst—the increased crosstalk at high frequencies resulting from the usual capacitive coupling between channels—should be of no audible concern.

The THD + noise vs frequency results, for 3V output into a load of 40 ohms, is plotted in fig.4. The level here is moderate and, as an analysis of the distortion waveform (fig.5) indicates, is dominated by low-level noise. In fact, to get the distortion waveform shown in fig.6, I had to push the Home HeadRoom to the 1% THD+N point (4V output into a 40 ohm load)—the onset of clipping. At output levels merely tens of a volt lower, the distortion waveform shows only noise. The output spectrum of the Home HeadRoom reproducing 50Hz at 3V into 40 ohms (fig.7) is very low in distortion artifacts. The highest, the sixth harmonic at 300Hz, lies at ~90dB, or below 0.003%. Harmonics of the power-
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Fig. 8 Home HeadRoom, HF intermodulation spectrum, DC–22kHz, 19+20kHz at 2.65V into 40 ohms (linear frequency scale).

Fig. 9 Home HeadRoom, distortion (%) vs output voltage into (from bottom to top): 150 ohms, 40 ohms.

line frequency are also clearly visible, but these all remain more than 90dB down.

Fig.8 shows the spectrum of the HeadRoom reproducing a combined 19+20kHz signal—the intermodulation products resulting from an input signal consisting of an equal combination of these two frequencies—at an output of 2.65V into 40 ohms (the highest level attainable at this combination of frequencies prior to clipping). The most significant artifacts here are at 18kHz and 21kHz (about -66dB, or about 0.05%); the 1kHz difference tone is at -79dB, or about 0.11%. A 40 ohm load is a stringent test for a headphone amplifier; both of these spectrum-analysis results are excellent.

The 1kHz, THD+N vs output curves shown in fig.9 were measured into both 40 ohm and 150 ohm loads. Note that the 40 ohm load considerably reduces the available voltage swing from the amplifier. (This curve, the first measurement taken, explains why a 3V output into a 40 ohm load was used for many of the other tests.) Nevertheless, the available output at this load is more than enough to push any set of headphones to levels at which you don't want to listen—if you value your hearing.

The test-bench results of the Home HeadRoom are very good, though it's only fair to point out that the tests of the portable HeadRoom Supreme (Vol.17 No.1) were better, due to its lower noise levels. Adding an AC power supply to an already fine product is no trivial matter. Nevertheless, I see nothing here which should detract from WP's strong recommendation.—Thomas J. Norton
have never found CD sound to be as terrible as some critics claim.

But, then, this may have something to do with my priorities. CD has been accused of trashing soundstaging, of damaging spaciousness, depth, and low-level detail; and poor CD sound does all of these things. But none of them has ever been near the top of my personal list of Things to Judge Sound By. More important to me are spectral balance, tonal (timbral) accuracy, extension at the frequency extremes, and detail—all of which CD usually does better than LP. But that doesn't mean I don't hear what the critics are complaining about. The thing that bothers me most about CD sound is what it does to the high end.

The days when the best CD sound was coarse, strident, and gritty are (thankfully) behind us. But CD sound still suffers from varying degrees of treble roughness, the audibility of which depends on the resolution of the reproducing system, the treble smoothness of the loudspeakers, and the person listening to it. I hear it from all digital sources, but it doesn't drive me batty the way it does some listeners—perhaps because I've always favored speakers with a rather soft high end over those that put the sound under a microscope. Yet, even with a forgiving speaker system, I'm continually aware that the sound of CD (and, more recently, of DAT) lacks the liquid transparency and ease of even run-of-the-mill LPs. The few outboard decoders I've heard in my home reduced this dryness significantly, but I have yet to hear any digital reproduction that has the exquisite, ethereal sweetness and delicacy I hear from some LPs—notably the incredible classical re-releases from Wilson Audio and Classic Records. But is the LP's richness really what we want from CD? I'm not so sure.

Between my winter recording activities and summer season tickets to orchestra concerts, I get to hear a lot of live acoustic music. I can assure those who don't hear it often that it does not always sound rich, sweet, or sumptuous. Depending on what's being played and how, real acoustic music is often brash, edgy, and strident—all of which are things that CD does better than analog. Consequently, I'm far more forgiving of these qualities from reproduced sound than those audiophiles who seek only sonic beauty—even while I recognize that CD tends to change the nature of those qualities from extraordinarily detailed and liquidly textureless to something rather more blurred, mechanical, and grainy.

But I don't expect that CD—or any digital medium—should sound as "sweet" as analog, because, to my ears, analog distorts truth in the opposite direction. It softens the sound, and I find that softening almost as obnoxious as others find CD's sometimes—excruciating detail. I believe that real sonic truth—assuming that's what we're looking for—lies somewhere in between the edginess of CD and the sweetness of LP. A good outboard converter can do a lot to narrow this gap.

In comparison with our Robert Harley ("Mr. Jitter"), I've heard very few outboard converters under familiar enough conditions to tell much about them; but those I have heard have been consistently better than the D/A sections in the CD players and DAT recorders I compared them with—not always by a huge margin, but by enough to justify their ad-
ditional cost. The Enlightened Audio Design DSP-7000 is only the third D/A
outboard I've heard in my system. The others—the Micromega T-DAC and the
Bel Canto Aida—were compared with the built-in converters of Sony's CDP-
799ES CD player and DTC-2000ES DAT recorder. The outboards clearly sounded
better, although neither was without its flaws. Each gave a somewhat deeper
soundstage than either Sony deck, and the Micromega had a sweetly detailed
high end reminiscent of (but not the same as) that of analog, but with a some-
what overripe midbass.

The Bel Canto, positively reviewed by Dick Olsher last November, erred in the
other direction, with a slightly lean but very punchy midbass sound. Both were
still a bit grainy at the high end in comparison with good analog, although a
little less so than either of the Sony units (and the Micromega was a shade less
so than the Bel Canto). Previously, I had lived happily with the sound of Sony's
built-ins; but after the Micromega came along, I started using it instead, and never
looked back. (I could put up with its rather rich midbass.) Would the EAD
cause me to switch again? Read on.

T-8000 UNIVERSAL DISC
TRANSPORT
The T-8000 transport, which appears to have been manufactured by Pioneer, is
a universal disc transport capable of playing every known variety of optical disc.
It also changes LD sides automatically, allowing viewers to watch an entire two-
hour film without hoisting their lazy butts from the sofa. The front panel has the
minimum number of buttons needed to operate the player during times when the
remote is in hiding, and includes a "Cinema Mode" button that blacks out the
eye-searingly bright green characters, the on-screen displays, and the between-
sides blue screen when you want to view a movie in a darkened room. A nice
feature.

The T-8000 has outputs for every digital interface: TosLink, AES/EBU, ST
glass (AT&T), and coaxial, plus a pair of phono receptacles for analog outputs.
But there's a catch: The analog outputs are for the laserdisc's analog tracks only.
If you want to hear the digital tracks, you need an outboard D/A converter, such as
the DSP-7000 Series 2.

Most of the player's functions are accessed from the remote control, which
includes buttons for:
1) Display allows you to select any of several modes (frame/elapsed time, re-

1 Vol.17 No.11, p.163.

—JA

aining time, etc.) appropriate to each disc format. For example, frame/time
shows frame numbers when playing a CAV laserdisc, and time in minutes and
seconds when playing a CLV.

2) Highlight/Intro allows you to sample
each track on a CD or CDV. It starts play one minute (or any other time value
you choose) into the track, plays eight seconds of the program, then advances
to the next track.

3) One-Shot Memory grabs whatever image is on the screen when you press
it, and displays it after the side stops playing.

4) Audio selects stereo or plays only the
L or R signal through both speakers.

5) D/A/CX selects digital sound, anal-
log without noise reduction, or analog
with CX noise reduction.

6) Lighting. This large button, located
on the left side of the remote, backlights
the main function controls for three
seconds so you can select the right one
when the room is dark.

7) Program is used with the number
keys to select individual chapters (LV)
or tracks (CD, CDV) for programmed play.

8) Edit is used for making cassettes
from CDs. Pressing Edit invites you to
turn the duration of the tape, and plays
the maximum number of tracks that will
fit, either in random order (one press) or
sequentially starting with track 1 (two
presses).

9) Jog/Scan. This 2" wheel allows you
to shuffle backward or forward through
a video recording, or move frame by
frame.

DSP-7000 SERIES 2
D/A CONVERTER
Though the DSP-7000 Series 2 D/A
converter uses the popular Burr-Brown
DF1700 digital filter chip, it is unusual in
that it offers user selection of 4x- or
8x-oversampling via a small switch on
the main printed circuit board. You use
what sounds best to you. (Frankly, I
couldn't hear any difference; I switched
with 4x-oversampling because I was born in
April.)

On the front panel is a button for
Absolute Phase. Theoretically, original
air-pressure compression waves should
be reproduced as compressions rather
than rarefactions. Many people don't
hear the difference. I'm one of them.

Another front-panel button provides
for Input select. The 7000 Series 2 accepts
tree digital inputs through back-panel
receptacles: coaxial, TosLink, and ST-
Glass (AT&T); a Lock LED illuminates
when the converter sees digital signal.
The 7000 will accept any of the three
standard sampling rates: 32kHz, 44.1kHz,
or 48kHz. Two front-panel LEDs light
up to show uncorrected (interpolated) read errors and problems due to unac-
ceptably mediocre data interconnects.

The latter is the more informative,
-cause you can do something about it (ie,
use a better interconnect).

As reviewed, the DSP-7000 has single-
ended analog outputs via two RCA
jacks. There are also knockout holes for
XLR balanced output receptacles, but
my sample was not so equipped. There's
no through circuits for the LD player's
analog outputs, which means that if you
ever want to listen to the running com-
mentary that many Special Collector's
Edition laserdiscs have on their analog
tracks, you must have the player's analog
outputs connected to its own inputs on
your control unit, or be prepared to unplug one set of outputs and plug in the
other.

SYSTEM
Other equipment used in connection
with this review included a Fosgate
THX Home Theater loudspeaker/ampli-
fier system, a Sony X-779ES computer
and a Sony DTC-2000ES DAT recorder,
with a SOTA Cosmos turntable with vacuum
holddown, the Well Tempered Arm, an
Ortofon MC-3000 cartridge and its mating
step-up transformer, a Vidikon
DPF40HD front projector and LD40
line-doubler, and a Stewart 6'-diagonal
projection screen (for the video tests). The
Audio interconnects were Monster M-
1000s, and front-loudspeaker cables were
AudioQuest Emeralds. All listening
was done in stereo rather than in surround
mode, using only the front left and
right speaker pair plus the subwoofers.

Software included recent laserdisc
releases, several RCA Shaded Dog Living
Stereo LPs and their RCA CD counter-
parts, and live-performance DAT record-
ings (symphonic and chamber works)
made locally by Steven Stone and myself.
Microphones used for our recordings were
by Sennheiser (MKH-30 and -40) and
AKG (Blue-Line bodies with CK-
91 capsules), and the mike preamplifier
was an Audio Engineering Associates
MS380TX. Also used was my modest
collection of bummer LDs—one which,
for various reasons, have challenged the
tracking capabilities of other players.

SOUND & VISION
First I checked the T-8000's ability to
handle disc surface blemishes, using the
single- and double-dropout tracks on
the Pierre Verany Digital Test CD set
(PV788031/2) and the bummer LD col-
lection. Here's what I found, compared to the performance of the Sony X-
799ES—a tracking champion.

The T-8000 played up to track 29 of single dropouts and track 46 of the double dropouts before producing audible clicks. The Sony played up to track 32 of single dropouts and track 47 of the doubles. Both results from the EAD were impressive, and indicated a high level of immunity to disc blemishes. (Performance with LDs should be equally impressive.) All the problem LDs played fine, including the badly rotted one, which was at least viewable if not enjoyable to watch. (Many players won't even lock onto it.)

Access times were also respectable. Starting with the drawer open, a CD loaded, and the front-panel CD button actuated, it took 11 seconds for a disc to start playing. With the drawer closed, it took 4 seconds. (The Sony took 5 and 2, respectively.) With the CD function off, starting times were 16 and 5 seconds, respectively.

Picture quality from laserdisc was outstanding in color fidelity and freedom from noise, but looked unusually soft for a player in this price range. Resolution from the SMPTPE pattern on Reference Recordings' A Video Standard test disc was less than 400 lines, which is very good, but not up to what I would have expected. The slightly soft resolution was a liability when the player was used with some line-doublers (the Vidikron LD-40, for example), which require a certain speed of luminance change in order for the edge-sharpening to take hold. Much of the line-doubled image from the T-8000 looked softer than the unprocessed picture. There was also evidence of somewhat overzealous sharpening in the player: overshoot outlines were visible at the monitor's middle sharpness setting.

I used three primary signal sources for my audio tests: DAT tapes, CD, and laserdiscs. Comparing the 7000 Series 2 with the converters in my Sony decks, there was in both instances a substantial increase in front-to-back depth and a marked sweetening of treble quality.

By no stretch of the imagination, however, could the DSP-7000's sound be described as analog-like. There was still a slight but unmistakable roughening and blurring of the extreme high end, and not so much of the airy openness I hear from even mediocre LPs. When I tried copying from one of the Classic Records Royal Ballet LPs to DAT, the gorgeous openness and delicacy that gave me goosebumps from the LP was traded when I listened through the Sony DAT deck's own D/A section. It was merely badly damaged when I listened through the DSP-7000 Series 2.

EQUIVOCATION

Now that I've launched what looks like a torpedo at the EAD converter, I need to explain where that missile came from. Comparing a 2000ES DAT copy with one of those discs was unfair, because the A/D converter in it—Super Bit Mapped or not—was obviously not a cost-no-object design, and undoubtedly contributed to the signal degradation I heard. It's also very possible that the extended high end of my phono cartridge—manufacturer-rated to 90kHz!—was causing more-severe aliasing in the 2000ES's A/D converter than would a more bandwidth-limited source signal. (There may not be any significant signal above 15kHz on an LP, but the slightest bit of mistracking produces strong out-of-band treble HF energy—and there's always some mistracking.) So if I seem to be coming down harder on the EAD converter than I have on any recent digital product, it's not because it's any worse a performer; it's better. I'm just more demanding these days. My recent exposure to some of the most beautiful-sounding LPs ever to cross my doorstep have only served to make me more unhappy with digital.

But a sad truth seems to be emerging from all this: The cost of state-of-the-art digital reproduction seems to be getting much higher than anyone had expected. Stereophile has reported that the sound of some $15,000 D/A converters may "approach" that of state-of-the-art analog, but they still don't quite make the grade. Along with this, there seems to be a growing inclination to seek our digital answers elsewhere, with the recent critical acclaim of new 20-bit systems, which are astronomically priced. And it seems that the disillusionment with 16-bit digital long held by some recording engineers is surfacing among the record-buying public at large. A recent CBS news report about the resurgence of LPs had a handful of consumers and producers saying they prefer LPs because they sound better than CDs—warmer, more musical, more involving.

MEASUREMENTS FROM RH

The EAD's maximum output level when decoding a full-scale, 1kHz sinewave was 2.36V—1.4dB above the standard 2V output level. Channel balance was excellent, with less than 0.01dB amplitude deviation between channels. The processor had a low output impedance of 50 ohms [the output drivers appear to be high-quality Analog Devices integrated-circuit op-amps—Ed.] and DC levels were a low 1mV (left channel) and 1.9mV (right). The highish output level and low output impedance suggest that the DSP-7000 should have no trouble driving a power amplifier directly through a passive attenuator.

The DSP-7000 had no trouble locking to any of the three sampling frequencies, and doesn't invert absolute polarity unless the front-panel polarity switch is engaged.

Fig.1 is the 7000's frequency response and de-emphasis error. Note that the de-emphasis curve is not the unit's frequency response when decoding a pre-emphasized CD, but only the deviation from flat de-emphasis tracking. The very slight rolloff in the top octave is negligible. In fact, this is one of the better de-emphasis tracking curves I've seen. Looking next at the interchannel crosstalk graph (fig.2), we see excellent, but not superlative, channel separation. Although better than 100dB through much of the band, the 6dB/octave increase in crosstalk with frequency in the treble is indicative of capacitive coupling between channels.

A spectral analysis of the DSP-7000's output when decoding a 1kHz, -90dBFS dithered sinewave is shown in fig.3. The noise level is quite low, and the Burr-Brown PCM-63P DACs appear very well-behaved (the trace peaks exactly at the -90dB horizontal division, and the traces perfectly overlap, indicating that both DACs are performing nearly identically). Extending the measurement bandwidth to 200kHz and driving the DSP-7000 with a digital signal of all zeros produced the spectrum analysis
A plot of fig.4. Again, the unit has a low noise level, and no spurious artifacts in or above the audioband.

The good DAC linearity hinted at in fig.3 is confirmed by the linearity plot of fig.5. The DACs are good to below -100dBFS, where noise dominates the measurement. This is excellent performance.

The DSP-7000's reproduction of a 1kHz, -90dBFS undithered sinewave is shown in fig.6. Note the symmetrical nature of the waveform, low audioband noise overlaying the waveform, and the clearly identifiable digital steps (+1, -1, 0). This isn't the best reproduction of this signal I've seen, but it comes very close to it.

Fig.7 shows how the DSP-7000's noise floor changes as a function of input level. The processor was driven by a 41Hz sinewave at -60dB, -70dB, -80dB, -90dB, and -100dB, and the output plotted spectrally. The five spectral analyses were combined on one trace to show any change in the noise floor's level or spectral balance as the input level changes. The DSP-7000 performed well on this test, with tight trace groupings, even below 1kHz.

Looking next at the DSP-7000's intermodulation spectrum when decoding a full-scale mix of 19kHz and 20kHz (fig.8), we see a very low level of intermodulation products. The 1kHz difference tone (20kHz minus 19kHz) is below -100dB, and the processor produces very few intermodulation products. Again, this is excellent performance.

In common with many other D/A units, the DSP-7000 uses the Crystal CS8412 data receiver, in conjunction with additional jitter-reduction circuitry. Its jitter performance was excellent. I measured the 4x-oversampling clock on the PCM-63's word-clock input using the Meitner LIM Detector, and drove the DSP-7000 with a PS Audio Lambda transport playing signals from the CBS Test Disc. Fig.9 is the word-clock jitter spectrum when the DSP-7000 was fed a 1kHz, full-scale sinewave. Note the absence of a 1kHz jitter component in the spectrum, the overall low jitter level, and, particularly, the smoothness of the curve. A smooth curve (very few spikes) indicates that the jitter is the more benign white jitter, rather than periodic jitter.

A few periodic jitter components at 4kHz, 6kHz, 8kHz, and 12kHz can be seen, however. These are produced by the input signal (the frequency and amplitude of these jitter components changed when the input signal was varied). The jitter spike at 7.35kHz is the 7.35kHz subcode data buried in the SPDIF datastream. When we change the input signal to a -90dBFS, 1kHz sinewave (fig.10), we see the now-classic jitter spike at the test-signal frequency. Remarkably, however, the rest of the spectrum stays very clean.

Finally, I drove the DSP-7000 with a 10kHz, full-scale sinewave and plotted the processor's jitter spectrum (fig.11). Note the jitter spike at 10kHz, but also the nearly complete absence of other periodic jitter components other than the subcode clock. The RMS jitter levels, measured over a 400Hz-22kHz bandwidth, were between 85ps and 90ps.
These low levels challenge the measurement capabilities of the LIM Detector (the LIM Detector's noise floor rises as the word-clock frequency drops). Moreover, the very close range of measured jitter levels over a wide selection of input signals indicates that the DDS-7000 has good rejection of incoming jitter.

Overall, the DSP-7000 had excellent—almost textbook—measured performance. The low noise level, good linearity, excellent reconstruction of low-level signals, and superb jitter performance all suggest that the DSP-7000 is very well-engineered.

—Robert Harley

CONCLUSIONS FROM JGH

The T-8000 provides better audio than video performance. Pioneer's CLD-97 LD player has almost 420 lines of resolution—a small numeric difference that makes for a big detail difference—its own built-in D/A converter (no slouch either), and costs almost $1500 less than the T-8000. But EAD's claim for jitter is extraordinarily good, while Pioneer publishes no jitter spec at all—the Pioneer may not deliver as clean a digital output as the EAD. Nonetheless, as a closet videophile, I think I'd opt for the Pioneer.

Because the EAD system gave me nothing I'd describe as LP-like sound from any digital source, I'd have to rate it below the state of the art. However, because it seemed to minimize differences in high-end roughness between different CDs, I'd hazard a guess that its jitter is probably very low. And because it made all my digital sources sound substantially better than the converters in my Sony decks, I'd have to rate it as a very worthwhile addition to any high-end audio system.

But where would I rank it ultimately?

The other two converters to which I compared it—the Micromega T-DAC and Bel Canto Aida—are similar in price to the Series 2 7000, and all three sounded about equally clean at the top. But, after listening to a large selection of made-for-audiophile CDs, I concluded that the EAD had the most nearly neutral low end of the three, being neither lean nor rich.

Not surprisingly, the digital sound from laserdiscs was superb—about as good as I've heard in my home. There were, in fact, times when the music in a film got to me more than the same music from the soundtrack CD—even with the picture turned off.

Would I buy this combo? If I wasn't able to borrow these kinds of products, I'd almost certainly buy the DSP-7000 Series 2, because I can't afford a Mark Levinson No.305. I'd be much more circumspect about investing almost $4000 in the T-8000. At $5000, the Runco LJRII LD player's picture is a hair better than the LDS-97's, but is much better than the EAD's. Still, I haven't had a chance to listen as rigorously to the Runco as I did to the EAD. Runco also makes an impressive claim for low jitter, and their top audio-option model includes what is claimed to be a very good D/A section—comparable to a mid-priced outboard. I would consider that too as a possible option to both of the EAD units.

In short, though I have reservations about the T-8000 Universal Disc Transport, I think the EAD DSP-7000 Series 2 D/A processor is an outstanding buy.2 Class B in Stereophile's "Recommended Components."—J. Gordon Holt $2 2 EAD is an HDCD licensee and is offering a Series 3 upgrade to owners of existing EAD processors. The upgrade costs $495 and includes the HDCD decoder and EAD's "Digital Flywheel" jitter-reduction circuitry. —RH

The following text is not relevant to the content:

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I've always wondered how much a digital processor's filter affects its sound. Apart from processors using custom digital filters run on DSP chips (Meitner, Theta, Krell, Wadia), nearly all good digital processors use the NPC filter chips or their Burr-Brown equivalents. Consequently, it's been impossible to evaluate the filter's sonic contribution in isolation.

The only processor in the world in which you can hear the effects of different filters is the Pink Triangle DaCapo processor reviewed here. Unlike the Counterpoint DA-10, which provides interchangeable DACs but the same filter, the DaCapo uses a fixed 1-bit DAC and interchangeable filters, the latter allowing the user to select from a variety of choices.

Although the DaCapo has been on the market for a few years, I was prompted to review this British processor for two reasons: 1) the DaCapo is the first processor on the market to offer the long-awaited High Definition Compatible Digital (HDCD®) decoder chip from Pacific Microsonics; and 2) the DaCapo's unique ability to switch filters allowed me to compare the HDCD decoder and filter to a variety of standard filters.

This review will therefore not only consider the DaCapo processor, but offer a first look at what could be a revolution in digital sound quality: HDCD.

**Description**

The DaCapo is unusual inside and out. Part of what distinguishes it is the black-painted wooden shell covering the chassis. The wooden front panel has a cutout for the input selector controls and status-indicating LEDs. Four pushbuttons, each accompanied by a LED, select between inputs; a fifth puts the unit into standby mode. A row of four additional LEDs indicates when the DaCapo is in standby, when it's locked to an incoming signal, if it's decoding an HDCD-encoded source, and whether it's running on its own AC supply or from Pink Triangle's optional DC power supply (more on this later).

The rear panel has four slots for accepting digital input cards. You can thus tailor the DaCapo's number and type of inputs for your needs. Adding an input is simply a matter of removing two screws and pushing in the input card. The DaCapo is supplied with one input; additional cards are $200 each. Output is via a pair of RCA jacks. An IEC AC jack finishes off the rear panel.

... Except for one more slot: for connecting the DaCapo to an optional battery power supply, called the DC. With the DC card installed, the DaCapo's power transformers and filter caps are replaced by a panel that accepts DC voltages from the optional supply. This supply contains rechargeable batteries which allow the DaCapo to run off pure DC (indicated by a front-panel LED) rather than that from the mains supply. Note, however, that the DaCapo still must be plugged in to an AC source, and that it derives some of its operating voltages from the wall supply.

The DaCapo's modular approach is evident from a look at the inside. The main printed circuit board has a row of edge connectors for accepting the digital input cards, and for plugging in either the AC power supply or the DC input card. The D/A converter is housed in a metal module soldered to the board. Next to the DAC, two rows of pins stick up to accept the plug-in filter modules. The input receiver is covered by a metal shield. Nearly all the circuitry, including the analog output stages, is implemented with surface-mount components.

Pink Triangle makes five different filter modules for the DaCapo, ranging in price from $375 each for the Yamaha or NPC to $600 each for the Philips 1307 or HDCD modules. The DaCapo's ability to switch filters may, however, be a moot point after you read my listening impressions.

Configuring the DaCapo for AC or DC operation, installing the input cards, switching filters, and setting the tiny jumpers on the main PCB requires more technical participation than that asked by most other digital processors. Moreover, you have to be careful about the order in which the DaCapo and DC are powered up and down, and you have to know when it's safe to disconnect the DC supply or change filters. If you disconnect the DC too soon, arcing between the plug and jack could damage the contact pins. To further complicate matters, the owner's manuals are poorly written and organized, and filled with unclear language.

**Problems**

I originally intended to review the DaCapo with the DC. The DC is the same size and shape as the DaCapo, which is meant to sit on top of the DC. Unfortunately, the DaCapo wouldn't work properly with the DC sample unit sent, producing high levels of white noise through the loudspeakers. The DC apparently was damaged during shipping, as its wooden exterior was cracked.

Pro Audio, Pink Triangle's US distributor, sent a new DC and DaCapo. When connected, the new duo also produced white noise at the output. I went through every aspect of the setup over the phone with Pro Audio, and concluded that I'd done everything right. I decided to review only the DaCapo, and save the DC for a Follow-Up in the next issue. But when I tried to audition the second DaCapo sample by itself, it wouldn't work (white noise again). I went back to the first DaCapo, which I'd been listening to before the second set arrived. All my auditioning was thus with the first sample run off the wall AC, without benefit...
of the optional DC supply. As you can imagine, this whole episode was an exercise in frustration.

Finally, on the last day of auditioning, the first DaCapo quit working. After changing filters, the unit produced no output. Though the front-panel "signal" LED wouldn't illuminate, the unit could still detect when the input data stream was HDCD-encoded, indicated by the front-panel LED illuminating. Consequently, I could perform no measurements for this review.

Normally, this report would have been held back for a month until the manufacturer could send a working sample. But because the DaCapo provided the first glimpse of the long-awaited HDCD decoder, we decided to publish the review, and report on the DaCapo's measured performance, along with its sound quality powered by the battery supply, in the next issue.

SYSTEM
I auditioned the DaCapo in my reference system, listening to the processor on its own and in comparison with the Mark Levinson No.30.5 (as an absolute reference), the Sonic Frontiers SFD-2 ($4695), Meridian 563 ($1350), and the Adcom GDA-600 ($750). (At $2895, the DaCapo falls in the middle of the range of these processors' prices.) The transport for all the auditioning was the Mark Levinson No.31, connected via an AudioQuest digital link with an RCA jack on one end and a BNC on the other (the DaCapo review sample had only BNC input).

The DaCapo's output fed an Audio Research LS5 Mk.II preamp, which in turn drove a pair of Audio Research VT150 tube monoblocks. Loudspeakers were Genesis IIs (see my review elsewhere in this issue), connected with 3' runs of AudioQuest Dragon. The Genesis amplifier drove the IIs's woofers. Interconnects were Magnan Type V, Transparent, and AudioQuest Lapis.

SOUND
To get a handle on the DaCapo's intrinsic sound quality without benefit of HDCD, I first listened to it with several of the other filter modules. My first impressions were that the DaCapo was competent, but not outstanding. The bass was the processor's biggest liability: low frequencies lacked extension, weight, depth, or power. For example, the lowest organ notes on Requiem (Reference RR-56CD) were suppressed when compared to the sounds of the No.30.5, SFD-2, and the Adcom GDA-600. Bass drum lacked power and impact, instead only hinting at the instrument's sound, and bass guitar was thin rather than weighty and full.

Similarly, the DaCapo's dynamics were constrained—even compared to the much less expensive Adcom. The Meridian 563, which was the least dynamic of the three other comparison processors on hand, was more dynamic and had deeper bass extension than the DaCapo. When compared to the SFD-2 or GDA-600, the DaCapo sounded uninvolving. The DaCapo's overall perspective was midway between the GDA-600's rather set-back presentation and the SFD-2's forwardness. I preferred the DaCapo's perspective, which was a little more immediate and incisive than that of the Adcom. Moreover, the DaCapo had a smoother, more liquid presentation of midrange timber than the Adcom.

In terms of detail resolution, the DaCapo fell short of the 563 and GDA-600. I heard less musical information with the DaCapo, and spatial cues were less well-defined. The 563 had a more open, transparent soundstage, with greater depth and bloom.

Overall, I preferred both the Adcom and the Meridian to the DaCapo. These impressions were consistent with a variety of filter modules, of which I liked the NPC less than either of the Yamahas.

Then I installed the HDCD decoder. Now that the HDCD decoder has arrived, we can expect manufacturers of high-end processors to include the decoder and digital filter in their newest products. As this issue goes to press, some manufacturers have put the HDCD chip in their prototype processors, and the response has been enthusiastic. Here's a sneak preview of HDCD products we'll see in the next few months:

Sonic Frontiers has announced their SFD-2 Mk.II, an HDCD-based revision of their acclaimed SFD-2 (named "Digital Source of the Year" in the December '94 Stereophile). The SFD-2 Mk.II has other improvements, including: a thicker front panel; a different analog stage layout that reportedly reduces THD, IMD, and crosstalk; Teflon bypass caps around the output coupling caps; some Vishay resistors (instead of Holo); additional digital inputs; an UltraAnalog AES21 input receiver selected for low jitter; and a customized version of the UltraAnalog DAC module.

The Mk.II will sell for $5295, a $600 price increase over the original SFD-2. Owners of the SFD-2 can upgrade the digital section of the processor (getting HDCD) for $1200. Note that the analog improvements are not available as part of the upgrade.

Sonic Frontiers President Chris Johnson reports that, with HDCD-encoded discs, "...everything was more natural. Soundstage width, depth, and height exploded. Instrument focus was pinpoint. The soundstage seemed 'blacker,' allowing the listener to be pulled into the experience. ...CDs now equaled or surpassed the best vinyl." (I'll report on the SFD-2 Mk.II next month.) HDCD is also at the forefront of HDCD technology, offering the decoder on all their new products. Owners of existing EAD processors can upgrade to "Series 3" level, which includes the HDCD decoder and EAD's "Digital Flywheel" jitter-reduction circuitry. The upgrade cost is $495.

Ben Gosvig, EAD's General Manager, had this to say about HDCD-encoded discs played through the HDCD decoder: "What we heard was truly astonishing. The increase in texture, detail, depth, and imaging once HDCD was activated was remarkable. This is a significant technology. It was a delight to see the long-awaited promise of HDCD fulfilled to this degree."

Adcom is entering the HDCD arena with the GDA-700 processor. The $1000 unit will use an Ultra-Analog AES21 input receiver, HDCD filter, and dual Burr-Brown 20-bit DACs. Dual power transformers, balanced and single-ended outputs, and AES/EBU digital input are also included. The GDA-700 is scheduled to be introduced at the Winter Consumer Electronic Show in Las Vegas in January.

So far, 14 manufacturers have become HDCD licensees. Expect to see HDCD-equipped processors from these companies in the coming months: Appropriate Technology, Audio Alchemy, Classé Audio, Camplex, Kinetics Research, Madrigal Audio Labs, Parasound Products, PS Audio, Resolution Audio, Spectral, and Theta Digital.

I expect that we'll see a wide array of HDCD-based processors at this month's CES in Las Vegas. Watch for a full report in our April issue.

—Robert Harley
The integral filter within the HDCD decoder chip—without any HDCD decoding—was so much better than I had heard that it rendered pointless any further consideration of the other filter modules. The filter had more space, depth, and sense of bloom around instrumental images. Resolution of low-level signals improved, as though I was hearing more music. The treble grain and glare I'd heard with the other filters were reduced, and timbres were more liquid. Overall, the sound had a greater sense of ease with the HDCD filter on non-encoded discs.

When playing HDCD-encoded CDs, however, the DaCapo was transformed. The sense of space increased enormously, both in terms of hall size and the air between instruments. The presentation was anything but flat and sterile. I was astonished by the resolution of individual threads within the musical fabric. Every nuance was distinct and an entity to itself, not merely another sound fused into the whole. The HDCD decoder also produced terrific dynamics, in sharp contrast to the DaCapo's rather compressed sound with the standard filters.

JA and I listened to the HDCD-encoded Requiem through the Mark Levinson No.30.5, then through the DaCapo with the HDCD decoder module. Although we could clearly hear things through the DaCapo that we didn't hear through the No.30.5, JA summed it up best when he said, "I want to hear HDCD decoding in the No.30.5."

**Conclusion**

Although the Pink Triangle DaCapo fitted with the HDCD decoder produced a good sound in my system, I can't recommend this processor in its current form. With a standard digital filter, the DaCapo offered performance that wasn't much better than mediocre for its $2895 asking price. Not considering the HDCD option, I preferred both the $750 Adcom GDA-600 and $1350 Meridian 563 converters to the DaCapo. With the HDCD decoder, the DaCapo was a much better-sounding processor, even on non-HDCD discs, but still not a contender taking its price into consideration. With other manufacturers about to introduce HDCD-based processors, it may be prudent to hear what those products have to offer before buying.

Finally, the lack of reliability of the review samples was the coup de grace. Four out of four review-sample failures (two DaCapos, two DCs) doesn't inspire confidence, even though the US distributor assures me that my experience was unusual.
Life is stressful. You could spend a few thousand dollars rushing to a weekend getaway at a rejuvenating retreat. You could mortgage your home for one of those "quiet as a recording studio" motor cars you've seen on television. Or you can keep the family fortune and relax in the sanctity of your own home with a pair of Sennheiser headphones.

Discover the ultimate in surround sound...at a budget you can easily afford.
With a massive fascia finished in "soft shadow" silver and finely sculpted greek-like features, the Classé M-700 monoblock power amplifier strikes a commanding yet elegant pose. It's difficult for any high-powered amp to win a beauty contest, and the muscle-bound M-700 is no exception. But move over, Arnold Schwarzenegger—the M-700's classic physique makes a serious contender for the title of Mr. Universe.

But the Talmud teaches us to examine the contents rather than the bottle. I removed the M-700's top plate to discover that it easily meets Dick's First Dictum of Power Amplification: Judge an amplifier by the size of its power supply. The internal volume in the M-700 is dominated by the power supply, in particular by a huge toroidal power transformer—a beast of burden that's a beauty to behold.

The capacitor filter reservoir, which totals an impressive 100,000μF, features Classé's proprietary ultrasonic filtering of both the transistor output stage and the local supply to the low-level differential stages. Construction and parts quality were nothing short of superb—the M-700 was clearly crafted to the highest high-end standards.

**The Fig of Epitectus**

About 1900 years ago, Epitectus said, "No great thing is created suddenly, any more than a bunch of grapes or a fig. If you tell me that you desire a fig, I answer you that there must be time. Let it first blossom, then bear fruit, then ripen."

Apparently, Classé Audio's Glen Grue knows Epitectus well. As Glen explained to me, Classé's design philosophy is centered on an evolutionary rather than a revolutionary approach to circuit design. You become familiar with a particular circuit topology and, over many years, evolve its full potential through the process of fine-tuning and upgrading the sound via numerous iterations, followed by critical listening sessions.

The nuts and bolts of this approach consist of substituting various combinations of passive and active parts (eg, transistors, capacitors, wiring, and printed circuit boards), and varying the operating point of the amplifier by adjusting specific operating voltages within allowed engineering ranges. The goal is to produce an overall sonic recipe that yields the most natural and realistic harmonic texturing—that is, the most convincing illusion of the real thing: live music. One basic circuit, tailored to a specific power output, is used for the entire line of Classé power amplifiers. In my opinion, this combination of art and science exemplifies the best that high-end audio has to offer.

The M-700 is fully differential from input to output. Hence, both balanced (XLR) and single-ended (RCA) inputs are accommodated, selectable via a toggle switch on the back panel. Of course, the use of balanced inputs requires balanced interconnects with XLR connectors (pin 2 hot), and a preamp with a balanced main output. Since none of my mainstay preamps are balanced, I used the M-700 strictly in its single-ended mode.

Speaker-cable connections are accomplished using what Classé describes as output bolts. Either spade lugs or bare wire may be used by placing the lug or wire between a washer and a large chassis nut and tightening the bolt. The nice thing about these connectors is that they can be torqued down with a nut driver as tight as even an audio gorilla might like. Classé is even classy enough to provide a nut driver with each amp. Please look carefully at this cool tool—it's embossed with the Classé moniker. Such attention to detail endeared this amp to me right out of the box. But it's what it sounded like that's important.

**Sound**

The popular conception is that the evaluation of a power amp is a piece of cake. Not so. It's well known that the gods placed the amp before the loudspeaker for a reason: For the common person to enjoy their speakers to the fullest, a power-amplifier match made in heaven is required. Each speaker load presents an amp with certain problems—challenges, if you will—which the amp must solve. Then there's synergy—the blending of flavors and sonic characteristics to produce a sound which transcends that of the sum of the parts. The challenge from the reviewer's standpoint is to examine the amp in enough contexts to discover its full potential.

You, dear reader, are precisely the reason why it's taken me practically forever to conclude the M-700's review process. During that time I mated the amp with numerous dynamic loads: two electrostatics (Sound-Lab A-1, Audiostatic...
The international standard for time measurement is the Cesium-Beam Oscillator, an atomic clock. Nothing is more consistently accurate. When Resolution Audio began design of a CD transport, we sought to develop the most accurate, low-jitter output possible. The Cesium CD Transport is the culmination of our extensive R&D efforts.

Based on the Teac Vibration-Free Rigid Disc-Clamping System (V.R.D.S.) drive mechanism, the Cesium offers precise tracking performance. An overhead turntable clamps and supports the disc, significantly reducing tracking errors.

While we couldn’t use an atomic clock, we did isolate a low-jitter crystal oscillator at the outputs, negating upstream jitter sources. In addition, the Cesium features a custom transmitter chip designed to remove jitter inherent in the S/PDIF data stream. Jitter can be further reduced through a unique approach to balanced operation. The proprietary transmitter allows the option of operating our processors as balanced mono units by splitting the conventional left/right data stream into two digitally balanced signals. The left and right balanced streams are then fed to a pair of Reference 20 or Quantum processors, one dedicated to each channel. By transmitting phase-canceling data, signal-induced jitter is eliminated at the transmitter.

To learn more about our products call, fax, or e-mail. Then go listen and hear for yourself the potential of digital audio.
ES-100) and one hybrid (Martin-Logan Quest Z). To my surprise, the Classé worked well with all of these loads. That's not to say that it necessarily represented the ideal complement for every load I tried, but at no time did it fail to acquit itself at least honorably. Keep in mind that the field of play included some highly reactive loads that have impedance dips well below 3 ohms—impedance prima donnas that only a handful of amps can safely navigate. It would be safe to conclude, then, that the M-700 came closer than any other power amp I've heard to date to personifying the mythical universal amplifier.

The M-700's sonic hallmark was consistent neutrality. It refused to editorialize upon either the tonal balance or the textural fabric of the music. With the Jadis JP-80MC preamp at the front end, no artificial color was added to the reproduction of harmonic textures. Textures were neither thickened nor brightened, remaining smooth, sweet, and convincingly liquid. With lesser preamps—as with changes in phono cartridges and digital components—the character of the sound changed in concert with the colorations of the particular front-end component under audition.

To use such adjectives as dark, veiled, or grainy in conjunction with the Classé would require pointing a finger at the front-end offender. Don't be tempted to metaphorically kill this potential messenger of bad tidings. The Classé's purity of expression simply gave me a clear indication of problems upstream.

Especially noteworthy was the M-700's ability to readily resolve the sonic origins—tubes or solid-state—of a particular recording. UB40's *Rat in the Kitchen* CD (A&M 75021-5137), which is devoid of any tubbs in the recording signal path, sounded hopelessly clinical and cold through the Classé. On the other hand, with Lesley Olsher's *Lesley & the Santa Fe Sound Machine* (Vital Music VF003), a recording with which I'm intumetly familiar, the Classé clearly disclosed use of tubes in the recording chain—the warmth of Manley's tube mikes shone right through.

The M-700 is a wide-bandwidth amplifier that actually sounds fast. Transient attack and decay were facilitated in exemplary fashion—fast attack followed by taut, clean propagation into the noise floor of the recording. Transient resolution was derived from an inherently pure and natural treble range—not from the etched or overly bright high ends which many solid-state amps possess, and which subjectively emphasize treble detail.

Caution should, however, be exercised if you're considering a heavy-metal speaker as a matching load. While metal-diaphragm drivers are quite detailed, they often ring (especially the tweeter, which is operated over the range where its breakup modes occur). This can produce a metallic flavor which I've grown tired of. While the Classé didn't exaggerate this problem, the zip of metal domes had no place to hide.

This may actually be a blessing to some. I've found to my dismay that a significant sector of the high-end market prefers a bright sound—probably shades of lifelong over-exposure to tinny TV and automobile speakers. If (praise the Muses) live music is still your reference, then a softer-sounding solid-state amplifier, such as the Coda 2.5, may be what the doctor ordered. Better yet, consider a tube design. By virtue of their limited frequency bandwidths, tube amps tend to soften the treble range and liquefy the midrange, thus nicely complementing metal drivers. I wonder how many Avalon loudspeaker owners, for example, discover the joy of tubes after having a fling with solid-state.

While the M-700 failed to erect the spatial perspective of a Jadis JA 200 or a Fourier Sans Pareil OTL, it nevertheless came very close to conjuring up a spatial illusion that even Toob Man could live with. Source material permitting, the Classé painted a panoramic, highly transparent soundstage that had excellent depth perspective. Image outlines were tightly focused, so massed voices were concisely resolved.

While it lacked the imaging vividness of some of the finest tube amps around, the M-700 outdistanced the average tube amp in that it didn't smear outlines as the harmonic envelope moved toward the upper registers. Image outlines were rock-solid from the bottom to the top of the spectrum. The acoustic signatures of various halls were readily discernible—a tribute to the Classé's inherent clarity. A case in point is Cecilia Bartoli's *If You Love Me* (London 436 267-2), a collection of 18th-century Italian songs, with György Fischer on piano. Recording engineer Jonathan Stokes superbly captured the ambiance of Vienna's Konzerthaus Mozart Hall; through the M-700, I was easily able to step into the soundstage.

Female voice is an excellent tool for separating any amplifier's wheat from its chaff, the criteria being truth of timbre, smoothness of texture without any attendant harshness, grain, or gratuitous brightness, and a realistic dynamic bloom. The M-700 performed extremely well. Although the amp failed to euphonically camouflage the soundstage and the midrange had no romantic tendencies, the music's microdynamics ebbed and flowed with great conviction, and harmonic textures were supple and liquid with a preamp of the stature of the Air Tight ATC-2 in the chain. For better or for worse, I basically heard the sound of the front end.

High-powered orchestral music was effortlessly facilitated—even into such inefficient and insensitive loads as the Sound-Lab A-1. The M-700 was only the second amplifier to come my way (the first was the Fourier Sans Pareil) that didn't clip on the A-1s at realistic playback levels. Dynamic contrasts from loud to very loud appeared to be rocket-launched into the sonic stratosphere without a hint of compression or congestion. I guess it's nice to have the power reserve of an M-700—even into the gates of impedance hell.

Orchestral bass foundations were fleshted out with remarkable extension and definition. Kickdrum and the lowest registers of double-bass were tightly defined; upper bass was exceptionally tuneful. Julius Berger's cello on Max Bruch's *Adagio on a Celtic Theme for Cello and Orchestra* (eds 6060) sounded tightly focused and gloriously sweet. The M-700 also was able to commandingly convey the punch and crunch of the bottom octaves. The impact and power of "Tsunami," as performed by the San Francisco Taiko Dojo (*Rising Sun* soundtrack, Arista 07822-11003-2), almost knocked me out of my listening seat—bass power at its wildest-dream best.

**Measurements from *Tjin***

A full set of measurements of the Classé M-700 was made in the unbalanced mode, which DO used for most of his listening. Input impedance, gain, Signal/Noise, and frequency response were, however, also checked in the balanced mode. Following the VS-power, one-hour preconditioning test, the M-700's heatsinks were too hot to touch comfortably for more than a second or two.

The M-700's input impedance measured 76.1k ohms unbalanced, 162k ohms balanced. Its output impedance was very low at under 0.03 ohms at either 1kHz or 20Hz, increasing to a maximum of just under 0.08 ohms at 20kHz. Voltage gain into 8 ohms measured 28.9dB unbalanced, 23dB balanced. As with the Classé Fifteen I measured for Larry Greenhill's November '94 review (Vol.17 No.11, p.157), this is just the opposite of the expected result, in which the balanced gain is normally 6dB greater than...
Clockwise from upper left:
- Harbeth Compact 7, HL-P3 and BBC LS5/12a loudspeakers
- Graham 1.5" tonearm
- Benz Micro Ruby wood body phono cartridge
- Benz Micro Lukaschek PP-1 phono preamplifier
- Basis Gold Debut Standard turntable
the unbalanced. DC offset was a low 3.9mV, S/N (unweighted at 1W into 8 ohms) measured 102dB unbalanced, a slightly better 103.3dB balanced.

The M-700 is non-inverting in its unbalanced mode; in the balanced, pin 2 is configured as the positive leg.

Fig.1 shows the frequency response of the M-700 at 1W into 8 ohms, unbalanced. The balanced response, as well as the response at 2W into 4 ohms, was virtually identical, and is not shown. The M-700's 10kHz squarewave (fig.2) shows the gently rounded leading edge consistent with the mild HF rolloff seen in fig.1.

The THD+noise vs frequency curves are shown in fig.3. As is often seen, the distortion increases noticeably, but not alarmingly, at higher frequencies, particularly as the load impedance drops. This is similar to the performance seen in the Classe Fifteen. The 1kHz distortion waveform (fig.4) shows primarily a third-harmonic component, combined with some higher-order harmonics.

The M-700, though it will put out large amounts of power briefly into 4 ohms, would not sustain very high power levels into that impedance for more than two or three seconds before its main power-supply fuse overheated and blew. Therefore, I ran the spectrum analyses shown in figs.5 and 6 at 5/8-power (or as close to it as possible) only into 8 ohm loads. The output spectrum of 50Hz at a 469W output into 8 ohms (75 the rated power of 700W) is shown in fig.5. All of the distortion artifacts are extremely low, the largest being the fifth at -91.3dB, or about 0.0025%.

Fig.6 shows the spectrum of a combined 19+20kHz signal—the intermodulation products resulting from an input signal consisting of an equal combination of these two frequencies—at 406W into 8 ohms. Clipping was visible with this signal just above this power level. The largest artifacts here are at 18kHz and 21kHz (about -66dB, or about 0.05%).

The 1kHz, THD+N is output curves are shown in fig.7. The distortion remains very low up to very high power levels, above which the normal rapid increase in distortion occurs at the onset of clipping. Note the abrupt end of the 2 ohm curve—the power-supply fuse blew at this point. From the trend of the curve, however, I have little doubt that the M-700 could approach or exceed an output of 2kW into 2 ohms at 1kHz—at least briefly. The sweep signal required to produce fig.7 lasts for several seconds, during which the power-supply fuse has time to heat up, then fail. This would be unlikely on normal musical transients.

Because of the M-700's susceptibility to blowing fuses at high power with low impedance loads, I took the discrete clipping level (at 1% THD+N) only into 8 ohms. The result: 859W (29.3dBW) output with an AC-line voltage of 113V.

The test-bench results of the Classe M-700 leave little room for criticism, except perhaps for its tendency to pop its power-supply fuses (albeit with no subsequent ill effects) into low impedance loads with sustained high outputs.

—Thomas J. Norton

**FINAL THOUGHTS FROM DO**

Should you purchase the Classe M-700?

That depends what sonic role you think a power amplifier ought to play. This is a reference tool, plain and simple, that unmasks what comes before it with refreshing lucidity; it's no NBC peacock strutting a fan of colorations across the soundstage. The Classe refuses to euphonomize reproduced sound, touching squarely on the issue of musicality. I believe that, with the right front end (ie, tubes), the M-700 could please the most sensitive musical soul.

Of all the solid-state gear I've heard to date, including Krells and Levinsons, the Classe's voicing, in tandem with that of the top-of-the-line Symphonic Line gear, strikes me as the most musically convincing of all. Combining mastery over the finest aspects of music with kick-ass dynamics and bass mentality, the Classe should satisfy on Nirvana or Mozart! Highly recommended.

—Dick Olsher

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1 As we went to press, we learned from Classe that the M-700 is to be discontinued this month and replaced by an entirely new model. Dealers should still have stocks of the M-700, however.

—JA
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I
n the ice-cream world, chocolate is the universal end of the line. Vanilla experiments that taste great but look foul, maple syrup flavors that are more maple than syrup, tutti-frutti that's too tutti—all are recycled as chocolate flavor, their visual sins permanently hidden from view. In the world of wood, the equivalent of chocolate ice cream is the ubiquitous "black ash" veneer. The original color and character of the wood are irrelevant: it all ends up stained black.

I was reminded of chocolate ice cream when I unpacked the loudspeakers I'm reviewing this month. While very different from one another in many ways, both are finished in chocolate—I mean, black ash veneer. Both are two-way ported designs from designers who learned their speaker engineering at the British Broadcasting Corporation. The Epos ES 14 was designed by Robin Marshall1 after he'd left the government-controlled broadcasting organization; Robin had played a small role in the development of the BBC's classic LS3/5A design. The Harbeth BBC LS5/12A was developed by Graham Whitehead at the BBC's Design & Development Department.

Both speakers are also typically British in that they are not time-coherent. In the December 1994 Stereophile, I reviewed two small two-way speakers from American designers—the Spica TC-60 and the Dunlavy Audio Labs SC-1—for which time coherency had been a major design goal. The fact that both speakers had superbly flat, uncolored midranges also revealed their designers' not forgetting the importance of the traditional frequency–response measurement. In the UK, however, while flat frequency response has always been a prime goal, for a speaker to be time coherent has never been considered a necessary indicator of goodness.

MEASUREMENT PROGRAM
Almost all the measurements accompanying this review were made with the DR Labs MLSSA system, a full-length card that fits into a PC. This generates a pseudo-random noise signal which is picked up by a B&K 4006 microphone, calibrated to be flat on-axis at the approximate measuring distance I use. The host computer then compares the microphone's output with the drive signal it sent out to the loudspeaker and, by performing a cross-correlation operation, calculates the speaker's impulse response. By windowing out reflections of the speaker's output from room boundaries, a good estimate of its anechoic amplitude in the midrange and above can be made by performing a Fast Fourier Transform operation on that impulse response. To assess low–frequency performance, I repeat the procedure with the microphone almost touching the woofer and port opening; this, too, allows the room to be almost entirely removed from the equation. To look at the speaker's horizontal and vertical dispersion, I take a series of measurements, rotating the speaker a predetermined angle between each reading using the Italian Outline computer-controlled speaker stand/turntable.

The impedance magnitude and phase were measured using the Audio Precision System 1, while for the 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 which in my room has proved to give a good correlation with a loudspeaker's perceived balance. I use an Audio Control Industrial SA-3050A 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 Goldline DSP-30 automated spectrum analyzer, which is currently under review.

Finally, I examine the vibrational behavior of a loudspeaker's cabinet by tapping a simple PVDF–film accelerometer to the panels and driving the loudspeaker with the MLSSA signal at a high level (around 7.6V RMS). The computer can then calculate the impulse response of the panel from the output of the accelerometer, which is amplified/buffered by a small battery–powered preamplifier.

SYSTEM CONTEXT
Power amplifiers used to drive these speakers were a pair of Mark Levinson No.20.6 monoblocks; the preamplifier was the remote-controlled Mark Levinson No.385. A Mod Squad Phono Drive EPS amplified LP signals from a Linn Sondek/Cirkus/Trampolin/Lingo/Ekos/Arkiv setup sitting on an ArchiDec table. Digital source was a Mark Levinson No.30 driven by a Mark Levinson No.31 transport via Madrigal AES/EBU cable and an Audio Alchemy DT! Pro or a Sonic Frontiers UltrajitterBug.

Interconnects used were AudioQuest's AudioTruth Lapis x3; speaker cable was a bi-wired set of AudioTruth Sterling. All source components and preamps were plugged into a Power Wedge 116, itself plugged into one of my listening room's two specially installed dedicated AC circuits and fitted with the Power Enhancer option. The speakers sat on 24" lead-shot–filled Celestion Si stands, interfaced to the stand top–plates with small pads of Blu-Tack. The stands were spiked to the tile–on–concrete floor beneath the carpet and pad.

My dedicated room measures approximately 19' by 16.5', with a 9' ceiling. The
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wall behind the speakers is faced with books and LPs, while further book- and CD shelves occupy the positions on the sidewalls where the first reflection from each speaker would occur. The room is carpeted, and there are patches of Sonex foam on the ceiling to damp the first reflections of the sound. The other wall has RPG Absfusors and ASC Tube Traps behind the listening seat to absorb and diffuse what would otherwise be early rear-wall reflections of the sound that might blur the stereo imaging precision. More Tube Traps are used in the room corners to even out the room’s bass resonances, the result being a relatively uniform reverberation time of around 200ms from the upper bass to the mid-treble, falling to 150ms above 10kHz. The room sounds relatively dry, without a lot of bass bloom, but is extremely articulate.

**Epos ES 14: $1395/PAIR**

The Epos ES 14 was last reviewed in *Stereophile* by Thomas J. Norton in 1988 and Sam Tellig in 1990, both of whom enthusiastically recommended it. As it was upgraded a couple of years back to allow for bi-wiring, I thought it worth taking a third listen and look.

The ES 14 is a reasonably large stand-mounted loudspeaker with a handsome aspect ratio. Though the top two-thirds of its front baffle is made from $\frac{1}{2}$" MDF, the front plates of the drive-units are square/rectangular castings that occupy the full baffle width. When each is fixed in position with four Allen-head bolts, which screw into captive T-nuts, the result is a strong metal/wood sandwich. In addition, because the driver front plates are rabbed, the result is a flush acoustic environment for the drive-units, optimizing their dispersion. The rest of the cabinet appears to be made from $\frac{1}{4}$" MDF, veneered on the inside surfaces as well as the outer ones, while bracing is provided by a horizontal aluminum rod that holds the sidewalls under tension. Urethane foam partly fills the inner cavity.

Both of the 14’s drive-units are manufactured by Epos. Prominent on the front baffle is a 1" aluminum-dome tweeter, protected from prying two-year-old fingers by a wire mesh and mounted vertically-in-line above a plastic-cone woofer. Rather than a dust-cap, the latter features a stationary “phase plug” attached to the magnet pole-piece. The woofer is also unusual in that it uses a 17mm-long magnet gap and a 5mm coil, as opposed to the normal system in which a coil perhaps 12-14mm long works in a 6mm gap. This gives superior linearity/lower distortion because the coil is always driven by a more nearly constant magnetic field. In addition, the fact that the coil is totally enclosed by a large amount of steel endows the drive-unit with good thermal stability, leading to good power handling and dynamic range capability.

The downside—there's always a downside—is that it makes for an expensive woofer. The magnet has to be physically much larger and heavier than normal for the same amount of drive, which is proportional to the magnetic flux multiplied by the length of the coil. The woofer uses an inverted half-roll-lateral and is reflex-loaded via a large port on the speaker's rear, 2.7" (70mm) in diameter and about 8" long. The port can be filled with a cylinder of polyurethane foam to convert the ES 14’s bass alignment to an overdamped sealed-box, if room acoustics or personal taste make that a desirable choice.

There isn’t a grille. The crossover is also unusual in that there almost isn’t one! The woofer is connected directly to the input terminals; the tweeter has a series capacitor—a 2.4µF non-polarized electrolytic type—stuck to its magnet, and that’s it. Robin Marshall believes in using a minimal crossover to maximize dynamic range and retrieval of detail. He also states that if you can spread the transition between the two drive-units over a larger part of the bandwidth than normal by using gentle-slope crossover filters, you can achieve a controlled off-axis dispersion across the band. However, this means that the bass driver has to be designed to have a natural roll-off slope to complement the tweeter’s first-order high-pass action. And that’s not something speaker designers who buy off-the-shelf parts have the luxury of doing.

Internal wiring is good-quality multistrand, and the drive-unit joints are soldered. Electrical connection is via two pairs of 4mm sockets that take banana plugs—optimally, the British spring-loaded ones. All in all, the ES 14 is very well engineered for what is a relatively affordable loudspeaker.

**Sound:** I started off using the foam inserts in the ES 14s' ports, but in my room, which is rather bass-shy, the balance was too lean. The acid test for a loudspeaker’s bass alignment—pace all those who discount those of us who find nonclassical music useful for reaching accurate value judgments—is to play a rock or fusion track with heavy four-in-the-bar bass guitar and kick drum. It might seem obvious, but, as demonstrated in a paper presented at the 1994 AES Convention by Sean Olive and Floyd Toole, you can't judge a loud-speaker's performance at the frequency extremes with program material that doesn't have any content in these regions—even if it is the sound of acoustic instruments in real space. Forget high-end political correctness; what’s important is to choose music that exposes what’s right and what’s wrong with a component’s behavior.

For quite a while now, my favorite torturer track to test bass performance has been Stanley Clarke’s *East River Drive* album (Epic EK 47489), particularly track 5, “Africa I’m Home.” With the foam in the ports, the 0dBFS kick drum on this track jumped out of the speakers, but lacked a little body weight. I ended up doing almost all my auditioning with the speakers in reflex mode. Though this gave the most extended and satisfying midbass performance, with good, weighty low frequencies audible down to the 35Hz region, the speaker did sound a little slower in the lows. This, I felt, was an acceptable tradeoff, given that the “Africa” kick drum was now viscerally exciting, the leading-edge sound of the drumskin being supported by a generous amount of body. In absolute terms, this was a little too much, but it wasn’t too turgid in the manner of the BBC L55/12A’s upper-bass balance. The adrenaline-laced title track of Stanley Clarke’s 1976

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2 Stereophile, Vol.11 No.6, p.117, and Vol.13 No.1, p.73, respectively.

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School Days album (Epic EK 36975), for example, boogied like a good'un, my feet a-tappin' nonstop in response to the Clarke muzzle's powerfully percussive picking'n'popping. "Musique non-stop!" agreed Kraftwerk on their Electric Cafe CD (Warner Bros. 25525-2), the next up at bat on the '31, the Epos's low-frequency extension making me desirous for some synthesized and sampled sub-lows.

Listening to this deconstructionist Teutonic mélange at high levels, I realized that what I wasn't hearing was the usual scrunching-up of dynamics and grainy grunting-up of the midrange that I associate with affordable two-way speakers. Whatever the soundsource playing (and on this album, they range from thunderous drum synths through sampled voices to telephone tones, all washed down with a variety of reverberation and gated echoes), they seemed much clearer, and freer from overlap with each other, than I'm used to.

This freedom from grain, or accurate reproduction of music's microdynamics, however you want to term it, was as easily apparent on classical recordings. The contrast between different instrumental tone colors seemed enhanced. The excellent Chesky "Gold Series" reissue CD of the Barbabroli Sibelius Symphony 2 (CG903), for example, more effectively conjured up visions of Finnish fastnesses fighting off the icy attack of Winter.

Perhaps because of this aspect of its performance, the ES 14 was a soundstage champ. The pizzicato strings punctuating the Sibelius's first movement could be heard to light up the acoustic of Walthamstow's Town Hall via the Epos. (I performed in this cavernous hall a few times in my musician days and never could conquer the acoustic. But with an engineer of genius at the console, like the legendary Kenneth (Wilkie) Wilkinson on this 1962 Sibelius recording, the auditorium's ambience is forced to perform in the service of the music.)

And on my Robert Silverman Concert recording (Stereophile STPH005-2), the piano image, while diffuse as a result of the spaced-omni mike technique I used, was palpably present in spades.

There was one aspect of the Epos's highs that did bother me, however. A treble spiciness was occasionally noticeable. This sometimes accented modulation noise on analog tape recordings and lent a shrieky quality to recordings that were already overcooked in the highs. And when I was experimenting with the noise-shaping curves provided by the Meridian 618 digital processor to prepare our recent Concert CD, the more extreme DSP algorithms, which heavily boost the noise above 10kHz, could be heard to add a strange whispering quality on climaxes via the Epos ES 14s which was not noticeable on, for example, the Harbeth LS5/12As. Don't get me wrong — I'm not saying that this was the fault of the Eposes, nor did it happen very often. Rather, they were changing the program material's high treble balance so that digital errors—either in the original ADC or in the subsequent DSP—that should have remained safely tucked out of harm's way became unmasked. I can't see that this idiosyncrasy should be a major problem with the ES 14s.

Oh, and of midrange colorations? The ES 14's upper mids are a little forward. That's it. No vocal vocalizations, no identifiable character.

To sum up, I was sorry to see the Epos ES 14s leave my listening room. At $1395/pair ($1645 with stands), I was very sorry.

**Measurements:** The ES 14 has a reasonably high sensitivity, 2.83V of B-weighted pink noise raising an estimated 87dB/Wm. Coupled with this highish sensitivity, it is very easy to drive, as shown by the plots of impedance magnitude and phase (figs.1 and 2). It drops below 8 ohms only in the very top octave, and then to just 7.2 ohms. I would have said that this combination of sensitivity and easy impedance characteristic would make the ES 14 a prime candidate for being driven by a classic tube amplifier. Note, however, the large swing in impedance value, particularly in the bass and upper midrange. This will mean that the speaker's sound will become exaggerated in these frequency regions when used with a tube amplifier with a high output impedance. The resultant tonal balance may depart too far from strict neutrality to be acceptable, given that the ES 14 is already a little forward-balanced in the upper midrange.

Fig.1 shows the impedance measured with the ES 14's reflex port in operation. The saddle at 43Hz reveals the port's tuning. For comparison, the impedance traces in fig.2 were taken with the foam plug in the port. The single peak in the bass indicates that this effectively transforms the ES 14 into a traditional sealed-box design, tuned to 52Hz.

I'm not sure what the wriggles in the trace at 200Hz signify. They don't look like a resonance—the blip at 25kHz is due to the metal-dome tweeter's "oil-can" resonance, for example. Perhaps there's some sort of mechanical equalization present in the woofer's construction. Although you won't be able to see it at the scale these graphs are reproduced in the magazine, there is a very slight wrinkle around 350Hz which does correlate with a cabinet resonance at this frequency (see later).

Fig.3 shows the individual responses of the port, woofer, and tweeter. The port's output is the bandpass centered on 45Hz, this frequency the same as the minimum-motion point of the woofer. Though there is a significant port resonance mode apparent at 870Hz, this is about 15dB from the speaker's nominal output at that frequency. This, in conjunction with the fact that the port is on the speaker's rear panel, facing away from the listener, should minimize this resonant mode's audibility. The woofer's output rises a little toward the top of its passband before rolling out steeply above 3kHz. This is the natural response of the drive-unit, there not being any low-pass filter present; but note the series of cone breakup modes visible between 4kHz and 22kHz. The tweeter comes in relatively slowly, but suffers from a series of peaks and dips before its output zooms.
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How these responses sum on the tweeter axis can be seen in fig.4. Both sealed-box and reflex low-frequency responses are shown in the bass. The former is over-damped, gently sloping down below 100Hz, while the reflex alignment is pretty much maximally flat down to 50Hz, rolling off steeply below that frequency. The upper midrange is a little forward, while the lower midrange is a little recessed; which is perceived by the listener will depend largely on the program material. Apart from the ultrasonic and therefore inaudible peak, the tweeter has a significant response spike apparent at 9.5kHz. This almost certainly is responsible for the occasionally “sniffy” quality I heard.

A peak of energy appears to the speaker’s sides (fig.5) just above 5kHz, filling in the on-axis notch in fig.4. The tonal balance doesn’t change significantly, however, until the listener is more than 15° off-axis. Vertically (fig.6), the ES 14 needs to be used on tall stands—a significant suckout in the crossover region appears if the listener can see the top of the enclosure. However, considering the use of a first-order crossover with its significant degree of overlap between the drive-units, the vertical dispersion is much better controlled than I would have expected. In my listening room, the spatially averaged response (fig.7) is impressively flat through the high midrange and treble, with useful bass power available down to the 32Hz band, the room reinforcing the speaker’s bass response for half an octave below its nominal 50Hz cutoff.

In the time domain, the Epos’s impulse response (fig.8) is dominated by the ultrasonic tweeter ringing. This can also be seen on the associated step response (fig.9), which reveals both that the tweeter and woofer are connected with the same acoustic polarity, and that the former leads the latter a little in time, as is always the case with speakers with flat vertical baffles. Simple crossovers do not in themselves confer time coherency on a speaker; the drive-unit acoustic centers must also be the same distance from the listener/microphone.

Fig.10 shows the cumulative spectral-decay, or waterfall, plot calculated from the impulse response data. This is relatively clean, though resonant modes can be seen just under 2kHz and at 3kHz, these presumably due to the woofer cone misbehaving. The big peak at 25kHz is our old friend, the tweeter’s “oil-can” dome resonance—it won’t be audible unless it’s so intense that intermodulation products fold down into the audioband. As I noted, I was occasionally disturbed by what sounded like high-frequency modulation noise on transient-rich analog program without much psychoacoustic masking—piano recordings, as the lay person would call it. Perhaps this could be laid at the feet of the tweeter.

I mentioned earlier that the transparency traces hinted at a cabinet resonance in the 350Hz region. Calculating waterfall plots from the output of a simple plastic-film accelerometer taped to the cabinet

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**Fig.4** Epos ES 14, anechoic response on tweeter axis at 45° averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield woofer and port responses below 300Hz (top) and nearfield response of woofer with port blocked by foam plug (bottom).

**Fig.5** Epos ES 14, horizontal response family at 45°, normalized to response on tweeter axis, from back to front: differences in response 90°–5° off-axis; reference response; differences in response 5°–90° off-axis.

**Fig.6** Epos ES 14, vertical response family at 45°, normalized to response on tweeter axis, from back to front: differences in response 15°–5° above tweeter axis; reference response; differences in response 5°–15° below tweeter axis.

**Fig.7** Epos ES 14, spatially averaged 1/3-octave response in JA’s listening room.

**Fig.8** Epos ES 14, impulse response on tweeter axis at 45° (5ms time window, 30kHz bandwidth).

**Fig.9** Epos ES 14, step response on tweeter axis at 45° (5ms time window, 30kHz bandwidth).
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panels reveals there to be just one identifiable resonance at 360Hz, this fairly strong on the side panels (fig.11) but much less so on the top and back panels. This is quite a high frequency for a speaker the size of the ES 14, implying that the speaker’s internal bracing/tensioning rod is doing its job.

**Conclusion:** I was pleasantly surprised by the Epos ES 14, this eight-year-old design still proving more than competitive at its relatively affordable price. My few quibbles were minor ones; I can confidently recommend the ES 14 to those without a fortune to spend on loudspeakers but who want good bass extension, excellent soundstaging, a pretty clean treble, and good dynamics.

**Harbeth LS5/12A: $2200/PAIR**

This tiny monitor was developed by Graham Whitehead of the BBC’s Engineering Department, a team famed for its work on monitors in the ‘70s, and which designed the classic LS3/5a, among other loudspeakers. Sadly, to save money the BBC has axed the staff in this department, meaning that the LS5/12A might be the last loudspeaker design to come from the BBC. As with all BBC designs, however, actual manufacture is licensed to outside companies; the LS5/12A is being produced by Harbeth Acoustics, the company founded by ex-BBC engineer Dudley Harwood and now run by LS3/5A enthusiast Alan Shaw (see “Manufacturers’ Comments,” January 1994, p.235).

The design brief for the LS5/12A was to make a monitor loudspeaker around the same size as the LS3/5A, with a tonal balance similar to existing larger monitors, but to have a much greater dynamic range and a more extended bass than its predecessor. The result is an elegant little loudspeaker, with the front baffle almost entirely occupied by two high-quality Dynaudio drive-units compared with the ’5A’s KEF units. The 1” soft-dome tweeter is an expensive Esotec unit, the D-260, which has a vented pole-piece, while the woofer, a Dynaudio 15W-7508, features a plastic cone with a radiating diameter of 4”, a large voice-coil, and the big dustcap typical of this company’s driver designs. The woofer is reflex-loaded by a large port on the cabinet rear, this about 5.5” deep and 2” in diameter. The port opening to the outside world is flared to minimize wind noise at high levels.

There are two pairs of metal binding posts on the cabinet rear to allow for biwiring. The LS5/12A can also be special-ordered with Neutrik Speakon connectors. Internal wiring is good-quality multistrand, and all the joints are soldered. The crossover appears to be fourth-order, and is constructed on a glass-fiber printed circuit board attached to the terminal posts. It is said to be relatively simple, due to the Dynaudio drive-units having naturally smooth responses, but still features a large number of parts—six inductors, eight capacitors, and seven resistors. These appear to be of high quality; for example, plastic film capacitors are used (with one exception in the woofer circuit) rather than electrolytics. However, although air-cored inductors are specified in the promotional literature, all the coils in the review samples featured ferrite cores. (This is an approved production change.)

I was interested to note in the LS5/12A’s publicity material that “the final balance of the system was optimized after extended listening trials in BBC studios, comparing the output of the loudspeakers with that of live program. Thus the balance has been set to re-create reality in a room, not a theoretical anechoic measurement ideal.” This sounds like a praiseworthy goal, but it does throw the responsibility for the speaker sounding neutral on the methodology used for the listening tests. The very different directivities of loudspeakers and “live program” can add a significant disturbing variable into a listening test which, if not accounted for, can lead to a preference for a decidedly non-flat balance, in my experience.

One QA aspect of the speaker should be noted. After six months, the black ash veneer on one cabinet split vertically and started peeling away from the carcase. This is probably just a sample fault, but Harbeth should look into it.

**Sound:** All during the review period, I...
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kept flip-flopping over the merits of the Harbeth LS5/12A. When it was good, it was very, very good. When it was bad... well, it was never really bad, it just failed to light my fire.

First the good news: Harbeth's LS5/12A has a simply stunning midrange—significantly more neutral than the LS3/5A, which always had a bit of a nasal honk at the top of the woofer's passband. Voices, while appearing to be a little more forward than I'm used to, sounded very natural. Midrange colorations there were none! And on rather complicated recordings, such as the superb new Dave Matthews Band CD (Under the Table and Dreaming, RCA 64449-2), sonic soup was never in evidence, every little detail in the mix easily apparent.

The '5.12As' imaging was also precisely focused and very stable with both frequency and lateral position, if not sounding quite as palpable as the Spica TC-60 and Dunlavy SC-1, both champs in this respect. There's that lack of time alignment, I guess.

The LS5/12A also sounds considerably more dynamic than the LS3/5A. An astonishing amount of sound comes from these two tiny boxes. While its sound grows up early compared, for example, with the much larger Epos ES 14, in this respect this is a loudspeaker to confound critics of "minimonitor sound."

Naturally recorded classical piano came over with a considerable amount of lower-frequency authority—perhaps too much, as recordings that I knew to be flat in the bass tended to sound too rich. I'll give you an example: For the next Stereophile Robert Silverman release—a tumultuous performance of the Liszt Piano Sonata in b—we used two pairs of microphones and recorded with 20-bit resolution on the four channels of a Nagra D open-reel digital recorder. The first pair were spaced omnidirectional B&K 4006s, the mikes used for our recent Concert release, while the second pair of mikes was actually a single stereo model, the Schoeps KFM-6U "Sphere." The B&Ks have terrific low-frequency extension but rather hazy imaging; the Schoeps Sphere has much more solid imaging but lacks low-frequency weight. Except when I played 16-bit DAT back-ups of the Nagra tapes over the Harbeths, the Schoeps sounded perfect, the B&Ks too fat. The naive listener might well conclude that the LS5/12A has "great bass"—me, I started worrying that the speaker's low-frequency alignment might be a little too good to be true.

Naturally, I reached for Stanley Clarke's East River Drive album (Epic

And in that area the LS5/12A falls down—perhaps only slightly for some, and not as much as I'd expected from its other reviews, but enough to rule it out of contention for me.

Measurements: Though it drops to 6.4 ohms in the upper bass, the LS5/12A's impedance plot (fig.12) reveals the speaker to be relatively easy to drive. This is a good thing, as its estimated sensitivity, though basically to specification at 81.5B/W/m (B-weighted), is very low, 1dB below even the LS3/5A. The port is tuned to a highish 72Hz, as revealed by the saddle in the magnitude trace at that frequency. As expected from the small, rigid cabinet construction, no wrinkles due to panel resonances can be seen in fig.12.

The Harbeth's individual drive-unit and port responses are shown in fig.13. The port's output peaks at 80Hz rather than the expected 72Hz, the minimum-motion point of the woofer cone. Higher in frequency, the woofer peaks up at 2.4kHz before rolling out sharply. The tweeter actually seems to come in a little early, though it doesn't actually plateau until 4kHz.

The sum of these responses can be seen in fig.14, which shows the response averaged across a 30° horizontal window on the tweeter axis spliced to the complex sum—magnitude and phase—all the way to the tweeter and port outputs. The bass peaks up sharply at 100Hz before rolling out at a steep 24dB/octave. Higher in frequency, the general response trend is pretty flat, but, as implied in fig.13, the...
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crossover from the woofer to the tweeter is suboptimal in that the response peaks up where the drive-units overlap.

As might be expected from the woofer’s small radiating diameter and the narrow baffle, the LS5/12A’s lateral dispersion behavior (fig.15) is excellent. The manner in which the high frequencies roll off to the speaker’s side is even and well-controlled, though the top octave rolls off a little prematurely. Vertically (fig.16), the response is maintained to 5° above the tweeter and 10° below, with crossover notches developing at more extreme angles. Given the on-axis peak at 2.4kHz, it would probably be best to listen with this Harbeth on stands high enough that you end up sitting on the woofer axis. Alternatively, if you placed it on a stand low enough that, when seated, you could see the top of the enclosure, this would pull down the direct energy in the crossover region to give a more neutral mid-treble balance.

In my listening room, however, the Harbeths proved relentlessly bright, which can be seen in the spatially averaged room response (fig.17) as the energy excess between 2kHz and 6kHz. Also as expected from my auditioning, the low frequencies in this graph are also peaked up. Early reports on the LS5/12A were that it was bright, but some modifications had been performed to alleviate this. So why did I still find it a problem? Note that, probably due to the tweeter’s limited directivity in the top octave, this graph is a little rolled-off in this region. This will have the subjective effect of accentuating any mid-treble boost. I also wonder if the BBC’s modification had involved adjusting the tweeter’s level when the real culprits are a problem at the top of the woofer’s response and the overlap in the drive-unit passbands, as shown in figs.13 and 14.

In fact, there is a clear correlation between the Harbeth’s perceived tonal balance and the trace in fig.17. I have to say to any loudspeaker designer that this kind of in-room response is almost guaranteed to mark a speaker down in my listening tests. Yes, it does bring detail forward in the mix, but gets too fatigu ing too quickly, in my experience, for any kind of long-term listening pleasure. As to why the BBC’s “Golden Ears” preferred this type of balance...

In the time domain, the impulse response (fig.18) is typical of a design using high-order crossover filters, while the associated step response (fig.19) indicates that the two drivers are connected in the same, positive acoustic polarity, with the tweeter’s output slightly leading that of the woofer. The waterfall, or cumulative spectral-decay, plot (fig.20) calculated from the impulse response is very clean overall, but is marred by a significant resonant ridge at 2.4kHz, this associated with the peak in the woofer’s response at this frequency. A second resonant ridge can also be seen an octave higher. These resonant modes will both contribute to the speaker sounding bright and make its balance rather “hard,” overall.

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5 Trevor Butler, in Hi-Fi News & Record Review, December ’93, Vol.38 No.12, p.39.
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were smooth, the Harbeth's cabinet does have one panel resonance detectable, just under 400Hz. This can be seen in fig.21.

Conclusion: Being a long-term BBC LS3/5A owner, I really wanted to like the Harbeth BBC LS5/12A. As a professional nearfield studio monitor, where its balance will be revealing of poor tape splices and disturbing background noises, and its increased dynamic range compared with the LS3/5A will be an advantage, I'm sure it has a successful career ahead of it. But as a domestic loudspeaker, I'm less impressed. Yes, the new speaker will play louder than its BBC predecessor, and it has a superbly neutral midrange balance. But homo audiophile doesn't live by the midrange alone. Ultimately, the LS5/12A's bass and treble balance irritated me, particularly on rock music, to the point where I was happy to stop listening to my music. When you consider that Harbeth's own superb little HL-P3, which I reviewed in December 1993 (Vol.16 No.12, p.189), is both more neutrally balanced in the treble and has a particularly well-tuned bass, and that it costs only half as much as the LS5/12A, you'll see why I don't think a recommendation for this final design to come from the BBC's Engineering Department is appropriate. Sorry, Auntie Beeb!

(Incidentally, ignore the ridge just below 16kHz in this graph, which is due to the computer's monitor's screen.)

Finally, though the impedance traces
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Neither its rather pedestrian name nor Manley Labs' own literature gives much of a clue as to the 175 monoblock's special pedigree. Where are the bands, the fanfare? After all, the rolling-out of a 6L6–based high-power audiophile-grade tube amplifier definitely qualifies in my book as a momentous occasion. Deplorably, such happenings are rare indeed; the 6L6 has been unjustly neglected in high-end circles.

The 6L6 was the first–ever beam power tube to be designed, and a certifiable American classic. Thousands upon thousands of guitar amplifiers, from Fenders to Mesa Boogie, have used the 6L6 family of tubes over the years. This is no accident or fad, but the direct result of the 6L6's essential musicality. Understand that guitar amps are routinely driven hard, much of the time into clipping—even a moderate twang on an electric guitar string is almost sufficient to drive an amp into overload.

I asked Randall Smith of Mesa Engineering (home of Mesa/Boogie) why he thinks the 6L6 is so appealing for musical–instrument use. His answer, not surprisingly, related to the manner in which it clips. Unlike an EL34, which clips with a blaze of raspy odd-order distortion products, the 6L6 yields a distortion spectrum rich in even-order harmonic products—a benign and musically attractive tinting of tonal color that gives a rounder, more liquid tone. A million guitar players can't be wrong—they’ve esteemed the 6L6 as a sonic talisman because of its ability to perform passionately under pressure.

I believe that a domestic power amp, too, must be able to perform under pressure; 100–watters are often called upon to drive loudspeakers that barely scrape a sensitivity spec of 84dB. An amp in such an application will red-line more often than you might think.

The 6L6 also happens to be a rugged tube—as it has to be for musical–instrument use. Guitar amps are designed to withstand being knocked over during bar fights, tripped up by lounge lizards, and dropped off the backs of band vans. In the '50s and '60s, the British, bless their hearts, routinely used KT66s—close cousins of the 6L6. In this country, the 6L6 has been snubbed by high-end designers—at least until just recently. What a collective blind spot! The Manley 175 should change all that.

**Technical Details**

The input signal of the 175 is direct-coupled to the grids of a 12AT7WA dual-triode, both halves of which are connected in parallel. Following the input stage, the signal is RC-coupled to a 6350 dual-triode connected as a cathode-coupled phase splitter. Note that the 6350 is the American military version of the 12BH7A, but with a different pin-out. Be warned: there is no substitute.

The output stage is dominated by an octet of Russian (Sovtek) 5881/6L6WGC beam power tubes operating at a B+ voltage of 525V. According to David Manley, the “W” in the tube designation denotes highest nul–spec to Russian protocols. These tubes are said to be rated by the factory at a maximum plate voltage of 600V—considerably higher than the ratings of ordinary 6L6 types.

The power supply is of conventional design, using solid-state rectification and capacitor–based filter networks. The output transformer is factory–wired for a 5 ohm load—a reasonable guesswork for most dynamic speakers. But this prohibits the 175 from being used with loads that dip below 3 ohms in the bass. However, these type of “short–circuit,” juice–hungry speaker loads aren't really tube territory anyway—they'd force any tube amp into cardiac arrest.

Individual bias pots are provided for the output tubes. The trim pots and test points are conveniently and logically laid out on top of the chassis. A multimeter with a DC voltage function is required for the bias adjustments. The trimpot is adjusted so that the DC voltage across each 10 ohm cathode resistor measures 260–275mV, which, by Ohm’s law, corresponds to a bias current of 26–27mA. The corresponding plate dissipation is a conservative 13W. Manley Labs recommends that the bias be checked every few months. They estimate an output tube life of three to four years with average usage.

**Sound**

My first listen to the Manley 175s was with the Audiostatic ES100/SW100 speaker system; I immediately felt as though the good Lord had plucked me out of my listening seat and slam-dunked me into an ocean of liquid harmonic textures. The music, quite fittingly, was good ol’ Bach’s Violin Concertos 1 and 2 (Itzhak Perlman, Daniel Barenboim, English Chamber Orchestra, EMI/Angel CDC 7 47856 2). Violin phrases were silky–smooth, the mids heavenly suave.
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Imagine biting into the soft, juicy flesh of a Georgia peach, the nectar dripping down your chin. That's what the 175s sounded like. On a scale of 1 to 10, my first impressions of the Manley's mids rated a stunning 10. My first coherent thought was, "Holy triodes! These have got to be the world's best tube amps!"

Then I sobered up enough to form a more objective picture of the 175's performance with the Audioscripts. Stage lighting was darker than with either the Music Reference RM-9 Mk.II or the Pass Labs Aleph Null amplifiers. The presence and lower-treble regions were a bit subdued, such that violin overtones lacked a full measure of sweetness. Specifically, while the extreme treble sounded open and reasonably airy for a tube amp, the 5-10kHz octave seemed deficient in brilliance. Bass lines weren't fleshed out with convincing definition, sounding a bit full and bloated. More seriously, bass-line punch and pace were diminished. I was left wishing for more rhythmic drive and lower-midrange transparency. The net result was that the Manleys were squeezing out some of the music's fire and drama.

These same impressions were reinforced when I switched to Magnepan's Magneplanar MG-20 loudspeakers (review forthcoming). I like to listen to Judy Collins' rendition of "Pretty Polly" (Wind Beneath My Wings, LaserLight 15 451) at loud volumes. This track, which is blessed with a mean guitar solo, rocks 'n' rolls along. The mids sounded glorious as usual, with billowing depth and palpably focused image outlines. The problem, however, was that "Pretty Polly" sounded pretty all right, but not nasty enough. Bass lines didn't boogie, and the feel for the recording venue was somewhat veiled, blunting the music's impact and pace.

I had a similar reaction to Tracy Byrd's No Ordinary Man (MCA Nashville MCAD-10991). Try to imagine country music without the infectious drive—there's little left to write home about. My favorite cut, "Lifestyles of the Not So Rich and Famous," lacked adequate punch and steam; the music was less compelling and involving.

**Tube-rolling**

It was about this time that I started experimenting with tube substitutions. My sincere thanks go to Gold Aero's Frank Morris, who generously provided me with a variety of 6L6 tubes to experiment with. I quickly discovered that the stock input and driver tubes were sonically about as good as anything else I could muster. However, the performance of the 175 monoblocks very much hangs on the choice of output tube.

The sonic fate of any tube product strongly depends on the final choice of tubes, as differing brands of a given type—even different production runs within a single factory—exhibit unique harmonic signatures. Tube aficionados routinely audition several tube brands in a component in an effort to optimize its voicing in the context of a particular system.

Because the whole tube scene is predicated on tube-rolling, I unabashedly advise tubephiles to experiment. In my experience, at least 50% of tube products I've reviewed would have gotten a thumbs-down or been seriously downgraded had they been evaluated with their stock tube complements. I see no indication that tube-gear manufacturers are particularly adept at tube selection.

Most of the tubes I substitute are either in current production (eg, of Russian or Chinese origin), or are New Old Stock (N.O.S.); it, available in quantity, and in tested and graded format from such companies as Gold Aero. Occasionally I'll report on hard-to-find tubes such as Telefunken 12AX7s or Sylvania Gold Brand 5751s, which are worth looking for in particular applications.

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**A Bit of History**

In the July 1936 RCA Review, R.S. Burnap recounted the development of the 6L6 at RCA's Radiotron Division. The power triode operating in class-A was recognized as the ideal output configuration—at least where its low efficiency (about 25%) and moderate power output were not practical obstacles. The power pentode, already around for several years at this time, was capable of class-A operation with nearly twice the plate efficiency of a triode, while requiring less than a third of the drive signal. The pentode's inherent fly in the ointment was rather large levels of third-harmonic distortion under large signal conditions, which unfortunately didn't cancel out in push-pull operation.

Radiotron's Otto Schade developed a new power-tube design combining the low-distortion characteristics of a triode with power sensitivity and efficiency exceeding those of a conventional pentode. Mr. Schade realized that the root cause of a pentode's third-order harmonic distortion was the suppressor grid. While this grid was quite effective in suppressing secondary emission from the plate, at low plate voltages (ie, large drive signals), an increasing number of primary electrons were driven back to the screen grid, causing a rapid drop in plate current (and attendant odd-order distortion of the waveform). It was also apparent that no practical change in the structure of the suppressor grid would eliminate this problem.

Mr. Schade's solution was to dispense with the suppressor grid and instead control secondary emission using the space-charge effect. He formed the electron flow from the screen grid to the plate into a high-density beam using beam-forming plates. At low plate potentials, this beam produces a space charge that drives secondary electrons back to the plate. The homogeneity of the space-charge region was maintained by suitably designing the contours of the cathode, grids, and plate. The proper positioning of the space charge was achieved through adjustment of the screen-plate spacing and the beam angle.

A further innovation was to use screen and control grids of constant pitch, these so assembled that the screen grid is hidden from the cathode by the control grid. This feature makes possible the uniform formation of electron-beam sheets between successive turns of the grid wires. It also reduces screen current and makes possible higher power output. This is a bit tricky to achieve in practice; often, final alignment of the grids is accomplished by viewing the grid structure under a microscope and sliding the grids manually until perfect alignment is obtained. Fig.1 shows an artist's conception of the structure of the new tube. Thus was born the world's first beam power tube.

——Dick Olsher

---

**Fig.1 Structure of beam power tube and formation by grid wires of beam sheets** (from RCA Review, July 1936).
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of the 6L6. Harmonic colors were more sensuous, sounding sweeter and warmer than with the stock tubes. Layering of depth perspective was also better. But, above all else, this tube evinced the drive and energy of the 6L6. The music's microdynamics bloomed without reticence. Loreena McKennitt's "The Lady of Shalott," from The Visit (Warner Bros. 26880-2), ebbed and flowed within a believable dynamic scale so that every dynamic nuance was fully resolvable, and with just the right harmonic palette. Amazingly, the 175 was transformed from a heap of jelly into a finely tuned musical instrument.

Out of the 16 KT66s Manley sent, I could only properly bias 11 of them. With the KT66's higher transconductance, there wasn't enough range in the bias pots to set the bias current at 27mA. That number of KT66s sufficed only for about a channel and a half—I filled in the rest with Russian 5881s. Even so, soundstage transparency advanced several notches over the stock tube complement, while harmonic textures took on a distinctively romantic hue, sounding sweet and tropical-forest lush. Neither was the elemental drive exhibited by the 6L6 shortchanged. The KT66 in this application had classic tube sound in spades, but without sacrificing lower-octave resolution and definition.

**Measurements from TjN**

Following its 1/2-power, one-hour pre-conditioning test, the Manley 175 was no warmer than normal for a tube amplifier. Its input impedance at 1kHz measured 146k ohms; its output impedance was 1.6–1.7 ohms at low and middle frequencies, decreasing slightly to just under 1.5 ohms at 20kHz into 4 ohms. These are middle-of-the-road values for a tube amplifier, in my experience. The Manley's performance—particularly its overall in-system frequency response—will be somewhat dependent on the partnering loudspeaker.

The 175's voltage gain into 8 ohms measured 28.1dB; DC offset was a low 0.7mV, signal/noise (unweighted ref. 1W into 8 ohms) measured 95.7dB. The amplifier was non-inverting in its unbalanced mode.

Fig.1 shows the frequency response of the 175. The differences between its 8 ohm and 4 ohm responses, within the audible range, is insignificant. The 175's 8 ohm response (fig.2) indicates one cycle of damped, ultrasonic ringing (possibly due to the mild, 30kHz rise visible in fig.1), also visible as a very narrow overshoot spike in the 1kHz squarewave (not shown), which is otherwise a textbook squarewave.

The THD+noise vs frequency curves are shown in fig.3, suitably low other than into the punishing 2 ohm load. The 1kHz distortion waveform in fig.4, for 2W output into 4 ohms, indicates a mainly second-order component. The result for 1W into 4 ohms (not shown) was similar, but for 4W into 2 ohms (fig.5), the distortion becomes third-order, with a higher-order component also present.

The spectrum of the 175's output reproducing 50Hz into 4 ohms at a level of 113W is shown in fig.6; the largest artifact is the third harmonic at 150Hz at −37dB, or about 1.5%, with the second and fifth harmonics not far behind. Fig.7 shows the output spectrum with the 175 amplifying a combined 19+20kHz signal (the graph shows the intermodulation products resulting from an input signal consisting of an equal combination of these two frequencies). The level was

---

1 I did consider using the Chinese KT66, which is very much in production and available as a premium-grade, fully tested Golden Dragon product. Tubes By Design's Kevin Hayes was kind enough to provide me with the requisite complement of these. However, the Chinese KT66 looks like a slimmed-down version of the original. Gone is the "fat" glass bottle, and the generous electrode structure with its massive plate. I was uneasy about pressing the Chinese KT66 into service, so decided not to chance it with the Manleys.
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52W into 8 ohms, with clipping visible just above this power level. The highest artifacts here are at 1kHz (~45.6dB, or about 0.5%) and 21kHz (~44.4dB, or about 0.6%). The artifacts of this input signal at 53W into 4 ohms (not shown) were 5–8dB higher: about 1% at 1kHz, and 1.2% at 21kHz. Both the 50Hz and the 19+20kHz spectral responses are acceptable performance for a high-power tube amplifier, though not at all exceptional compared with the best we’ve measured from amplifiers in general.

The 1kHz THD+N is output power curves are shown in fig.8. The distortion characteristic here is quite different from that of most solid-state amplifiers. The distortion increases unmistakably up to the break-point, or knee. The over-all levels of distortion are moderately high—though acceptable—and the amplifier doesn’t quite make its power specs. The clipping levels are shown in Table 1 for three levels of THD+N. (The manufacturer’s power rating is obtained at the 1.5% distortion level.)

Overall, the measurement results for the 175 are good for a high-powered tube amplifier. The 175’s distortion at lower impedances restrains its power output for a given level of distortion, but it will put out significant power into 4 ohms if you allow for a 3% THD+N level (1kHz).

As delivered from DO, the bias levels of the 175’s output tubes had been set about 20% below the recommended values. I rebiasied the tubes according to the manufacturer’s directions; the above results reflect this. However, before doing this, I made several measurements at the lower bias setting; the differences, while favoring the recommended bias, were not particularly significant. I measured about 10W more output into 8 ohms, and only marginally lower distortion with the correct bias. Apparently, this adjustment isn’t overly critical in the 175.

—Thomas J. Norton

FINAL THOUGHTS FROM DO

Undeniably, the stock Manley 175 monoblocks possess a special gift that, upon first listen, is bound to dazzle and impress even the most hardened transistorophile. The bravura with which it caressed midrange textures was awesome. When I closed my eyes, I was beamed into a palpable, living, breathing soundstage, where I could swim laps in an ocean of liquid harmonic textures.

Unfortunately, the 175 is handicapped by a laid-back, languid upper midrange and an overly ripe, somewhat veiled bass reproduction, with the effect of robbing the music of drive and dramatic spark. A refined Dynaco Mk.III on steroids is what the stock 175 ultimately reminded me of.

Configured with either Gold Aero’s N.O.S. GE 6L6GC or genuine KT66s, the 175s gained sufficient bass—line precision, lower-midrange transparency, and timbral accuracy to challenge any high-power tube amp I’ve heard to date. The sonic gains vault the 175 to the head of the Manley line—the 175 was, in essence, the most musically incisive Manley or VTL amp I’ve ever heard.

The sonic potential of the Manley 175 clearly rests on its output-tube complement. The choice is yours, but be sure to check with the factory before you roll-in any tube alternatives. —Dick Olsher

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Table 1

<table>
<thead>
<tr>
<th>Load 1% THD+N</th>
<th>1.5% THD+N</th>
<th>3% THD+N</th>
</tr>
</thead>
<tbody>
<tr>
<td>W (dBW)</td>
<td>W (dBW)</td>
<td>W (dBW)</td>
</tr>
<tr>
<td>8</td>
<td>126.1 (21.0)</td>
<td>127.5 (21.0)</td>
</tr>
<tr>
<td>4</td>
<td>48 (13.8)</td>
<td>87.5 (16.4)</td>
</tr>
<tr>
<td>2</td>
<td>17 (6.3)</td>
<td>26.8 (8.3)</td>
</tr>
<tr>
<td>All line voltages</td>
<td>115V, except * at 114V</td>
<td></td>
</tr>
</tbody>
</table>
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Orfeo Review • "Highly Recommended" • Dick Olsher, Stereophile, July 1994, Vol. 17 No. 7
Orfeo • Recommended Components (Tube Amps), 'Class A' • Stereophile, October 1994, Vol. 17 No. 10

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F or some unfortunate folks, vinyl is dead. Not me—I’ve got over 3600 reasons1 to consider analog anything but moribund. Luckily, such companies as VPI, Graham, Wheaton, Clearaudio, Denon, Benz, and Dyna-vector—to name just a few—continue to raise the dead, expanding the limits of what’s available in cost-effective, ergonomically elegant, sonically exceptional analog-reproduction gear. Today’s analog equipment is decidedly more neutral than that of days past, but equipment mismatches and inappropriate pairings are just as prevalent and sonically degrading as they’ve always been.

PATHS TO HAPPINESS

JA, an admitted “Linnie,” has owned various incarnations of the Linn Sondek LP12 turntable over the past 17 years. I guess I’m a VPI guy—I bought my first HW-19 Mk.I in 1982. Since then, I’ve gone through four motor upgrades, and three upgrades each of platter, spindle bearing, and suspension—all to the same chassis and base, and all done with nothing more than a Phillips and/or flathead screwdriver, a spirit level, a wood chisel, and an occasional call to VPI designer Harry Weisfeld to make sure I’d done the right thing to the right thing. I like that the HW-19 is easily set up, even by those with limited technical abilities—in fact, one could dub the VPI HW-19 “the people’s turntable.” If you’ve ever changed a car tire, you’ll be able to tune your VPI to a fare-thee-well. Even the ambitious “final upgrades” to an HW-19 Mk.IV—installing an SAMA (Stand-Alone Motor Assembly) and PLC (Power Line Conditioner)—are simple, straightforward, and non-threatening.

When I asked Harry Weisfeld at the 1994 Winter CES about the differences between a fully loaded VPI HW-19 Mk.IV and the new VPI TNT Jr., he diplomatically answered, “The HW-19 with SAMA and PLC is the end of an upgrade path, while the TNT Jr. is the beginning of an upgrade path”—an answer worthy of a Congressperson.

The TNT Jr. offers VPI folk who’ve run out of upgrade options on their HW-19s the opportunity to relive all the delights of incremental improvements; and, at the end of the Yellow Brick Road, they’ll have a TNT III Plus. The first Jr. option is the $800 “cost-effective upgrade,” which substitutes the TNT III’s drive belt, triangular pulley system, and PLC power and speed-control unit for the Jr.’s own. Next is the $800 stainless-steel spring assembly system, and the final upgrade is the $500 acrylic/aluminum platter. Those who want more can get the $1000, 28-lb flywheel and outside motor-mounting platform, which is even an upgrade to the TNT III, raising the Jr.’s price to $6000.

DESIGN

The VPI TNT Jr. is a high-mass turntable of sonically benign materials. While no material is sonically inert—everything resonates—some materials, such as acrylics, are said to resonate in ways that are consonant to music. Other materials—aluminum, for instance—resonate in ways that are claimed to be fundamentally musical. The Jr.’s main chassis, or plinth, is made of two 1”-thick pieces of acrylic bonded together. The plinth is rigid and relatively inert. The 20-lb platter is made of aluminum, acrylic, and four pieces of laminated lead.

On close examination, it’s difficult to find the aluminum—the entire top and side surfaces of the platter are acrylic, and the underside’s cork-like substance covers the laminated lead rings. Three hex-bolt screws allow for minute leveling adjustments of the platter—a nice touch. The motor assembly, which is housed in a free-standing stainless-steel casing to minimize vibration and hum, is, like all VPI motors, a synchronous rather than a DC design. Harry Weisfeld feels strongly that motors which synchronize with the 60 cycles of the AC line are intrinsically more stable than DC designs.

The most important physical difference between the TNT Jr. and the TNT III is that the Jr. doesn’t have the side-pulley system and the PLC. In addition to reducing the side load on the platter, the three side-pulleys more effectively isolate the platter from motor vibrations; the PLC smooths out any power-line glitches, and makes switching from 33rpm to 45rpm more convenient. The III uses a stainless-steel spring system, the Jr. compliant Navcom isolation; if you use the Jr. with a Bright Star Big Rock TNT base and VPI stand on a solid floor, the sonic benefits of the spring sys-
Bryston is pleased to announce our new 8B-THX four channel audio power amplifier. With today’s interest in quality home theatre the 8B-THX amplifier provides state-of-the-art performance with the unquestioned quality, value and reliability for which Bryston has gained an international reputation. All Lucasfilm Home THX certification parameters are easily met for its intended use within a multi-channel audio/video installation.

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tem will be negligible. The platter of the TNT III has more metal and less acrylic, which allows VPI to machine it to tighter tolerances. Some people may actually prefer the Jr.'s platter, with its greater amount of acrylic, which, according to Harry Weisfield, has a softer character.

OUT OF THE BOX
The TNT Jr. is absurdly simple to set up, but takes up a 18" D by 24" W space. I used a Bright Star Big Rock TNT base ($275–$299, depending on finish) specially made for the TNT Jr. This heavy, sand-filled, 21% V by 27% H by 4% H base requires a very sturdy stand. I used the VPI TNT stand ($800 with acrylic top, $500 without) without its top. The primary advantage of the acrylic top is that it can be levelled; the Bright Star base can’t. (Those with especially crooked floors take note.) The “shelf” of the four-legged TNT stand is a crossbar. Don’t even think about the TNT stand and Bright Star base unless you have a very sturdy floor. Also, make sure you have the stand in the right place before you fill its legs; readjustment may require several very strong folks.

After the TNT stand and Bright Star base are set up in the desired location, place the TNT Jr.’s motor on the circular cutout on the Bright Star base. This isolates motor vibrations from the rest of the Big Rock surface. Then put the TNT Jr.’s four corner columns with their Sorbothane suspension inserts and Delrin top covers in the approximate corners of the Big Rock’s top surface. Now adjust the columns so that the Delrin top covers slide into the Delrin cups on the chassis.

Next, place the platter on the spindle, and level the turntable by adjusting the hex-nuts on each corner column. Then place the drive belt, which is coated with white powder that will get all over the top of your nice new black-acrylic turntable, around the platter and motor drive shaft. Next, mount your tonearm on the TNT Jr. tonearm board, which comes pre-drilled for whichever arm you specify. Finally, place your armboard/ tonearm assembly on the chassis and screw in the six bolts that hold it in place. Voilà! The TNT Jr. is fully assembled. Now all you have to do is adjust the tonearm, install and align the cartridge, and hook the whole thing up to the phono preamp. Total assembly time: about 55 minutes (not counting sand-loading time).

Audiophiles who regularly change tonearms will find the TNT Jr. tonearm platform–attachment system an absolute joy. I was able to change tonearms in less than five minutes—and I don’t mean merely attaching a new tonearm; I mean listening to one optimally adjusted tonearm, and then changing to another in five minutes! The Basis turntables are the only other ones I know of that have this quick-change ability.

SYSTEM
I did all of my listening in my large room. Tonearms used for this review included the Graham Model 1.5 T, Wheaton Triplanar IV Ultimate, and Clearaudio/Souther; cartridges included the Benz L04, Clearaudio Veritas-S, Denon S-1, Dynavector XX-1L, and van den Hul MC-1 Super. (I will review all of these components individually in the near future.)

Digital sources included an EAD 7000 Mk.II D/A fed by either a PS Audio Lambda CD transport or Sony D–7 DAT. Preamps in–house were the Denon JX–80 Mk.II Gold, Boulder L5–AE, and Michael Ye Audio PFE-1 and Vendetta SCP-2C phono preamps. Power amps included two Parasound HCA-2200 HS, two Boulder 250-As, and two Boulder 500-As. Speakers were Apollo Full–Ranges. Interconnects were Straight Wire Virtuoso and WireWorld Eclipse, both balanced and single–ended. Speaker cables were Dunlavy Labs DLZ–8; digital cables were Mod Squad Wonderlink and Parasound fiber optic. Other accessories included Roori Tunes Echo–Tunes and Ceiling Clouds, Acoustic Sciences Tube Traps and Wall Panels, Arciici Levitation Stand, The Original Cable Jackets, Music and Sound ferrite beads, AudioQuest ferrite clamps, Noise–Trapper power stripe, AudioQuest record brush, Gryphon Exorcist system demagnetizer, Sumiko FB–1 Fluxbuster cartridge demagnetizer, Nitty Gritty record–cleaning machine, Radio Shack sound–pressure–level meter, Kleenmaster Brillantine CD cleaner, and Trial Run, by Dick Francis.

SOUND
Both the TNT Jr. and the older, less expensive HW–19 Mk.IV share the same platter, bearing, and motor, but there are still substantial sonic and material differences between the two units. Their motors may be identical, but the TNT Jr.’s center–mounted motor is housed in a stainless–steel case, while the HW–19’s offset–mounted Stand–Alone Motor Assembly is housed in a smaller, lighter case. Due to its lighter case and offset position, the HW–19’s SAMA has more noise and vibration than the Jr.’s motor. Placing the HW–19 on a Bright Star Jr.

7 base fitted with a special SAMA top– plate will mitigate some of the SAMA’s vibrations, but great care must be taken during setup to make sure that the SAMA doesn’t touch the main platform, or its vibrations will be passed directly into the chassis of the HW–19. The result will be a very–low–level hum that sounds like “vinyl noise.” Even with its Sorbothane suspension systems, the TNT Jr. has far less sensitivity to airborne vibration than does the HW–19. The lower resonance of the TNT Jr. is due primarily to its chassis construction. Not only is the Jr.’s acrylic plinth less resonant than the HW–19’s, but what resonant characteristic it does have appears to be more benign. The leveling scheme of the TNT Jr. is also more sophisticated than that of the HW–19. The HW–19 has four rubber feet on screw threads that wobble if used for leveling purposes; the TNT Jr. has hex-nut adjustments on each support tower that allow for very accurate leveling without wobble or loss of stability.

The major sonic difference between the TNT Jr. and the HW–19 is that the Jr. was more silent than the HW–19. Not only was there less bass–level noise, there seemed to be less vinyl noise as well. A “blacker soundstage” is the audio–critic chestnut that comes to mind. The TNT Jr. had more silence (an oxymoron right up there with “more unique” and “military intelligence”), resulting in more apparent low–level information. Subtleties deep in a mix were more easily discernible with the TNT Jr. For example, listen to the low–bass decay way back in the mix of the first chorus of “Pretty Good Year” on the German LP of Tori Amos’s Under the Pink. With the TNT Jr., subtle low–bass phenomena were less obscured by non–musical phenomena.

Speaking of low bass, I’ve noticed an interesting effect on many turntables that I’ve dubbed “bass creep.” Low–bass energy appears to ascend further up the frequency spectrum, being perceived as midbass energy instead of remaining where it should in the low bass. Early

3 The HW–19 normally comes with steel springs, but I prefer the optional and less expensive Sorbothane suspension. Sorbothane suspension pushes limit sideways motion due to belt tension better than springs. If you have anything other than an extremely solid floor, I suggest you use springs to isolate the table from floor–borne vibrations. High–end is often about choosing the most sonically benign option; e.g., the sonic advantages of better side–thrust correction would be negated by footfall–induced subsonic pulses wiping out your woofers.

4 I put card stock beneath the rubber feet to level the HW–19 and eliminate screw–thread wobble.

5 Unless your speakers go down to at least 25Hz, you won’t even begin to hear how it decays into truly subsonic frequencies.

6 This shouldn’t be confused with a lowlife who plays bass.
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Linns, known for their overly rich mid-bass, were prime purveyors of bass creep. The Thorens/Chadwick turntable I used for several years also had this problem. Even the HW-19 had a bit of bass creep compared to the VPI TNT Jr. Low bass on the Jr. had greater bottom extension, less midbass warmth, and better bass definition than the HW-19. This was consistent with the additive nature of bass creep—the extra midbass energy obscures bass detail.

Both the TNT Jr. and the HW-19, when using the same tonearm/cartridge combination, had identical soundstage size, depth, and height. This isn’t a bad thing, since the HW-19 doesn’t seem to editorialize dimensional information. Dimensional characteristics can be easily altered by installing different tonearms and cartridges. The dimensional neutrality of the TNT Jr. has proven a fascinating benchmark for discovering the different dimensional presentations of various tonearms and cartridges I will be discussing in forthcoming reviews.

When I mentioned to an audiophile friend that I had the TNT Jr. in-house, he told me that he found it to have a very “romantic” sound. I found his comment puzzling, since I didn’t find this to be the case. Depending on which arm/cartridge combo I used, I was able to change the overall harmonic character of my analog system from fast and lean to dark and lush. I found that the TNT Jr. had very little sonic character of its own, but was very much at the mercy of the character of the other links in the analog chain. Since neutrality is the ultimate goal of any piece of gear, the chameleon-like nature of the TNT Jr.’s basic harmonic character is a positive attribute. It’s like a blank canvas, waiting to be painted by the colors of the arm and cartridge of your choice.

As a longstanding HW-19 Mk.IV owner, I wouldn’t discourage fellow owners to junk their HW-19s in favor of the TNT Jr. without some serious thought. In most systems, a well-set-up HW-19 Mk.IV with SAMA will supply almost 95% of the performance of a TNT Jr. Only systems extending to at least the 25Hz region, or those set up in small rooms with no way of getting the turntables away from their transducers, will garner substantial sonic benefits from switching to the TNT Jr.

**COST-EFFECTIVE UPGRADES**

After about three months with a stock Jr., I received from VPI the “cost-effective” upgrade. Sonic differences between the stock TNT Jr. and its first upgrade were of about the same magnitude as those between the Jr. and the HW-19. Just as the TNT Jr. was quieter than the HW-19, so the addition of the three-pulley system further isolated the platter from motor vibration, smoothed out the belt movement, and minimized side-thrust activity.

The result of this extra hardware was an even quieter background, less vinyl noise, and ever-so-slightly-better inner detail. Listen to any of the scrunptious Living Stereo re-releases from Classic Records, and you’ll hear the differences.

On the “Gnomos” movement from Mussorgsky’s _Pictures at an Exhibition_ (LSC 2201), the cellos and string basses create a palpable three-dimensional cushion of air. With the upgraded TNT Jr., each instrument seemed to exist independently in space, while still joining the others for the ensemble sound.

The PLC is an absolute necessity once you add the three-pulley base system; the pulleys not only increase the drag on the motor, but also slightly reduce the gear ratio. I found that I had to turn up the SAMA’s vernier speed control about 30% to compensate for the pulley system. The PLC also makes changing from 33rpm to 45rpm much easier—you’ll never again have to touch a rubber belt. The only disadvantage of the PLC is that it does produce some mechanical hum. In a quiet room, you may want to put it into one of Bright Star Audio’s “Padded Cells”-soundproofed isolation boxes designed for power supplies with hum problems. Unfortunately, a PLC in a Padded Cell is difficult to adjust or turn on and off. Seems every solution to a problem brings its own new set of problems.

**ANALOG VS. DIGITAL**

The TNT Jr., with its cost-effective upgrade mounted with the Graham, Wheaton, or Clearaudio/Southern arms and any of the cartridges mentioned at the beginning of this review, still sounded better than my current digital system. The latter doesn’t sound bad, but still suffers in comparison to the analog rig. There’s a point when the digital rig’s resolution hits a brick wall while the TNT Jr.-based analog system keeps dredging up information. For example, on Olympia’s _Lament_—music for voice and chitarone with Emily Kirkby and Anthony Rooley (Elektra 79125-1)—the analog system had much better low-level detail and a greater degree of three-dimensional palpability. Microdynamics, especially the varying intensity of Kirkby’s vibrato on individual notes, were more pronounced. Also, the decay of Rooley’s chitarone was far more discernible as it moved through the hall.

On the LP and CD of Rickie Lee Jones’s _Traffic from Paradise_ (Geffen 24602), the subtle but superior resolving properties of the TNT Jr. coupled with a first-class tonearm were readily apparent. Listen to Brian Setzer’s guitar on “Rebel Rebel”—the LP has better separation between the guitar and the rest of the mix. Also, the guitar is more three-dimensional, with a greater sense of depth behind it and—dare I say it—“bloom.”

Analog is also more involving. I find it very easy to just listen through an entire LP, while it often doesn’t take more than a few minutes of listening to a CD before I begin to wonder what I’ll be cooking for dinner.

**SUMMARY**

I’ve spent more than a few minutes during my time as an audio reviewer wondering what makes a person buy one particular piece of audio gear over another. I think it comes down to three factors: personal sonic taste, ergonomic compatibility, and price. The more successful you are in finding equipment that satisfies in the first two areas, the longer you’ll keep that component in your system, and the more pleasure you’ll derive from it. I’ve been using the VPI HW-19 turntable for quite a few years. That fact alone speaks volumes about my feelings for VPI products. I’ve been delighted by the HW-19’s ease of setup, long-term performance, reliability, and value. Remarkably, VPI’s TNT Jr. is an even better product for only slightly more money.

For audiophiles like me who demand reliability, simple setup, and sonic consistency from their turntables, the TNT Jr. would be an unregrettable choice. Coupled with a first-class tonearm and cartridge, the TNT Jr. is a superlative analog transcription system for under $3000 ($6000 if you count all the upgrades). I’m buying my review sample. Unless you have a deep psychological need to own a turntable that requires constant tweaking, I suspect that the TNT Jr. will turn you into a VPI guy or gal for good.
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JACK ENGLISH SETS THE STAGE

No matter how groundbreaking the last (or next) digital breakthrough, we still have our LPs. If not a single vinyl disc was ever pressed again, our existing collections would still provide us with countless hours of musical ecstasy. Though many listeners have abandoned vinyl, their decision to do so has made even more records available to those of us who continue to cherish them. Used records are plentiful, and can often be found at a fraction of the price of new CDs. These reasons alone should be more than enough for dedicated vinyl-lovers to nurture their analog passions.

But new vinyl is still available. Carl Baughner, in last October's Stereophile (Vol.17 No.10, p.71), described Classic Records' ambitious RCA Living Stereo reissue program. In addition, other audiophile-oriented companies such as Acoustic Sounds, Mobile Fidelity, Chesky, Reference Recordings, Clarity, AudioQuest, Sheffield Labs, Wilson Audio (EMI), Decca, Blue Note,Mobile, and Super Analogue have been producing albums, and there are still a few popular recordings that have at least limited vinyl runs—often available here only as imports.

As predicted by Dick Olsher two years ago in his own phono-cartridge survey (Vol.16 No.2), all those analog obituaries were premature. His chiding of the "purveyors of doom and gloom" was right on the money. The pessimists saw the half-empty glass and the eminent death of analog. My condolences.

Ardent vinyl-lovers have valiantly held on, and now we're reaping the rewards of our persistence. With little fanfare, analog reproduction has experienced a marvelous renaissance. Cartridge manufacturers have led the way, quietly developing stunning new products at near breakneck speeds. In fact, I'm amazed at the number of new, great cartridges that are available, and which have been virtually ignored. Where are the reviews?

With a handful of calls, Jonathan and I gathered the following seven state-of-the-art cartridges: the Benz-Micro Ruby, Oracle Reference, Sumiko Transfiguration AF-1, Symphonic Line RG-8 Gold, Lyra Parnassus, Blue Oasis, and Clearaudio Signature. If this lineup doesn't set your heart aflutter, stick with digital. Analog lives!

AN ENGLISH REFERENCE SYSTEM

For a number of years my analog front-end has consisted of a Versa Dynamics 1.2 record player typically fitted with a Koetsu Pro IV cartridge. Output is fed through a 1m length of NBS Signature cable into a CAT SL-1 Signature preamp. For most reviews I don't change components in my reference system unless there's a specific reason to do so, as was the case with this cartridge survey.

To give each cartridge its best shot (in terms of loading, gain, and/or sonic compatibility), I used a number of other preamps and phono stages, including a Microlab 1.3. Gold, MFA MC Reference, Benz-Micro Lusaksch P11, and Klyne 7PX25. Output from the preamp/phono stage went through additional lengths of NBS Signature cable, which ultimately ran into my Conrad-Johnson Premier Eight power amplifiers. Bi-wired runs of NBS Signature loudspeaker cable were connected to ProAc Response 4 speakers. Key accessories in the system included The Original Cable Jackets, Microscan Anti-Resonance Devices, Harmonix and Shun Mook feet, API and Tice power conditioners, Solidsteel 410 equipment stands, and room treatments from RPG, ASC, and Soundwalls.

During my 40-year obsession with vinyl I've developed a ritual for setting up cartridges. I begin with a careful review of all manufacturer-supplied literature, which in most cases doesn't take long. Given the value and vulnerability of the products, this lack of documentation is abhorrent—an owner's manual can give vital information on cartridge weight, compliance, output, tracking weight, loading, VTA, and wiring conventions. For example, the Oracle Reference weighs a light 4.5gm; the Symphonic Line RG-8 Gold reviewed next month tips the scales at a hefty 18gm. Both cartridges would have compatibility problems with different tonearms.

Once I've digested the manufacturer's
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information, I check out the provided hardware, such as interfaci ng plates, headshell leads, tracking-force, and leveling bubbles, tools, mounting hardware, etc. Then I go over the voluminous instructions that came with my turntable.

I check my turntable stand, platter, and linear tonearm with a carpenter's level, then use my personal supply of aluminum (for low mass and magnetic properties) to mount hardware to put the cartridge into the headshell, which is disconnected from the tonearm. I connect the leads to the cartridge with needle-noise pilers, then connect the headshell/cartridge lead assembly to the turntable/tonearm.

Crude VTA is set using the turntable's tools and procedures (typically with the top of the cartridge body set parallel to a record sitting on the platter, with the stylus tip resting in the record's lead-in grooves), as is overhang; zero tracking force (i.e., seesaw balancing of the tonearm) is set with either a Technics SH-50P! stylus-pressure gauge or a Swiss-made Correx gram scale (depending on the construction of the cartridge)—to the middle of the manufacturer's suggested range. Azimuth is adjusted with the help of an Audio-Technica AT6020 phono-cartridge analyzer, and anti-skate is dialed in with the grooveless track from Nautilus's Audio System Test Record.

VTA is fine-tuned using a series of settings first identified by Adam Rosenberg of LOCI tonearm fame, and a number of records that I have found that prefer high, low, and average VTA settings. When I'm done, I've established an effective VTA range. I begin my listening with the VTA set at the middle of this range.

Throughout the bulk of my listening I specifically try not to treat the cartridge as any part of the cartridge, nor do I use any demagnetization. I do, however, regularly clean the stylus with a soft brush, a hard brush, and a powered Sineat SK305 cleaner. I also rely heavily upon my VPI HW-17 record cleaner and Hunt EDA record brush to ensure the cleanliness of my albums.

At the beginning of the review period, I listen to whatever strikes my fancy. As I grow accustomed to the character of the cartridge, I carefully listen to recordings that I know will present specific challenges to it.

—Jack English

JONATHAN SCULL BEGINNS THE TEQUINE

There are ten million stories in the Naked City. I had an affair with a Gold Grasshopper. My wife knew about these; turgid goings-on, but aside from informing me that gold is a little vulgar, she said nothing. Ah, the French—very understanding about matters of the heart! She loved the sound of this van den Hul cartridge, too; fast, open, exciting, airy, transparent, and capable of remarkably palpable imaging.

It was a pain, though. If you were the least bit heavy-handed, you might bend the stylus in a blink of an eye. You don't actually see the damage—it occurs up in the generator after the fragile, insect-like stylus is bent beyond its tolerance; soon afterward, the suspension collapses. Concentration is required with most cartridge setups; with the 'Hopper, you'd best be calm and collected. I lounged mine a while back and had to ship it off to van den Hul Cartridge Hospital. When I got it back, the pole piece (the cartridge's front "face"—or codpiece, so to speak) was loose. Gaaah! I nearly swallowed my tongue. I called vdH GHQ, and A.J. instructed me to simply glue it back on with "one-second adhesive." He surmised that the rigors of shipping were the culprit.

At the risk of making myself sound an ass, I'll tell you that I baffled around to several hardware stores looking for "one-second adhesive." When Kathleen came home and heard about my inability to find this magic-elixir stick, she nearly died laughing. "Crazy Glue, mon cher!" Of course.

A system is a system is a system... but for how long? The preamps used for this survey were my CAT SL-1 Signature and the Jadis JP-80MC. The Jadis Analog Experience was conducted mostly with the Clearaudio Signature in attendance on the Forsell Air Force One turntable. (A synergistic and charming couple, by the way. Germany and France—go figure.) Rack-wise, continued investigations have proven that the CAT, despite its heavy build and internal damping, focuses more precisely when nestled in the Michael Green Designs ClampRack. Small adjustments of the locking nuts effect small changes in the upper-midrange and treble regions, and slight transformations of the bass and overall sense of air.

Amps were our reference Jadis JA 200s. Before I started listening critically to the first set of cartridges, I replaced the 200s with a set of Gold Aero KT99As. I was immediately attracted to the KT99As' refinement, sweet, airy highs, and suave, liquid midrange, and found it easy to forgive their slight lack of transparency and softer bass.

I subsequently spoke with Jadis importer Victor Goldstein, who grew troubled when he understood that I was running the KT99As. Unbeknownst to this reporter, Jadis designers Jean-Paul Caffi and André Calmettes never intended the 200s to be used with these tubes—they may saturate the transformers and blow out the line fuses. But in the interest of continuity (and as I'd had no difficulty to that point), I resolved to continue with them.

As Audiophile Lady Luck would have it, the right channel went down the very next day. As I was kneeling to replace the KT99As with the somewhat crude Ruff n' Readys Oshkosh B'Gosh High Americana GE 6550s, Monsieur Goldstein appeared with a set of Soviet 6550 power tubes which had been closely matched at the factory.

Well, I tried to keep my system stable during this cartridge survey, but, as with most best-lead plans, the audio variety, too, gae off awry. This Jadis tube incident actually occurred before I'd turned over my first set of cartridges to JE, so I reset my expectations, listened to all the review cartridges yet again, and registered the changes. Wotta life.

All cartridges benefited from the Russian 6550 treatment. The bass had greater pace, slam, and expressiveness, and extension was tighter and more defined. Midrange: liquidity, texturing, harmonics, and soundstaging were largely on a par with the KT99As. The Soviets were certainly more transparent, but a touch dark in the upper-midrange/treble region.

The GE 6550s sounded thin in the critical midrange, where the Soviets flourished, retaining many of the GE's positive characteristics: a sense of real power across the entire audio band, terrific punch in the bass, and extended and detailed highs. As a bonus, the Russian tubes were as detailed as the GE, but sounded smoother and less analytic in the treble. In our system, the Russians sound vastly more refined. Let me put it this way: I'd prefer to walk down a dark alley with the American tubes at my side, but I'd attend a concert and a late supper with the Russians. The amusing irony of Tractors-R-Us Mother Russia (my ancestral homeland) producing such a refined tube isn't lost on me—they're very well-made and seem industrial-strength robust in every way.

It was the Russian tubes' greater transparency that set the soundstage farther back than the KT99As on the Avalon Ascents. The Soviets certainly had greater authority and clarity, and the soundstage quieted down and grew appreciably in all dimensions. But the 6550s aren't perfect. Life is full of compromise, no? The Soviets weren't as liquid, lush, rounded, or ineffably musi-
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Dick Olsher - Stereophile, March, 1994 Vol. 17, No. 3

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Step right up! I first auditioned all cartridges unloaded straight into the CAT phono stage. If required, I made use of the Expressive Technology SU-1 MC step-up transformer (reviewed by Robert Harley in July 1992, Vol.15 No.7, p.142), also lightly squeezed between two Clamp-Rack shelves, its rubber feet removed, and Audio Points "floating" the unit top and bottom. The other phono amplifier in play was the jewel-like FM Acoustics FM 222.

Setup: I mounted each cartridge on an appropriate arm and slider, and initially dialed in for azimuth with the Audio-Technica AT6020 cartridge analyzer. Unfortunately, this unit (and its companion test record) is no longer manufactured. Fortunately, Bob Graham of audiophile tonearm fame markets a simple yet effective little device that inverts phase in one channel and allows you to adjust azimuth for the greatest null, thus accomplishing the same task: finding the point of lowest interchannel crosstalk. However you set a cartridge up, you still have to tweak it by ear; there's some wobble in the Signet's measurements, and you still might be off by a hair. In the stylus microworld, a hair is a lot.

Each time I swapped arm/slider/cartidge assemblies I swiped the arm bearing with acetone to keep its surface tidy. New York air, you know. I dabbed and lightly scrubbed connecting pins with SuperContact during installation, doing the same with the interconnects each time I changed a cartridge. I used the same LP (Carmen McRae Sings Monk, Novus 3086-1-N) to zero-in on the proper VTA of each cartridge, adjusting VTF with little dabs of Mortite at strategic points fore and aft on the arm, thus snapping in the focus and adjusting the amount of "body" in the sound.

I also tweaked each cartridge for bass and overall soundstage size and transparency by playing with the airflow to the arm bearing. I know, I know—the Forsell makes audio fascists wild with rage: it doesn't tell you what music should sound like, it tells you call the shots. I know what I want from this 'table, and by now can achieve it with some facility.

There's one Shun Mook Mingono on the Forsell's VTA adjuster knob, three triangulated about the platter and pointing in the direction of rotation, and one on the rear platform of the flywheel. I can see the headline now: AUDIO WRITER OSTRACIZED BY MADDENED LOGICAL POSITIVISTS!

To further refine each cartridge's presentation, I used either the Shun Mook Record Weight or the Combak Harmonix TU-812 Tuning Record Clamp. In spite of its air-everything topology, the Forsell does not sport a vacuum hold-down. To do so would be completely anti-Forsellian. In general, the Shun Mook produced a sound that was very human, slightly soft, bloomy, and rich. The Harmonix Clamp, a heavier metal device that has ebony wood around its bottom (for the best of both worlds), produced a crisper, tighter, more focused presentation that brought forward the upper mids and lower treble.

Finally, there's a mini Original Cable Jacket on the armwire at the RCA junction plate, and three normal Jackets on the connection between the power supply and the flywheel. Will this craziness ever end?

Nope. Get this: The three small pumps for the 'table (and the one for the Forsell CD transport) are mounted in two small custom-made ClampRacks that have wooden dowels below and above the pumps. Before you die laughing, lemme tell ya—the stands cut the vibration and buzzing, and they're cute.

Speaker cable was Siltech LS4-240, and all analog connections were made using Siltech type FTM4 Si.

—Jonathan Scull

CLEARAUDIO SIGNATURE MOVING-COIL CARTRIDGE Pass the bratwurst! I'd already installed the $2100 Clearaudio Signature on a thin Forsell arm/slider with the thinnest Tellson spacer by the time my heavy-weight Hopper arrived back from the Netherlands. The fairly substantial Clearaudio weighs in at 10gm, and its body is fabricated of a special lead alloy treated to remain free of any trapped air. The total surface is hand-polished, rhodium-plated, and tempered in accordance with Clearaudio's "Resonance Free Technology" design criteria, with manufacturing tolerances said to be less than 0.001mm.

The lower "hammerhead shark" housing flanking the stylus contains the output pins. This wide lower section looks like a turn-of-the-century handlebar moustache (thus earning my sobriquet, "Der Kaiser"), and bumps alarmingly against the wide-footprint Shun Mook Record Weight when a record is finished. The Harmonix TU-812 Tuning Record Clamp is less broad in the fanny, thus causing me to jump less rapidly out of my listening chair at the end of a side. Fortunately, the hollow boron cantilever is stiff and durable, and takes these Asian-induced ignominies in stride.

Clearaudio supplies with the Signature a graphic which illustrates their unusual approach to generator design. In a three-quarters view from above front, you can see that there is a set of four magnets (two pairs abreast oriented NS and SN), both pairs 180° from each other on either side of the right-channel windings. Farther up the cantilever, and at right angles to the right channel, is a brace of four magnets in the same orientation for the left channel. Looking at it head-on, you can see what amounts to a staggered X surrounding the cantilever.

According to the manual, this arrangement offers unique "anti-reflection moving coils" that have electrically matched impedances of 60 ohms. If used in combination with matched 50 ohm cables, distortions caused by cable nonlinearity and reflections from cables and connectors are said to be eliminated. They also claim low distortion and superb linearity in phase response because of the patented location of the coils within the magnets. The vibrating elements are always inside "homogeneous magnetic fields." (I certainly felt homogeneous when I played the Signature.)

You may have read about certain manufacturer who slices up LPs with a laser and examines the groove walls under an Elektronen-Rastermikroskop-Aufnahme. Well, these are the guys, of course. The groove photos are fascinating for any Analogue devote, and illustrate the rationale behind their nadeform. The resultant stylus shape, dubbed TRYGON P-2 (twice-polished TRYGON diamond), is said to better match actual record–groove geometry, avoiding mistracking and poor signal–to–noise ratio. Designed by Dr. E. Weinz, "designer of the well-known PAROC–shape stylus" ("Scuse me!), and a Mr. Peter Suchy, the diamond tip measures 0.005mm by 0.035mm (0.0002" by 0.0014")

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Setup, schatzie: Setup with the Clearaudio was a little quirky. The front and sides have registration marks which are used for alignment. I used the AudioTechnica analyzer to set azimuth (pretty close to vertical), and initially set the Signature for VTA with the side marks perpendicular to the record surface.

With every other cartridge in this survey, the diamond usually appears to be sitting in the groove in a "normal" (straight in) fashion after the suspension takes its "set" on a disc. When unloaded, it may appear canted back, but during play it assumes the position.

Not the Signature. With proper VTF and VTA zeroed-in, the diamond looks way down at the front and up in the rear. It's a little scary. When I set the Signature down with close-to-maximum recommended VTF on a trash record, it actually began slicing out tiny strands of vinyl! Normal range for VTF is listed between 1.6gm and 2.8gm (!), and a blob of Mortite at the rear of the arm to give a downforce of just under 2gm did the trick. I ignored the way it looked when it settled into the grooves, and just enjoyed the music.

Sound: The Signature's highish 6mV output allowed it to be used straight into the CAT with no additional step-up required. It threw a very big, natural-sounding, well-formed soundstage that extended well out to either side of the Avalon Ascents and as deep as whatever was encoded in the grooves. There was no compression or narrowing whatsoever in the rear corners. I set about dialing in VTA with Carmen Sings Monk, which was a snap with the Signature. The soundstage moved up and down as I focused in on the magic spot: a natural soundstage height coinciding with the best tonal balance.

The perspective was immediate, vibrant, and clearly set within the first few rows—in a word, compelling. How compelling? It conveyed with utmost ease the qualities of musicality, involvement, expressiveness, and especially neutrality—its most endearing gift. The Signature never got in the way of the music.

Cyndee Peters' "House of the Rising Sun" (Test Record 4, Opus 3 9200) showed up tight, well-controlled bongos padded in their own air and sounding fast and impactful, the background triangle shimmer and natural. The cymbals perfectly conveyed the unique sound of wood on brass, without a trace of unruly sibilance from a tweaked presence region or a rising top end. Peters' voice was well back and natural in the airy, open soundstage. Tweaking her voice with very small adjustments in VTA was child's play: up a little from Carmen (perhaps an eighth of a turn) and her voice became a tad more open, defined, and expressive. (This is a knockout demo cut, by the way.)

Branford Marsalis's tenor sax on "The Nearness of You," from The Jepp (Columbia CX2 44199), was urgently palpable, with what might be described as a certain "darkness" over the upper-midrange/ lower-treble region when loaded at 100 or 300 ohms. This easy-to-distinguish anomaly disappeared when I unloaded back to 47k ohms. There was a tad more silence between the performers at 100 ohms, and the already top-drawer imaging became slightly more palpable, but its neutrality was compromised ever so lightly.

The acoustic bass was exquisitely and powerfully separated from the left speaker and the other performers, somewhat forward in space (where it should be), and with scads of air around it. The drum kit was high and to the right, closer to me in what I've come to expect from this recording: a well-defined, U-shaped soundstage. The delicate cymbal work was perfectly rendered.

Branford's instrument—expressive, soaring, emotional, and tightly focused — was a breeze to "see." The several riffs he fires off to the rear were clearly reproduced as just such events. There was no simple volume change to indicate that his back was toward me (as I heard with one of the other cartridges); rather, I heard his horn coming from the rear, as both reflected and direct sound coming around his body to my ears. It was uncanny. This recording sounded musical and emotive through the Signature, the pace and rhythm drawing me right into the mix.

I auditioned all cartridges with the aged but well-buffed Howard Rumsey's Lighthouse All-Star, Vol. 4—an early mono Contemorary (C3520) with a colorfully present piano, textured acoustic bass, and oboe/flute midrange magic. I also spun a red-vinyl Brubeck à la Mode (early mono Fantasy 3301), just to see how each cartridge handled the essence of the music.

With the Signature, the All-Stars' rendition of "Albatross" (no jokes, please) was vivid, clear, and spacious, with enormous air and separation between the players. The piano sounded dynamic, tonally rich, full, and unclouded, the bass tuneful and powerful. The initial snap of bass transients existed as an all-important adjunct to the full harmonic envelope developed in the decay. I almost couldn't believe I was listening to mono, despite the fact that everything's in the center. Makes me wonder why we even bother with stereo, much less 5.1 channels.

The Signature captured the Art of Noise's quintessential "Paranoidia" (In Visible Silence, Chrysalis BVF41528) in all its glory, sounding surprising, rhythmically driving, and trippy in an enormous artificial soundstage with sounds coming from everywhere imaginable. The electric bass—tuneful, deep, and controlled—had a powerful foundation and moved the beat along with zippy transients. The Art of Noise's "Yebo" (Below the Waste, China Polydor 839 404-1) is a knockout; "Spit" (very à propos) sounded incredibly wide, deep, ambient, and liquid. Individual female voices on the backup were completely differentiated from one another, and the male vocals were layered and more forward.

I then played Stravinsky's "The Sacrifice," from The Rite of Spring, with Solti and the Chicago Symphony (UK London CS6885). In the lyrical opening you can hear someone (probably Solti) moaning softly—excellent detail that helps breathe life into the performance. After about five minutes, the timpani come in with a gut-wrenching, visceral explosion of deep bass that could almost knock you out of your seat. The Signature was completely untruffled by this sonic landscape, never changing its presentation under duress. It delivered a big, musical, dynamic, and detailed soundstage that just didn't quit.

Staying with the high decibels, Duke Ellington's Jazz Party in Stereo (Columbia Special Products JCS 8127) sounded wonderfully ambient. "Fly Pastelurbablv Blue" was very present and alive, everybody nicely placed in the wide, airy, U-shaped stage. The piano was strong and powerful to the left, if a little chilly (that's the recording), the vibes shimmery and forward in the soundstage. Proffering another example of the detail provided by the Signature sans echo or brightness, Jimmy Rushing's voice in "Hello Little Girl" was beautifully rendered, his way-down-in-the-mix fingers snapping coming through discretely. The horns and trombones were spotlighted, salty, and powerful. I became subtly aware that I was hearing not only the performers in the soundstage, but also the bounce off the walls of the recording studio!

You will come to attention for ze summary! I've told less about what the Signature sounded like than what the mix sounded like through this cartridge. A good sign. The Signature was, without a doubt, the most perfectly neutral in
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character of the first group of cartridges Kathleen and I auditioned in our system. It tracked like an Olympic athlete and snapped the transients at us throughout the entire frequency range without etch, tizz, or leanness. It was clean and linear, harmonically complete (if not especially rich) and accurate, with no specific range of the audio band leaping out at us.

In this regard, it was a good match for the superbly neutral CAT. Its strong, controlled bass remained expressive and harmonic, its midrange neutral and without artifact. The highs were extended, fast, open, airy, and natural, with no nooks or crannies in the frequency response. It was unflappable, unchanging in character from the quietest passage to the loudest crescendo. Micro- and macro-dynamics with the Signature were such that I felt the crashing of timpani in Stravinsky's Rite of Spring, yet the cartridge was also able to hang on to the subtle nuance of Jaime Laredo's violin in Beethoven's Triple Concerto (Columbia 360 Sound Two-Eye MS 6564) with Rudolf Serkin and Leslie Parnas. The Clearaudio Signature is a high-resolution device, delivering detail without the hash, spit, and grit of lesser cartridges that masquerade detail as brightness.

If you're looking for euphonic mids and warm, luscious highs, look elsewhere. If you want something analytical and lean, keep looking. At a price of "only" $2100, the Clearaudio Signature is a steal for its consistent performance and high level of neutrality. Install it in a system that's up to its standards—one without gross colorations—and you may find cartridge happiness. You'll hear what's recorded, without embellishment. You may think this a fault in some mysterious way—after all, life is tough enough without having to escape into the sweet, nurturing world of music. But I didn't find this to be the case with the Clearaudio—just give it to me straight. Definitely a contender for Best of the First Bunch on absolute terms; given its price:performance ratio, it's something else again.

—Jonathan Scull

JE Comments: Whenever I think of a Clearaudio cartridge, I quickly say to myself, "it might not fit;" "people won't be able to get it;" and "it'll have great soundstaging." Clearaudio's often come, as did this Signature, with the connections pins closer to the stylus tip than most other cartridges. A traditional body is replaced by things akin to wings toward the front, where the pins are located. I remembered this quirk from an earlier experience mounting an Accurate2 in an SME V, when the tonearm leads were unable to reach the pins. The cartridge didn't fit. I offer this only as a caution; neither JS nor I had any difficulties mounting the Signature.

It often didn't matter if the Clearaudio fit or not—though they've been imported into the US for over 17 years, they've often been impossible to find. As it turns out, Joe DePhillips of Discov-ery Cable and some of his friends are long-time Clearaudio fans. Failing to find a source for replacement or repiping of their cartridges, Joe contacted manufacturer Peter Suchy and his son Robert in West Germany. One Vegas CES later, Discovery became the US distributor for the full line of moving-coil cartridges, ranging from the $760 Gamma-S to the $7320 Insider.

Discovery imports the revised Souther tonearm, a full line of moving-magnet cartridges, various connectors, clamps, CDs, and records, and is considering bringing in phono preamps as well. And yes, the Veritas-S dedicated to the Souther arm is once again available. With currently at least 15 dealers, you'll finally be able to get one of these cartridges.

In the past, one of the consistent strong suits of all Clearaudio cartridges has been their soundstaging, in part attributable to impressive channel separation. With a midband rating in excess of 35dB, the Signature is no exception. I expected great soundstaging, so wasn't surprised when JS led off extolling the Signature's soundstaging prowess. Even on the Rolling Stones' non-audiophile-approved Exile on Main Street (Rolling Stones CG 40489), the stage was unusually wide and precisely defined. While I agree with JS that the perspective was closer than average, I wouldn't describe it as being in the first few rows. Some cartridges push the performers into the room; the Signature clearly didn't have that type of immediacy.

As JS noted, the Signature did an excellent job of re-creating air and space. On Ella Fitzgerald's playful "A-Tisket A-Tasket" (Live at Carnegie Hall, Columbia G 32557), the Signature, in contrast to the Blue Oasis, conveyed a realistic sensation of Carnegie's size, and rendered my fellow audience members more real. The Clearaudio was one of the few cartridges in this survey that powerfully communicated Ella's mood. An even more impressive feat was the reproduction of Sir Adrian Boult's and the London Philharmonic's quadrophonically (!) recorded performance of Elgar's Symphony 2 (EMI ASD 3266, SQ-encoded). With the Signature, this recording had a warm, natural ambience as well as excellent soundstaging.

The Elgar also provided ample evidence of the Signature's impressive dynamic capabilities—from subtle shadings to massive transitions, as JS found. The cartridge didn't have to play loudly to come alive, but it did so with no ill effects. At virtually any level, the Signature was consistently quick, clean, and very revealing. The word "tight" appeared frequently in my listening notes. Throughout the range, but especially in the mid—upper bass, the Signature was fast and well-defined, making it a great match for dance music. Bass lines, synthesizer work, kickdrums, toms—toms, and timpani were all excitingly real, their rhythms conveyed with conviction.

Through the ever—critical midrange, JS and I reached different conclusions. I agree entirely with his description of sonic performance through this range as detailed and clean, even neutral. However, I didn't find it as harmonically rich as the Sumiko Transfiguration or a properly amplified Benz—Micro Ruby or Blue Oasis, and it clearly didn't equal live music. Neutral, yes, but harmonically incomplete. Voices were clear, and it was exceptionally easy to separate artists, but something was missing from the overtones—which may have actually been a problem in the lower treble. I prefer a fuller, lusher midrange (as evidenced by my long love affair with the Koetsu cartridges).

I searched for ways to deal with the problems I found in this cartridge's treble range. It was wonderfully extended, open, and airy, which may in part have contributed to the prominence of surface noise—ticks, clicks, and pops. Loading down helped some, but at unacceptable costs. After much experimenting, I ended up preferring the Signature unloaded (as did JS). VTA was critical.

My ultimate frustration was in the lower treble, where something seemed amiss. For example, Jon Hassell's Dream Theory in Malaya Fourth World, Vol.2 (Editions EG EGM114) usually hypnotizes me. It didn't with the Signature. Something was a bit distracting, and tended to become most obvious on voices and cymbals—especially those with sibilance. There wasn't any added hardness or percussiveness, there just seemed to be too much of something. Sibilance on The Sugarcubes' Life's Too Good (Elektra

2 The Accurate, priced at $1920, is the next step up from the Signature.
3 Be careful regarding the cost of these cartridges. According to DePhillips, at least one prominent equipment directory contains prices from 1987!
4 Steven Stone is currently running the latest version through its paces.
TAS is famous for sneak previews and mini-reviews that never turn into full reviews, and I hate to break a great tradition. I do feel, however, that I should follow up on my initial comments on the Wireworld Eclipse interconnects [Issue 83/84] and speaker cables to the point of confirming my original praise.

I have now worked extensively with the Wireworld Eclipse phono interconnect, RCA interconnects, balanced interconnects, Starlight digital interconnects, and speaker cables.

The net result confirms my initial impressions. The Wireworld Eclipse cables have proved to be reference quality products that have integrated smoothly in connecting up both an entire reference system and in connecting all of the 30-odd components I have had in for review since I started using them. I have found them to be fully compatible with every component I have tried, and I have found them to be extremely revealing without exaggerating any aspect of sonic performance, or producing the kind of false insights into the music which later turn out to be coloration.

The Wireworld Eclipse interconnects and speaker cables not only reveal the music that is on the recording, they reveal the full capabilities of all types of equipment. They have proved to be of great value in making detailed equipment comparisons. They have not always been the best interconnects or speaker cables in connecting specific electronics or speakers, but they have been competitive, and they have usually been superior.

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60801) sounded pumped up and dragged out. On Lou Rawls' Soulvin’ (Capitol ST 2566), everything sounded hotter—as if the entire lower treble had been elevated.

I admired the many strengths of the Clearaudio Signature, but was less enthused about it than was JS. While it was a very good performer, this group of cartridges is the cream of the crop—world-class performance at every turn. For me, the Symphonic Line RG–8 Gold outdid the Clearaudio Signature in those areas where the Signature was at its best. In the midrange, I preferred a number of other cartridges.

**BLUE OASIS MOVING-COIL CARTRIDGE**

**Was that a camel I just saw?** The Blue Oasis arrived with no fanfare or literature of any kind, other than a single spec sheet delivered by a guy named Joe Camel smoking a Lucky.

The Blue Oasis looks completely innocuous in blue aluminum. Installation in the Forsell was a snap—just a thin arm slider with a next-to-thinnest Telion spacer. I thought it sounded fine at exactly 18 gm VTF, with no loading, direct into the CAT. Average volume setting was a reasonable 12–1 o'clock, with plenty of gain to play with.

First impressions of the Blue Oasis were quite positive. It sounded lovely, and is sure to bring smiles to any vinyl-lover's face. The Blue Oasis didn't develop quite as enormous a soundstage as that of the Clearaudio Signature, but there was noticeably more depth. Its soundstage perspective was a few rows farther back than the Signature's, but by no means mid-hall–diffuse. And even though it was somewhat less transparent and airy, it was still wonderfully ambient.

The Blue Oasis didn't have the Clearaudio's sense of pace. The bass was immediately noticeable—lighter and less powerful than the Clearaudio, but quicker, better defined, and more lithe, with deliberate overtones and harmonics. The midrange and highs were to die for, dahling.

**Tempus Fugit:** As the hours accumulated, I noted that the Blue Oasis didn't possess the Clearaudio's quality of air. In direct comparison it certainly wasn't dry, but had a slight loss of transparency and was a tad darkish. Its more distant perspective was quite pleasing, but somewhat less involving and immediate. Nevertheless, this cartridge had great charm.

The Blue Oasis had a mellowness that the fast-paced Clearaudio Signature lacked. It had midrange bloom coupled with an upper-midrange/lower-treble sweetness—an ineffable gentleness—that made for a more forgiving sound. Its sound was "prettier" and more laid-back than that of the Clearaudio, and was certainly easier to live with. Don't get me wrong, the Blue Oasis isn't some rolled-off piece of caça—we're talking extremely high-end subduty, musicality, and refinement.

As good as I found it (which was mighty good), the Blue Oasis didn't have the attack, speed, snap, excitement, transparency (and for me, therefore, involvement) of the Signature. But this light sweetening of musical textures was so well integrated into the overall presentation that it didn't call attention to itself. With practically state-of-the-art everything else, a bit of all right on top—if not overdone—is no bad thing.

I heard this sweetening on Duke Ellington's Jazz Party in Stereo, where I still got the bite (from a slightly hot recording) and clatter from a room full of musicians, but also found an engaging hint of warmth in the upper regions. Though the more neutral Clearaudio still gets my vote for doing the right thing, I can see why many would go for the Blue Oasis—you can't help but enjoy music through it. Jazz Party is an outstanding recording, but I've always longed for it to sound... just as it does with the Blue Oasis! So what's the problem? There is none, unless... aye, poor Audiophilus, there's the rub.

Everything has its price. In its ineffability, the Blue Oasis is a touch less immediate than the Clearaudio. It's like looking at a beautiful model on CNN's Style with Elsa Klensch on Saturday morning: I appreciate her drop–dead looks, sneak a peak at the wife to make sure she hasn't seen my eyes pop out of my head, and just admire her as I catch sight of my stomach and the unused NordicTrack in the corner. The Blue Oasis's slightly more distant soundstage perspective is so beautiful you don't give a damn if it doesn't always take place inside of you. You may see this as a question of taste. I surely do.

A record weight is a record weight... or is it? The Harmonix TU–812 Record Clamp really did the trick with this cartridge, bringing that gently sweetened upper-midrange/lower-treble region more forward and detailing in a more interesting fashion. The Record Clamp tightened things up, got the pace moving, and let the spaciousness out of the box. Some bloom was sacrificed, but it was worth it.

The Blue Oasis with the Shun Mook Record Weight caused Cyndee Peters to sound more boomy in "House of the Rising Sun," but a touch recessed and ill-defined; with the Harmonix, she sounded vital and palpable, those striking triangles more vividly shimmering, with a delicate, nuanced decay. No information was lost in the noise floor, and the details came through. Did I say "noise floor"? Keep these important words in mind—we'll consider them later. The record weight you choose to use with the Clearaudio Signature will be more dependent on your mood, the piece, or the recording; with the Blue Oasis, the Harmonix is the one to light your way.

With the Blue Oasis, Art of Noise's "Spit" came at me with tremendous separation between the performers. The song also had the Blue Oasis's appealing, sweet, slightly removed upper midrange/lower treble, excellent midbass definition, and fine deep bass—but it didn't sound hot and sibilant, as I've heard it before, and which was how it was recorded. So, appealing though it was, the Blue Oasis lacked some of the raw, nervous, exciting quality the Clearaudio let through.

A curious anomaly occurred with Blue Oasis on the monophonic Howard Rumsey's Lighthouse All-Stars, Vol. 4. While the loveliness factor was naturally very strong, it sounded like "just" mono rather than spectacular, as it did with the Clearaudio. The Clearaudio exploited the already warm and wonderful recording; the Blue Oasis sounded perhaps too consonant with the album. In interesting contrast, the mono Brubeck, with its outrageous musicality and vitality shining through the noise, sounded drop-dead gorgeous with the Blue Oasis.

Don't let the digital badge scare you on Musique de Nuit (Audita Schallplatten 68.409), a seductively involving recording of gorgeous and ravishingly elegant music. The short Faure pieces following the Koechlin are transcendent—ethereal, sweet, lovingly sounding, romantic period instruments on a spacious (if the least bit digitally dry) soundstage. My copy is warped, so the Satie on side B is a bit of an up–and–down affair. "Hey, buddy–ch!"

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Chad Kassem exclaimed when I'd called to complain, "your cartridge tracks it, don't it?" Well...yes. But from the side, the Blue Oasis on the warp looks like a mirage glimmering in the distance.

The soundstage on Thelonious Monk's "Crisis-Cross" is beautifully populated. With the Blue Oasis, the recording sounded delightful, sonorous, and lovely, if a bit removed and less visceral than via the Clearaudio. Nevertheless, it was so enjoyable that I couldn't complain. The mid-bass was superb. The piano didn't sound terribly powerful, but was wonderfully integrated into the overall sound, woven through the music in painterly ways. This old two-eye Columbia (less than desirable than those yummy six-eyes) usually sounds a little threadbare on top. The Blue Oasis offered a kinder, gentler presentation.

The sound of the Oasis had a richness that can be illustrated with another two-eye: Beethoven's "Triple Concerto." My notes said "seductive and liquid," Say no more! Although I'm turned on by imme-
diacy and excitement, great beauty can also be a strong audiophiliac. Sefkin's piano sounded rich, harmonically fleshed out, and lush; the strings, while having a bit of bite (not as much, I fear, as is encoded on the disc), with plenty of stage presence and air, wasn't quite as fast, transparent, or visceral as the Clearaudio. So sue me...the Oasis was a delight.

The Clue, the CAT, and His Consort: My review up to this point has been of the Blue Oasis straight into the CAT. As JE points out later, the Benz-Micro Ruby is oft misunderstood because it's auditioned with insufficient gain. This is where we take the noise-floor clue I noted earlier and run with it. I tried the Blue Oasis with the FM Acoustics FM 222 phono stage, and while this combo was quieter (the FM 222 is si-lent), it just didn't make a nice sand-
wich. The FM Acoustics did work wondrously well with one cartridge, which I'll discuss in Part Deux next month. But, me maties, the Blue Oasis run through the Expressive Technologies SU-1 step-up transformer sounded KILLER!

No sheep-dip. This combo is amazing. It also ups the price by $3500, putting it in Symphonic Line territory. Running the Blue Oasis through this US-made 25x transformer is like stepping out of a Lexus into a perfect Lamborghini Miura SV, Gandini's transverse 12-cylinder masterpiece. (Surprised you, right?) The Expressive eliminates the audio quibbles and cavils I warned you of in the previous sec-
tion of this audio epistle.

A tale: An audiophile manufacturer who came over listened to the Blue Oasis/Expressive combo and thought it was the Clearaudio Signature he'd heard during his last visit. Is the $2100 Clearaudio as good as the $2250 Blue Oasis plus the $3500 Expressive? Or as fine as the Symphonic Line at $5000? We shall see—that's what conclusions are for.

The Expressive is simple to set up— just read the manual. You must ground the unit to the target preamp; otherwise, bed-
lam and endless loud humming will ensue. In the interest of remaining constant, I used another set of Siltech cable rather than Expressive's own fine-sounding cable. The result of this fiddling was [echo on] REFERENCE SOUND [echo off]: dynamic, powerful, ultra-detailed, extended, linear, and, most important, musical. The won-
derfully synergistic match of the Oasis and the Expressive brought me the best of both worlds, with little in the way of com-
promise. Bravo.

So why didn't I just write about the cursed Oasis with the Expressive from the beginning? I was informed by the distributor that, thanks to its adequate output of 0.4mV, most Blue Oasis cartridges are being run direct to preamp. If asked to choose between the turbocharged Oasis and some other dream machines, I'd have a hard time doing so.

The Sun Sets on the Great Pyramids: It can often be fun with a new cartridge to dig out the vinyl you haven't heard in a while. The Blue Oasis excelled at this happy musical task—everything sounded so good. The Blue Oasis was designed to work in any number of analog front ends with little insecurity, handwringing, or gnashing of teeth. This attractive cartridge made listening fun and enjoyable—isn't that what it's all about?

The Blue Oasis is a creature of the con-
sumer market, while the Clearaudio is more of a reviewer's tool, more enthus-
astically uncovering flaws in recordings. I envision the distributor and the OEMers of the Blue Oasis huddling in a dark, smoky room: "Let's design a cartridge that'll sound great in a lot of systems with very little tweaking. A cartridge that sounds beautiful and is state-of-the-art— something you can drop into most systems anknock their socks off!!" They succeeded.

The Blue Oasis wants to please you, the Clearaudio Signature just dishes out what's there.

—Jonathan Scull

JE Comments: With an output of 0.4mV (twice that of the Benz-Micro Ruby), I expected the Blue Oasis to work well straight into the CAT, so was surprised that JS needed the Expressive Technolo-
gies SU-1 to extract the cartridge's optim-
imum performance. I was even more sur-
prised when he described its performance
through the transformer as being more extended and linear. I really wanted to get at this one—who wouldn't look forward to listening to a cartridge that wasn't "tacta" but "sweet"?

Preliminary fiddling with the Oasis revealed that the optimum tracking force for my tastes was 2gm, with no loading, directly into the CAT. This gave me low noise, very good tracking, and more than enough gain. A discussion with JS regard-
ing our different experiences with the Blue Oasis led me to believe that his RFI-rich Manhattan flat and my suburban central New Jersey home presented these car-
tridges with very different electromagnetic environments. Neither of us could run very-low-output moving-coils (e.g., Benz-Micro Ruby) direct, while both of us were able to run highish-output models (e.g., Clearaudio Signature) straight into our (nearly) identical preamps. Our reactions differed with middle-level low-output models such as the Blue Oasis. The higher levels of RFI apparently raised the noise floor across the board for JS, so he needed a higher gain to reduce it to an acceptable level.

In my system, the Blue Oasis worked fine without a step-up transformer. In fact, background noise was among the lowest of the cartridges surveyed here. In addition, surface noises (ticks, pops, clicks, and hiss) were softened almost to the point of inaudibility. VTA adjustments did make a difference, but weren't as critical as they were with some other cartridges (Oracle Reference, Symphonic Line RG-8 Gold). I've often found these traits—soft surface noise and robust VTA tolerance—to be associated with soft top ends and/or less than stellar resolution of detail.

I agree completely with JS's description of the Blue Oasis straight into the CAT as sounding darkish with a lack of air. The tonal balance had a noticeable upper-treble softening. The contrast with the unloaded Clearaudio Signature was dramatic, as it sounded brighter, lighter, and more exci-
ting. As a result of the Blue Oasis's attenu-
ted top end, cymbals, triangles, and upper harmonics were slightly softened and quiet. On the up side, there was no sibil-
ance, texture, or dryness in the lower treble range. As JS found, there was a loss of spaciousness and ambience. For example, Ella Fitzgerald's Live at Carnegie Hall sounded full and smooth, but also dark and not particularly transparent. Even the sensation of being part of a live audience was diminished.

The midrange was where the Blue Oasis came into its own. My listening notes were replete with such terms as "full," "rich," "lush," "smooth," and "liquid." In short, the Blue Oasis's mid-
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range was eminently musical, immensely enjoyable, and consistently involving—especially with vocals. For example, with the Clearaudio Signature, Björk's singing on the Sugarcubes' "Blue Eyed Pop," from Life's Too Good, was somewhere between edgy and irritating; with the Blue, it was smoother and fuller, thus sounding much more human and far less electronic.

I wondered what the Signature and the Blue would do with/to an inherently smoother-sounding voice. On Lou Rawls' "A Whole Lotta Woman," from Soulful, the Blue was more lifelike, with a softer, more natural sibilance, offering a silky-smooth, throat-you-can-almost-touch re-creation of his spectacularly unique voice. While Fitzgerald's voice was harmonically richer with the Blue, it was much more detailed with the Clearaudio—I was almost able to see her moving to and fro, turning her head from side to side and singing louder or softer in minute gradations.

On the rhythmically precise Sugarcubes album, both cartridges had a compelling sense of pace and drive. However, the pace was less well-defined with the Blue on the Rolling Stones' "Rocks Off," from Exile on Main Street—there was more rollin' than rockin'. In contrast, the more revealing Signature had more insistent drive and energy. If the music was very busy, the Clearaudio's detail resolution made the difference.

JS found improved resolution by running the Blue Oasis through the Expressive; I found the same to be true using either the Benz-Micro PP1 or the Klyne 7PX2.5 phonos preamps. Unusually, the PP1 took away too much midrange magic to justify the improved information retrieval. Like the Expressive transformer, the Klyne proved a wonderful match with the Blue—detail resolution and pace were both improved.

I ran the Blue with and without the Klyne, various combinations of Conrad-Johnson Premier Eights and Classé One Thousands driving a pair of Apogee Studio Grandis (review upcoming). Michael Newman's interpretation of Bach's Chaconne (Sheffield Lab 10) was sharper, quicker, and more alive and dynamic through the Klyne, and slightly richer directly into the CAT. In either case, the performance was involving and musically satisfying.

On Dead Can Dance's Into the Labyrinth (4AD 45384–1), there was plenty of space with the Oasis fed directly into the CAT. With the Klyne, "plenty" became gobs, and detail resolution was stunning. While I couldn't tell just what was in the maracas, I thought I could count 'em! My experience with the Klyne closely mirrored that of JS's with the Expressive. The only difference in our opinions concerned the evaluation of the Blue Oasis directly into the CAT: With less of an RFI/noise problem, I was able to achieve a higher level of performance with the Blue Oasis directly into the CAT—the differences with a top-quality step-up weren't as great, and the tradeoffs were clear.

The bass was the most difficult area of performance to evaluate. While the treble was soft, the bass was neither exaggerated nor attenuated—I didn't find the Blue Oasis to have a downward-tilted tonal balance. I was initially puzzled by the very different levels of bass performance JS achieved, depending on the use or not of a step-up, the specific choice of step-up, and the choice of record clamp. In my auditioning, bass performance was consistent and unperturbing. I don't mean this as a criticism—the bass was always there, but never in a way that distracted me from the music.

A favorite bass test has been the pervasive and tonally shifting synthesizer line from Heart's "Magic Man" (Dreamboat Annie, Mushroom MRS-5005). The Blue Oasis got all of it with every configuration, never jumping out or disappearing, which would have indicated peaks or suckouts. The bass was consistently tight, clean, and simply part of the music. In contrast, my Koetsu gets softer as this bass line digger deeper; the transfiguration made it more powerful overall.

The bass performance with the Klyne (which replaced the CAT's phonostage and was fed into a line-level input) was tighter, stronger, and more extended. This is more of a comment on the cartridge than a comparison between tube and solid-state phono stages.

The Klyne was able to show the truly superlative bass performance of the Blue Oasis—it was extended, powerful, controlled, and articulate, with the requisite surrounding air. Rock had a somewhat more forceful presentation, symphonic works a slightly more impressive foundation. While JS ran the Blue through the Expressive into the CAT's phono stage, I bypassed the phono stage, running the Klyne into the CAT's line stage. Nonetheless, both of us found that the ultimate key to bass performance was tied to the choice of phono stage.

As JS said, the Blue Oasis "made listening to music fun and enjoyable" I couldn't agree more. While the Blue Oasis had a bit of top-end softening and not the last word in detail resolution, this cartridge's midrange splendor and otherwise excellent performance made it a wonderful choice. With price factored in, the Blue Oasis stood out among these splendid cartridges.

—Jack English

BENZ-MICRO RUBY MOVING-COIL CARTRIDGE

JE Enters the Cottage of the Three Bears: The oft-misunderstood Benz-Micro Ruby was the inspiration for this survey. It has an unusually low output, even by moving-coil standards. Consequently, the Ruby has often been auditioned with phono stages and/or preamps that lack gain enough to allow it to strut its stuff. Unlike most of the other cartridges in this survey, the Ruby typically requires an external phono stage and an additional set of interconnects; or a preamp, such as the Melos 333 Gold or MFA MC Reference, with atypically high gain. These unusual requirements must thus be factored into the overall cost of the cartridge.

The Benz-Micro Ruby is unusual in other ways as well. Like all the cartridges in Benz's "Micro" line, the Ruby's proprietary "Micro-Edge" stylus-tip geometry is designed to closely mimic the cutting stylus. The intent of such geometry is to retrieve the maximum information from LP grooves. Like the Benz-Micro MC Reference (reviewed by Dick Olsher in Vol.16 No.2), the Ruby uses a sophisticated generator assembly similar to the one found in the Benz MC-3 (an earlier version of the Ruby reviewed by Tom Norton in Vol.13 No.3 and Vol.14 No.8).

One of the most unusual features of the Ruby is its body, which is made of Bruyere (pronounced "bru-air") wood. For some time, audiophiles have been praising wooden cartridge bodies—especially those from Koetsu. Speculation abounds concerning the nonmagnetic, non-conductive, resonant nature of wood. Wooden bodies have colorations of their own, but many designers and audiophiles have found these to be very musical—much like the second-order-harmonic behavior of tubes.

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with cartridge bodies altogether—to run the cartridges "nude." Various sonic benefits, notably the elimination of body resonances, have been attributed to this particular tweak (included in the design of the Symphonic Line RG–8 Gold). Many audiophiles believe that nude cartridges simultaneously exhibit enhanced upper-midrange speed and greater transparency while suffering shifted tonal balances—often at the expense of the midbass.

Benz attempted to capture the positives of the "nude" tweak by eliminating the bottom of the body (the surface area just above the LP), all the while capitalizing on the virtues of wood. I'd like to note that the value of any body is the simple mechanical protection it offers the cartridge—especially expensive ones like the Ruby.

Benz refers to their semi-nude body as "vented." This open-bodied design should result in fewer resonances while still protecting the cartridge's delicate innards. In addition, the vented body provides the necessary mass for improved bass performance and allows for better cartridge-to-tonearm coupling.

Primarily as a result of the success of Dynavector, many of us tend to associate the use of rubies with cantilevers. Not so with the Benz-Micro Ruby, in which, as in all Benz cantilevers, the cantilever is solid boron. A synthetic ruby is used in place of iron in the core or generator, which reduces the mass of the moving coil and eliminates still another source of potential magnetic interaction.

In addition to its low output, the Ruby has a relatively high suggested tracking force of 2.2–2.5g. This is important; effective tracking was one of the major design goals for this cartridge. Benz's consideration of this in stylus-tip geometry, generator weight, and overall cartridge mass would all be for naught without the correct tracking force (ie, higher than typical). Properly set up, the Ruby, like all other recent Benz cartridges I've auditioned, was an excellent tracker.

The Ruby is Benz-Micro's most expensive cartridge, which means it should be the best. But what, exactly, does that mean? In some cases, such as with the Mark Levinson No.30.5 DAC, it means setting new standards across the board. The Koetsu Pro IV pushed the envelope in the midrange. At $3000, I expected the Ruby to achieve similar results.

The Proof of the Pudding: Fed directly into my new CAT SL–1 Signature, the Ruby suffered from poor dynamic performance, high levels of noise, obscured low-level detail, and tonal aberrations—especially weak bass.

The Ruby's very low output, roughly half that of a Koetsu or the Benz-Micro Reference, was causing it to perform less than optimally with a number of preamps. It was marginally acceptable with the CAT SL Signature, but was a far better match with the Melos 333 Gold using the optional 333 phono stage which offers a combined 82dB of gain, the excellent Klyne 7PX2.5 phono stage with any preamp, the extremely high-gain MFA MC Reference preamp, or the Benz-Micro Lukaschek PP1 phono stage. With a number of other preamps, the Ruby simply sounded dynamically lifeless and harmonically emasculated. Even Athena's splendidly dynamic reissue of Rachmaninoff's Symphonic Dances (ALS–10001) lacked any appreciable dynamic wallop or harmonic splendor with the Ruby fed directly into the CAT.

With lower-gain preamps, all sorts of noises, including all surface noises, tube rush, RFI, and low-level system hums, were unusually prominent. Because of the cartridge's low output, I always had to set the volume higher than with most other cartridges I use (including the Benz-Micro MC–3), which magnified every noise in the system. The surface noise on my much-abused copy (purchased from a library) of Aaron Copland conducting his Appalachian Spring (RCA LSC–2401) was intolerable. And if the preamp didn't have tremendous gain, the Ruby sounded horrible even before it touched the record's surface.

I'd guess that most of the audiophiles who have heard this cartridge have heard it mated to an inappropriate (ie, low-gain) preamp and/or phonostage line, in which case they've never really heard what the cartridge is capable of. Take this as a stern warning; if you don't have the right preamp, or are unwilling to buy a new one with adequate gain, you shouldn't consider this cartridge—it'll just sound mediocre.

Once mated with an appropriate preamp, however, the Ruby took on an entirely different character. Given its sophisticated tip geometry, I expected something between surgically analytical and ruthlessly revealing. I heard nothing of the kind. The Ruby's revelation of detail was very good, but the cartridge hadn't neither the richly musical midrange resolving power of some, nor the false sense of detail provided by others via exaggerated trebles. Eliot Fisk's acoustic-guitar performance of Scarlatti's Sonatas (Mark Levinson MLAR C 45 000 006) was a rich combination of vibrating strings, body resonances, and top-surface reflections coupled with the sound of Fisk's hands playing the instrument. This excellent recording sounded believably lifelike with the Ruby.

The Ruby was quick and clean, though not necessarily fast. Sounds began, sustained, and stopped, as musical sounds do. My attention was never drawn to the speed of transients, nor was I ever aware of sounds decaying too rapidly, or of any other odd attack/decay relationships. The character of the sound was more musical, and less what many might call "accurate." For example, the plucked, struck, and bowed strings of the double-basses on Ray Brown's Super Bass (Capri ACPR–74018) were always musical and identifiable. As with Fisk's guitar, the double-basses came a satisfying mixture of sound from strings, body cavities, and reflecting surfaces—the music was always tuneful and rhythmically coherent. The Ruby captured the drive and energy of "Righteous Boogie Bass" without drawing attention to transient edges.

The tunefulness of the Ruby on Super Bass revealed more information about the cartridge's character. The Ruby had extended bass response—most obvious with my reference ProAc Response 4s—as well as a powerful, articulate, well-controlled mid-upper bass. In fact, when mated with proper ancillary equipment, the Ruby's most spectacular characteristic was the overall extension, clarity, and power of its bass.

The Ruby extended to the powerful low frequencies of Richard Schönherz's and Peter Scott's demo-quality One Night in Vienna LP (Windham Hill WH–1060). The wonderful tremolo'd bass line of Kraftwerk's "Autobahn" (Autobahn, Vertigo VEL 2003) was clear, tight, and punchy. The Ruby's overall bass capability was equally satisfying with large orchestral works, small jazz ensembles, or virtually any rock recording I tried.

Harmonically, fast cartridges typically sound thin, slow cartridges overripe. The Ruby didn't fall into either camp: it wasn't fast, but it was too clean and rhythmically solid to be called "slow." These same balanced-on-the-tightrope comments are true of the Ruby's harmonic richness. The cartridge was neither thin nor lush. Mark Knopfler's voice on Dire Straits' "You and Your Friend" (On Every Street, Warner Bros. 26680–1), while sounding breathy, dynamic, and emotive, also had enough body to sound realistic. Some cartridges provide greater detail, some give more chest/nasal character (ie, more fullness). The Ruby offered a pleasing blend.

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Larry Greenhill, Stereophile. (May 1994, Vol. 17, No. 5)

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monies 2-14013-1) wonderfully demonstrated just what the Ruby did and didn’t do to harmonics. This unusual recording features Western thematic material heavily influenced by Eastern singing using complex harmonies. With the Ruby, every odd enunciation and lyrical phrasing was evident; simultaneously occurring notes, often from the same singer, were clearly distinguishable. Nonetheless, with some cartridges I’ve heard even finer resolution of the details of vocal tappings; with others, I’ve heard fuller, richer harmonic structures. The Ruby gave me the detail without highlighting it, and the tonalities without enriching or fattening them. Or I could say that the Ruby gave me neither the ultimate level of detail resolution nor the complete vocal richness of this recording’s enchanting voices. What it did give me was very good detail with very good harmonics, though neither at the expense of the other.

The Ruby continued its balancing act in the trebles. Triangles from the Rachmaninoff were clear, standing out in the mix as they should without drawing undue attention to themselves. Cymbals on the Dire Straits recording were metallic without being excessively splashy. The treble was neither attenuated, exaggerated, hard, or bright. There was not just treble detail or obvious treble speed; the sounds were musical, with an effective balance of detail and body.

What should be clear by now is that the Ruby’s character is one of carefully crafted tradeoffs and compromises. The Ruby’s tonal character was a blend of detail resolution and harmonic richness. Frequency performance, while extended, was neither exaggerated nor attenuated. Not surprisingly, the Ruby’s soundstaging balanced on a similar tightrope: the stage was generally wide (neither too narrow nor too wide) and deep (neither foreshortened nor elongated). Placement of performers was stable, but not pinpoint. Maybe I should call this the “Goldilocks” cartridge.

With the right source material, the presentation was open and spacious, but never as open and spacious as I’ve heard with some other cartridges. However, it was never closed down. In every instance, the Ruby’s performance was most impressive with the high-gain Melos 333 phono-line-stage combination or the MFA MC Reference. With different preamps, various degrees of performance were lost across the board, but especially in the areas of dynamic contrasts and harmonic richness.

Chesky’s wonderful reissue compilation, *The Power of the Orchestra* (RC30), fit the Goldilocks’ soundstaging pattern to a T. The reproduced stage was wide and deep, with layers in each direction. Performers were clearly located in specific areas of the stage, and the overall presentation was open and realistic, with my listening seat located mid-hall. Filling out the illusion were majestic dynamics (not explosive, but close), rich, full (but not lush) timbres, clean and tight (but not fast) percussive snare, and clear (but not bell-pure) triangles and cymbals—all built on a very strong bass foundation. Other orchestral performances, such as the Copland and Rachmaninoff, yielded very similar results.

**JE Concludes:** The Benz-Micro Ruby is an unusual cartridge. Its very low output mandates careful matching to a preamp with high gain within a system of low noise. This isn’t a suggestion—it’s a stern warning. Putting the Ruby in a system that fails to meet these criteria will lead to mediocre and unsatisfying performance.

Sonically, the Ruby sets no new standards. At its high price, most listeners would expect something spectacular. The Ruby wasn’t spectacular. However, it did offer up a thoughtful combination of sonics compromises. It didn’t typify any particular approach, school of thought, or set of colorations. In the right system, the excellent-tracking Ruby was a very good performer in all regards.

—Jack English

**JS Takes a Whack at the Ruby, or The Name of the Gain:** . . . As JE pointed out, the Ruby requires meticulous care and feeding. It’s certainly a sophisticated member of the top-o’-the-line brigade. As mentioned, it’s an easily misunderstood cartridge, cast aside as inadequate for the job when all it needs is (bags of) clean gain. Pump up this Bruyere—wood coconut and it’ll deliver the goods. Enhanced gain results in strangled sopranos. One must be demanding, dahling.

Despite the CAT’s new found crank-ability, a quick listen to the Ruby direct into its phono inputs confirmed my doubts about this setup—ill-advised at best. The Ruby worked very well partnered with the high-gain, 25x Expressive SU-1 step-up transformer, but sounded most compelling with the Swiss-made FM Acoustics FM 222 phono stage, especially given that unit’s adjustability. I zeroed-in the VTA with *Carmen Sings Monk*.

While I had great success with a set of Discovery Cable balanced-to-single-ended cables, I used FM’s own interconnect for review purposes. If you own an FM 222, be sure to get the grounding right; if you don’t, the unit will sound ho-hum.

The FM 222 offers myriad adjustments. The (performer well-heeled) analoge can tailor the cartridge’s response via dip switches and selecting varying capacitive and resistive loads. I favored 160 ohms, despite the manufacturer’s recommendation of 500 ohms to 47k ohms. Front-panel-accessible chips are available for the FM 222 which cover most loading ranges. The owner of this cost-no-object phono stage can also press a gold Chieft-like button to boost the output by 10dB, thus choosing either the phono stage or the CAT for the pumping. In general, the Ruby sounds best with the 10dB gain setting, which results in a warm, harmonically rich presentation with adequate jump and dynamics, staging, and overall tonal neutrality.

**What do You Sound Like When You’re Loaded?** I checked this kick-butt 10dB theory with the Art of Noise’s “Spik.” Even with 10dB additional gain, the CAT’s volume was open to 12 o’clock, and the resulting waveform was truly magnificent. The Ruby rendered the most natural, musical, and open top-end I’ve heard on this disc with any of the cartridges. (I usually apologize for this LP’s hot top-end.)

I found the lower gain setting more consonant with the Ruby’s mellifluous sound on smaller-scaled works. Bradford Marsalis’s *Tri Jeep* sounded better with the cartridge opened up to 47k ohms and the 10dB gain cut, allowing the CAT to handle things. These settings sounded faster, better at nailing at least a few of those leading edges; more alive, yet a little less smooth (though some may welcome this). The bass, a little more out of control at 47k ohms, was tighter and more extended when loaded. When wide open, the bass lost a touch of refinement, but was more athletic, horned, and ready to rearrange your face! However, a touch more grain between the performers needed to be reckoned with. Ultimately, for most material I preferred the Ruby loaded to 160 ohms, and adjusted the FM Acoustics’s gain as required.

At a hair under 2gm, the Ruby’s soundstage was somewhat less distinct and controlled than those of the Blue Oasis or the Clearaudio Signature; nonetheless, it could be wonderfully palpable and musical, surprising me with its immediate-sounding, soundstage-forward presentation. I recalled a more distant perspective before adequate gain was applied; the overall soundstage dimensions were somewhat smaller than
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gain who purchase the Ruby absolutely must use the Harmonix TU-812 Tuning Record Clamp, no matter the tune or platter. A certain tendency to lusher-than-life imagery, coupled with the Ruby's forgiving nature, require the precision of the Harmonix. The Shun Mook Record Weight offered too much of a good thing, especially in the bass, to give you that state-of-the-art performance. I was talking about. Harmonix'd, the majesty and flatten-you-to-the-wall-and-compress-your-chest drums in Stravinsky's Rite of Spring were as visceral as I'd care to hear coming at me from the hall's far rear. It wasn't perhaps the tightest I've ever heard, but powerful, fullsome, and hair-raising!

**Finis:** The Benz Ruby is the basic Aston Martin of cartridges: "Double-oh-seven, please try not to break it this time, there's a good chap." Clubby, unhurried, refined. Jeeves at your sleeve with a martini, very dry (shaken, not stirred), served with your tush ensconced in a button leather chair. I say, what?

The Benz-Micro Ruby offered a lovely thereeness to images that's at least $3000 attractive. Yet, although I acknowledge its place among the other top performers in this survey, there was nothing about it that really grabbed me. Honor the Cleaudio Signature for its complete (but never brutal) honesty and neutrality, saluting it as I whisper, "I'll take it." I admire the Blue Oasis on its own, lustng for it while whispering. "I'll take it when powered by the 25x-oversampling Expressive Technologies SU-1 step-up transformer" [badaBOOM!, take my cartridge, please!]

The Ruby never involved me enough to make me whisper, "I'll take it." Although I admire the effort, it didn't turn me on. Too safe. However, not comparing out on top compared to these other cartridge gods is no condemnation; the Ruby also lives on Mt. Parnassus—just not at the pinnacle. —Jonathan Scull

**Oracle Reference Cartridge: Turntables, Tonearms, & Cartridges**

**JE Looks at a Strategic Decision:** As digital home-audio gained popularity, analog was obviously in serious jeopardy. As a manufacturer of drop-dead gorgeous turntables, Oracle Audio Corporation quickly recognized their vulnerability and chose to diversify, becoming an effective producer of loudspeakers (see review of their Mentor Studio in Vol.17 No.9), and thus ensuring their viability in the field of home audio.

Having protected their corporate viability, Oracle found themselves in a better position to seek an increased share of the shrinking analog market, which they aggressively pursued with newer turntables and tonearms (the latter sourced from SME). Oracle also teamed up with an unnamed Japanese manufacturer to introduce two moving-coil cartridges. The higher-priced of the two, the $195 Reference, is the (barely) least-expensive cartridge in this survey.

The bodies of many high-end cartridges are cut, removable, or nonexistent. The Reference, unusually, has a double-walled body intended to provide better control of vibrations (as well as much-needed protection for its delicate innards). The outer, dark-gray cartridge wall, made of a mixture of plastic and aluminum powder and weighing a modest 4.5gm, sports a MicroRidge stylus-tip geometry and a boron cantilever. The suggested tracking force is 1.8gm.

In spite of its low specified output of 0.2mV, the Reference was one of the loudest, if not the loudest, cartridges in this survey, working well with every preamp and phono stage I tried. This high gain was related to some of the cartridge's greatest strengths. Played loudly, it didn't become harsh or congested. Rather, it had that rare ability to allow the music to fill the listening room by energizing it with sound.

The dynamic Reference matched up well with rock, since it was effective at re-creating the big shifts in volume typically found in popular music. For example, unlike many audiophile components, the Reference re-created the unbridled power and raw energy of Led Zeppelin II (Atlantic SD–1977).

On the other hand, the Reference lacked the ability to fully re-create the lower-level dynamic contrasts more typical of classical performances. For example, subtle volume shifts in Rimsky-Korsakov's Scheherazade (Chesky RC4) were obscured. With more dynamically diverse recordings, the Oracle effectively conveyed the power and authority of the music without fully re-creating the emotional messages contained in these subtle variations in volume. In large part, this inability was tied to some of the more negative aspects of the cartridge's performance, which gave it an unusually high noise-floor.

In addition to its gain and wide-range dynamic strengths, the Reference had an extended, powerful bass range upon which impressive music foundations could be built. For example, the cartridge splendidly reproduced the live excitement of Kitaro's "Japanese Drums" (Asia, Geffen GHS 24087). However, the
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Reference had a slight lack of deep-bass control. A good illustration of the power, extension, yet modest lack of bass articulation was the third movement of Scheherazade, in which plucked bass notes, in particular, became a bit boomy.

Another of the Reference's strengths was its expansive soundstage, which had discernible layers of width and depth clearly audible on such well-recorded music as the Rimsky-Korsakov. Placement of performers within the stage was precise, with no wander or vagueness, typified by the third-movement snare at the rear left. In general, the Reference placed me in a mid-hall seat, with good distance between me and the performers, who were located well behind and around my speakers. This kind of staging, which I prefer, was a bit of a surprise. I've often found that cartridges which play loudly and energize my listening room also become quickly fatiguing, as they tend to push the performers in front of the speakers.

Oddly, the Oracle didn't offer up strong sensations of spaciousness. Nevertheless, it had a strong, clear treble range. With no loading, the top end tended to sound hot and crisp on some material. Recordings that were hot to begin with (eg, Manhattan Transfer Live, Atlantic 81723) became nearly unbearable. While VTA adjustments tamed the top end a bit from recording to recording, the Oracle benefited far more from cartridge loading—more so than any other cartridge in this survey. Although I could reasonably alter the top end, a slight sibilance region remained further down in the treble range.

While both frequency extremes were obvious and dominant, the midrange was slightly thin and mildly obscured. Everything was clear—in fact, detailed resolution was surprisingly effective given the less-than-optimal noise floor—but harmonic structures were never full, lush, or rich. I always heard every sound I expected to hear, but they were often something less than I expected (especially after hearing the very same sounds through some of the other cartridges in this survey). This thinness was strikingly obvious in comparison to my Koetsu Pro IV, which has a superlative midrange. Of all the preamp/phono-stage combinations I tested, the Reference worked best with the complete Melos 333 Gold, which offered a somewhat rich midrange.

While the harmonic thinness disappointed me, the Reference had a number of other characteristics that gave me more trouble. For example, it produced high levels of surface noise on all recordings. While this made its ability to resolve detail that much more impressive, it most severely impacted borderline vinyl, making it nearly unlistenable. For example, the surface noise on my used copy of Shostakovich's Symphony 5 on British EMI (Melodiya ASD 2668) was very distracting—like someone with a persistent cough. Clicks, ticks, and pops were also unusually prominent, so well-played recordings sounded older and more abused. (Admittedly, I've grown less tolerant of surface noise as digital steadily improves.)

I experienced some, albeit infrequent, mistracking along the entire prescribed range of tracking weights. With Led Zeppelin wailing "Whole Lotta Love" at +90dB, mistracking drew my attention from the music. The tape hiss was more obvious with this cartridge than with any of the others, as evidenced on the softer passages that highlight the Everly Brothers' wonderful vocal harmonies (The Golden Hits Of The Everly Brothers, Warner Brothers 1471). Tape hiss—one of the many continuous reminders that the Oracle was reproducing music—was somewhat mitigated when the Reference was loaded down from 47k ohms, but was never made sufficiently unobtrusive.

**Conclusion:** Despite a few impressive strengths—eg, its reasonable sensitivity and low mass—the Oracle Reference was clearly outclassed here. It didn't live up to the reputation of Oracle's gorgeous line of turntables or its SME-sourced tonearms. However, since neither JS nor I listened to a full Oracle system, it's possible that some synergy might exist in a complete Oracle front end—just as there is with a full Linn setup. —Jack English

**JS Comments on the Oracle Reference:** The Oracle Reference is an enigma. Run straight into the CAT, it had some things going for it. There was a certain noteworthy charm and looseness in the midrange that bordered on the captivating without ever fully blooming, but it was never an overriding consideration. Of course, in a sense, that's how it should be. The bass was powerful and somewhat plummy, but at least it was there to set the foundation.

I'd heard that the Oracle sounded "crisp," so mounted it on a thick-walled Forsell arm. At first I used a next-to-thickest Teflon spacer to tame what I thought might be an etched upper treble. Although the resultant midrange was attractive in an older-Koetsu-like way, the bass was way out of control, and the highs were obviously rolled off. I'd sort of expected this to be the case.

Because I have a very understanding audiophile wife, and obviously have no life outside of mounting and remounting cartridges, I changed the next-to-thinnest to the next-to-thinnest Teflon spacer in the same arm, and reset azimuth with the cartridge analyzer. This cartridge registered greater than 40dB channel separation at 1kHz—one of the best measurements of all the cartridges tested. But measurements are not everything; I kept an open mind. The Golds (van den Hul Gold and Symphonic Line RG-8 Gold) and the Transfiguration were no great shakes in this department, but they all sounded...well, you'll see.

I'm not shouting! I just have an unusually high output! Interestingly, while the Parnassus and the Benz-Micro don't have the output to run straight into the CAT, at a published 0.2mV (a tad modest, methinks), the Oracle has much more punch and dynamics this way, sounding much more powerful than any other 0.2mV cartridge I've ever heard in our system. Arm-optimized and straight into the CAT, the Oracle sounded okay, a tighter bass complementing a seemingly attractive midrange.

The highs, however, were enigmatic. The upper midrange to lower treble sounded veiled—not a heavy muslin or burlap coloration, but a light skin that recessed this important region; the treble and above, on the other hand, sounded clean, quick, and snappy. The slightly recessed presence region endowed the cartridge with a sweetish tinge, while the crispy-chicken upper treble kept the sound aligned and moving in the right direction. There was a slight but noticeable lack of dynamics with the Oracle Reference running straight into the CAT.

**An Expressive Experience:** The Expressive Technology SU-1 step-up transformer changed the Reference's presentation quite a bit, adding to its mystery. Although the Parnassus, for example, was enhanced when high gain was applied, it remained a Parnassus, with recognizable traits and qualities. The step-up transformer rendered the Reference, on the other hand, a completely different cartridge, tightening up the plummy bass while also leaning it out (less harmonics and bloom).

The midrange, while remaining essentially recognizable, could easily be accused of having even less bloom and harmonic fullness. Highs at times were more forward, a touch hard, and quite etched. Macrodynamics were enhanced, but don't even mention microdynamics—there were none. Also dishearteningly
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missing was whatever small sense of refinement there was to enjoy with this cartridge. "With the Expressive, a cartridge can’t hide from itself," Jonathan intoned meaningfully.

The bass, while giving the impression of having power, was somehow flat and incomplete, lacking important harmonic shadings and expressiveness.

Speaking of flat, the Oracle also had some unusual imaging characteristics, to say the least. Its soundstage was flatter than that of all the other cartridges in this review. While it managed to put Jimmy Rushing and Branford Marsalis back a bit, it had less layering and less of an overall sense of depth than any of the other cartridges. The soundstage was wide, yes; layered, no. I was able to achieve greater image focus and body using Mortite, but the Oracle was more obscured here than the rest of the mob, as JE discovered. Then there’s that pesky grayishness in the upper midrange, though this was less in evidence than when run straight into the CAT.

You talkin' to me? I noticed something very particular when listening to Branford Marsalis’s "The Nearness of You": With the Oracle, the two memorable passages when Branford turns around and sails some mighty fine riffs toward the rear of the studio sounded like simple volume changes. Less verisimilitude.

Sir, the Swiss embassy is on the phone something about a phoo-new stage? The Oracle Reference undoubtedly sounded better with the FM Acoustics FM 222 phono stage. Although not bad loaded at 1k ohm, I liked the Oracle best when playing small works wide open at 47k ohms. There wasn’t as much depth or silence between performers this way, but it did sound more immediate, if a bit sibilant.

Similar to the sound when run straight into the CAT, the Oracle’s midrange had an appealing smoothness through the FM Acoustics; but there was still a darkish, recessed quality in the presence region that continued to disturb me. The FM 222 helped the Oracle to sound wider and more dynamic, and as transparent (finally) and ambient as it ever managed in our system. We got power and jump coupled with some subtlety and refinement. Nevertheless, Milt Hinton’s acoustic bass on the Marsalis LP sounded more like an electric bass.

JE was more positive regarding the Oracle’s imaging—I would never use such words as "precise" to describe this aspect of its sound. Listening to the ambient Jazz Party disc made me realize that, with certain recordings, the Oracle must be loaded to coax whatever soundstage depth you can from the thing. At 1k ohm, I got some space and retained the crisp highs, as heard on the cymbal work on either the Ellington disc or the Cyndee Peters cut. This crisp quality helped re-create the air that was generally missing from this cartridge. Detail retrieval was reasonable—Jimmy Rushing was well back, his fingersnapping easily heard in the mix.

Curiously, the Oracle Reference not-ready-for-prime-time cartridge mistracked like the dickens, as it did for JE, annoyingly emphasizing pops’n’ticks. None of the other cartridges in this survey behaved so churlishly.

My kingdom for a horse! Mounting the Oracle was equally a pain in the pancreas. Despite its high-tech composite body, it still managed to feel lightweight and plastic-cheap. Incredibly, this cartridge is the only unit in this survey not tapped for screws, requiring nuts to hold it in place—not a big deal for this nimble-fingered cartridge meister, but a pain for the inexperienced.

JE has written a fair enough assessment of the Oracle’s strengths and weaknesses. It didn’t image as well for me as he managed in his setup—perhaps I needed to spend more time tweaking it. But, although I gave the Oracle Reference the same attention I gave the others, I never found myself sufficiently moved by its sound to squeeze out that last smidgen of performance it just might possess. You win some, you lose some. Next . . . ?

—Jonathan Scull

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(Muddy Waters)
3. My Captain - 5:10
(Muddy Waters)
4. Good Morning School Girl - 3:12
(Garling Boy (Philadelphia)
5. You Gonna Need My Help - 3:49
(Muddy Morgenfield)

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SONY TCD-D7 PORTABLE DAT RECORDER

Steven Stone

Sampling frequencies: 48kHz, 44.1kHz, 32kHz. Frequency responses: 48kHz: 20kHz-22kHz ±0.08dB; 44.1kHz: 20kHz-20kHz ±0.08dB; 32kHz: 20kHz-14kHz ±0.10dB. SNr ratio: >87dB. Dynamic range: >87dB. THD at 1kHz: standard play, <0.008%; long play, <0.09%; Input levels: line, 80-500mV; microphone, 0.04mV minimum. Output levels: line, 500mV, headphone, 5mV. Headphone output impedance: 32 ohms. Power requirements: 6V DC, 1.2W. Approximate battery life: with monitor, 3½ hours playback; without monitor, 4 hours playback, 3½ hours recording.

Optional accessories: AC-E60AM AC power adapter; AC-E60L worldwide AC power adapter; DCC-E60L car-battery adapter cord; CPA-3, CPA-4 car connecting packs; RMT-D7 wired remote commander; POC-DA12 optical digital cable; RK-DIAO coaxial digital cable; RK-D239 audio connecting cord; ECM-95A, ECM-737 stereo microphones. Dimensions: 5½" W by 1½" H by 3½" D. Weight: 1 lb 1 oz, inc. batteries. Price: $699.95 with case. Approximate number of dealers: 1000. Manufacturer: Sony Electronics, 1 Sony Drive, Park Ridge, NJ 07656. Tel: (201) 930-1000.

Budda budda budda budda... DATMAN!

A morphed rendition of the ultra-cheesy TV show's musical theme ricocheted inside my cranial cavity when I first caught a glimpse of Sony's minuscule TCD-D7, a second-generation portable DAT recorder roughly half the size and weight of my trusty, world-traveled Sony Walkman pro WMD-6C cassette recorder. Visions of recording Balinese Gamelan orchestras in inaccessible island villages danced in my head as I held this diminutive unit in my palm. Lemme at 'em—with a TCD-D7, I'm ready to record the world!

On-location recording and playback are the TCD-D7's primary functions, but during the last six months I've discovered several other roles for the little critter. The TCD-D7 is superb as a playback DAT deck piped through a high-quality D/A. I seriously doubt you'll hear any differences between the TCD-D7 and Sony's ES series DTC-2000 playing the same tapes through the same D/A. Too bad the TCD-D7's A/D isn't the DTC-2000's equal, but more on that later. The TCD-D7 is also quite handy for direct-copying DAT tapes. Unfortunately, Serial Copy Management System (SCMS), pronounced "scams" for good reason) anti-copy protection is built-in.

SYSTEM

The system in my large room consists of a VPI TNT Jr. turntable on a Bright Star base and TNT stand, mounted alternately with Graham 1.5, Wheaton Triplanar V, or Souther-Clearaudio Tri-Quartz tonearms fitted with van den Hul MC-1 Super, Dynavector XX-11 low-output moving-coil, Benz 0.04 MC, Clearaudio Veritas-S, or Denon DL-11 cartridges. Digital sources include the EAD 7000 Mk.II D/A processor and PS Audio Lambda CD transport. Preamps are the Dennesen JC-80 Mk.II gold, Boulder LS-AE, Michael Yee Audio PFE-1 phono preamp, and Vendetta SCP-2C phono preamp. Power amplifiers include two Parasound HCA-2200 IIs, two Boulder 250-AEs, and two Boulder 500-AEs. Speakers are Apogee Full-Ranges.

Interconnects are Straight Wire Virtuoso and Wire World Eclipse (both balanced and single-ended), and speaker cables are Dunlavy Labs DLZ-8. Digital cables include Mod Squad Wonderlink and CAL fiberoptic. Other accessories include RoomTunes EchoTunes and Ceiling Clouds, Acoustic Sciences Tube Traps and wall panels, Arcici Levitation stand, Sumiko Fluxbuser, The Original Cable Jackets, Music and Sound ferrite beads, AudioQuest ferrite clamps and record brush, NoiseTrapper power strip, Gryphon Exorcist system demagnetizer, Nitty Gritty record-cleaning machine, Radio Shack sound-pressure-level meter, Kleenmaster Brillanz CD cleaner, and Cellist, by Gregor PlatiGregorsky.

My small-room system is the same as that listed in my Paradigm Atom/Energy Excel speaker reviews (Vol.17 No.9, p.131), with the addition of Avalon Eclipse speakers driven by Pass Aleph Zeros. I also listened to the TCD-D7 through my Stax Pro Lambda headphone system as well as with Grado SR60 and SR100 headphones.

ERGONOMICS

The TCD-D7's top-panel controls include (counterclockwise from left): Fast Forward, Stop, Play, Fast Rewind, Record/ID Write, Pause, Light, Reset, Counter, and Clock. Side-panel controls include (from left to right): SP/LP speed selector, Volume, AVLS (Automatic Volume Limiter System), On/Off, Hold/Open switch, Record Level, Record Mode, and Mute sensitivity. Also included are Line and Phones outputs, and a Remote/Digital I/O connector.

Several of the control buttons serve multiple, but not exactly intuitive, functions; the instruction book is necessary at first. Although the TCD-D7 requires playback at 48kHz, 44.1kHz, or 32kHz sampling rates, it selects which rate will be used: when recording in Standard Play mode from analog or digital sources, the TCD-D7 defaults to 48kHz; when recording digitally from a CD, MD, or another DAT, it chooses 44.1kHz; and when recording in Long Play mode, it runs at 32kHz sampling.

Stereophile, January 1995
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Unfortunately, you have to reset the clock, which lacks alarm functions, whenever you replace the batteries. The TCD-D7 also has Sony's Automatic Volume Limiter System (AVLS). According to Sony, this "automatically limits the sound pressure so that it will not exceed a certain level without degrading the sound quality, even if you attempt to turn the volume higher." Say what? Does this mean that it'll automatically crud-up the sound if you try to play back through 'phones above a certain volume level? Yup, sounded like my headphones were full of Rice Crispies. Do consumers (presumably adult consumers) really need a volume governor in their DAT recorders? Luckily, you can turn AVLS off. For cleanest headphone output, select line/headphone—unfortunately, with this you lose the ability to adjust the output volume. Life is hard (and sometimes loud).

Another "feature" that consumers may find less than ideal is the built-in bass rolloff on the microphone input. This non-deletable bass attenuation renders the direct mike input useless for full-frequency music recording. Most good mikes already have built-in bass-rolloff switches; the person who dreamed up this redundant, pernicious feature should be locked in a room and forced to listen twice to the complete works of Frank Zappa through a system that has this very same bass contour built-in. Then they might realize that this was a wicked, stupid idea.

Back to the slightly more useful features. Record Mode selects among three modes: "Manual," which allows the user to select the recording level via the Record Level knob; "Music" which is automatic gain-riding; and "Speech," which also automatically sets the recording levels. I usually set my own levels—even when making verbal diary field-recordings—so I found this feature of limited value. This Speech function might be useful for nonprofessional types who record lectures; but who does DAT?

One of the delightful features of DAT recorders are the 1Ds, which can place markers anywhere you want in a recording. The TCD-D7 can even automatically write 1Ds to all moments of silence. Unfortunately, if you want to move, erase, add, or renumber existing 1Ds, you need Sony's RM-D3K "system adapter kit"—mandatory for serious TCD-D7 users. The RM-D3K also permits digital interface via coaxial or TosLink, and allows for full remote-control operation of the TCD-D7. Unfortunately, not only does the RM-D3K run only on AC power, the TCD-D7 must also be AC-powered to properly operate with the RM-D3K. If you plan to do any field recording that requires changes in 1D markers, you'll have to wait till you get back to civilization.

Battery life is a major problem with the TCD-D7. If you use the built-in control-panel light, you'll be lucky to get 1 1/2 hours of life per battery set—barely enough to record a classical concert, and certainly not enough for an entire Grateful Dead show. If you're planning to do serious field recordings, you'll need to carry a passel of pennlight batteries (and be very deft at rapid changes), find an AC outlet (good luck in the middle of Mexico or in an outdoor amphitheater), or some alternative power source.

Luckily, a company called Eco-Charge makes an elegant external battery pack, the Sigma ($119.95), which includes a charger, two sealed, lead-cell batteries good for at least 12 hours each per charge, and a dedicated adapter that allows you to use the batteries with the TCD-D7. The advantage of lead-cell batteries over NiCads is that you can recharge them at any time in their discharge cycle without the dreaded NiCad "memory effect" shortening their operating longevity. Eco-Charge batteries are good for 300-600 charge/recharge cycles. The only disadvantage of lead cells is that they're heavy—each cell weighs slightly more than the TCD-D7, and the whole shebang adds almost 4 lbs to your travel pack.

SCMS
All consumer DAT machines share SCMS digital-copy protection. I'm not pro-piracy, but SCMS is stupid. The pirate recordings I've heard prove that most pirates don't care about sound quality—they make analog copies, bypassing SCMS completely. SCMS is only a major problem for home and semiprofessional recordists who need to make multiple masters of live performances. JGH and I have found that the Sony DTC-2000 DAT has the best A/D we've heard; it also has SCMS protection. When we record concerts, we'd like to hook the TCD-D7 up to the digital output of the DTC-2000 to make a second master tape using the DTC-2000's A/D converter. Unfortunately, the SCMS system makes the TCD-D7 tape an SCMS-protected copy. If the DTC-2000 master gets damaged, the TCD-D7 copy can't be used to make duplicates. If you need two original DAT tapes and use consumer DAT machines, you have to use the A/Ds on each machine, which means that, unless you have two identical DAT machines, you'll get slightly different-sounding tapes, depending on the quality of each machine's A/D converter. I hate that.

There's a solution to this SCMS copy conundrum, but it's unfortunately illegal. After talking with John Buttrick, Stereophile's chief counsel, who told me that if I tell you how to circumvent SCMS I could be prosecuted by the RIAA, I've decided to chicken out. Makes me feel so bad I want to go on a bender. But then I'd probably wind up at an AA meeting, watching the ceiling moldings with my beady eyes. Being law-abiding can be a big drag.

Sound
In The Complete Guide to High-End Audio, Robert Harley makes the analogy that listening to live music is like looking directly at the Grand Canyon (p.3). He also equates the components in a sound-reproduction system to layers of glass between the viewer and the original scene. I'd like to expand and refine this analogy. The actual musical event is certainly like the Grand Canyon. A recording of the event is more like a transparency or slide of the original scene than the actual scene itself. If a recording is very good, it's like a large-format transparency, with excellent clarity and color accuracy that can almost fool the viewer. Unfortunately, as with any photograph, it's a view from one particular point chosen by the photographer. If the camera (or microphone) is moved in any direction, the final result will be different. Because of the limited perspective a photograph (or recording) offers its audience, it can never be as vivid or as real as the actual event.

The level of fidelity and acuity of a recording or photograph can vary from extremely fine to very coarse. A master tape is analogous to an original large-format transparency; unfortunately, most commercial musical releases are more like third- or fourth-generation 35mm duplicate slides than large-format originals, and introduce about the same amounts of additive and subtractive distortion.

The quality of recording devices varies as much as that of cameras. Some recording devices, such as the Nagra D digital recorder, are like 11" by 14" Dearford view cameras fitted with Goerz Golden Dagor lenses; others, such as cheap, portable cassette recorders with built-in

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microphones, are akin to Kodak Brownie Hawkeyes. Continuing down the line from the Nagra D/Deardorf, the Sony DTC-2000 ES (reviewed by JGH in Vol.17 No.11) would be the equivalent of a 4x5 Sinar view camera; the Revox A-700 at 30ips would be the equivalent of a Hasselblad 2¼" reflex camera; the Sony PCM F-1 system would be equal to a Rolleiflex 2¼" camera; the Arcam Delta 100 Dolby S cassette machine (reviewed by JGH and JA in Vol.17 No.10) would be like a Nikon F-4 35mm SLR; and the Sony Walkman Pro WMD-6C would be the equivalent of an old Pentax Spotmatic 35mm SLR.

So where does the Sony TCD-D7 fit in? I'd say it's about equal to the Arcam Delta 100 Dolby S. On the Arcam, tape hiss filled in the silent gaps between music; on the TCD-D7, this space was filled with slight digital grain. The TCD-D7 had more top–end extension than the Arcam, but the Arcam was slightly smoother overall than the TCD-D7. As JGH stated in his Arcam review, the TCD-D7 "had a subtle but consistent roughness... that I actually found more irritating in the long run than the more benign high–level congestion of the Arcam." To put things in economic perspective, you can buy three TCD-D7 machines for the price of one Arcam deck.

Comparing the TCD-D7 to the Sony Walkman Pro WMD-6C is almost unfair—without Dolby S, no cassette machine can hope to compete with a DAT machine. In all sonic parameters—background noise, top and bottom frequency extension, dynamic weight, range—the TCD-D7 cleaned the WMD-6C's clock. Only in non–sonic areas such as battery life and ergonomic ease was the WMD-6C superior.

If you forget to put the TCD-D7 in the "hold" mode before you put it in your bag, it'll invariably have dead batteries when you decide to use it. This can't happen with the WMD-6C, which has piano–key buttons. I've owned the WMD-6C for five years, during which time it's received a fair amount of abuse, and it's proved extremely rugged. I'm not sure whether or not the TCD-D7 will absorb as much rough use—but give me time.

I've used the Sony TCD-D7, the $3500 Sony D-10 II, and the $2500 Sony DTC-2000 ES DAT machines for a number of live classical recordings, and the TCD-D7 produced clearly inferior tapes. Surprised? Unfortunately for the budget–minded hobbyist recorder, you'll get what you pay for, sonically speaking. When I used the TCD-D7 as a playback deck into a high–quality D/A, I was unable to hear any differences between it and either of the other two machines playing back the same tapes. Conversely, I could easily hear the differences between tapes recorded on the DTC-2000 ES and the TCD-D7 when played back by those machines through the same D/A converter. The DTC–2000 ES master tape had less overall grain, more real depth, more three–dimensional body, and was a more accurate picture of the musical event. I wouldn't say that tapes from the TCD-D7 sounded bad, they just lacked the refinement of the DTC–2000 ES recordings. Bear in mind that the DTC–2000 ES is almost four times as expensive as the TCD-D7.

Recording CDs onto the TCD-D7 revealed its internal A/D to be the weak link. Digital recordings—made by taking the digital output of an outboard D/A and running it straight into the digital inputs of the TCD-D7, thus bypassing its A/D—sounded identical to the original CDs when played back through the same outboard D/A. Copies of CDs made via the analog inputs of the TCD-D7 had a pervasive graininess and roughness that the original CDs didn't have when played back through the same A/D. Moral: If your CD player or D/A has digital outputs, DAT tapes made with them will be of much higher quality.

**SUMMARY**

The Sony TCD-D7 portable DAT recorder is a remarkable little machine. Its worst flaws—SCMS, limited battery life, and a fair A/D—can, in most situations, be overcome with outboard devices and a bit of guile. If you already own a consumer DAT machine, the TCD-D7 would be an excellent, versatile second unit, useful for making copies and backups. For world travelers, the TCD-D7 would be ideal for making high–quality field recordings with a minimum of fuss and added weight. For hard–core Walkman Pro WMD-6C users, a TCD-D7 will not only increase the quality of location tapes, but reduce the bulk and weight of your travel kits.

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Stereophile, January 1995
The young, upwardly mobile Gustav Mahler, appearing as conductor with the Budapest Opera, was invited by the Budapest Philharmonic to conduct a work of his own during the 1889–90 season; this spurred him to complete his First Symphony—his first large-scale orchestral work. After the symphony’s poorly received Budapest premiere in November 1889, the composer undertook extensive revisions, dropping the second of the original five movements (subtitled “Blumine—a movement of flowers”), revising and expanding the orchestration of the remaining four movements, and supplying the symphony with a detailed program as well as the subtitle “Titan,” after a popular novel of the time. Mahler conducted this revised version in Hamburg in October 1893 to a greater success, but later repudiated both the subtitle and the program (the composer’s distaste for programs in general is evident from his letters).

The symphony begins with the primordial stirrings of nature. Over a sustained A in six octaves of strings, fragments of themes appear: a descending fourth in woodwinds, which will evolve into the symphony’s unifying motif; spectral, muted fanfares; cuckoo calls; and singing horn phrases. Over a disquieting rising chromatic line, the horns introduce a canon on the descending fourth; as it fades, the fresh, vernal textures of the exposition break in. Mahler’s “Ging heut’ Morgen übers Feld,” from his 1883 Songs of a Wayfarer, which conveniently begins with the descending fourth, provides much of the material for this exposition, which reaches a festive climax.

After the exposition, the stillled hush of the strings’ A again descends: what now? Flute and cello take up fragments of the exposition, while the clarinet repeats its cuckoo call. Foreboding brass chords unexpectedly swing into D sunlight as the horns introduce a quiet fanfare, returning us to the exposition’s vernal mood. Ominous shadows of minor
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harmony briefly cloud the horizon, but with exuberant trumpet calls and trills, the music tumbles headlong into a forte return of the horn fanfare. The thematic fragments variously recombine in a sort of recapitulation as the movement hurries to a rousing close.

As he was often to do, Mahler based the second movement on the _Ländler_, the Austrian folk dance which was the precursor of the waltz. As the low strings stomp out the descending fourth in a bumptious triple meter, the peasant-like, triadic main theme is introduced over it, undergoing some development before its brilliant climax. The lyrically effusive Trio section has a smoother, more wallz-like flow; as it fades into nostalgic cadences, the horn tentatively interjects a reminder of the opening motif, which the basses abruptly seize to begin a telescoped recapitulation of the _Ländler._

An eerie solo double-bass intones the main theme of the third-movement funeral march, a minor-key version of "Frère Jacques," which develops into a full-textured canon over steadily pulsing fourths in the timpani. Contrasting with this are a Jewish folk-like melody introduced by the oboes, as well as some banal klezmer music. A lyrical interlude drawn from the fourth Wayfarer song, "Die zwei blauen Augen," represents happier memories; its unexpectedly desolate cadence effectively sets up the return of the funeral march, which ultimately fades away in pizzicatos and soft gong strokes.

A cymbal clash heralds the immediate arrival of the tempestuous Finales; originally subtilted "Dall'Inferno al Paradiso," it retains the quality of a pictorial free fantasy. The introduction, which the composer described as "the cry of a wounded heart," is marked by shrieking reeds, desperate running strings, and brass motifs (including that ominous bit from the first-movement development). A long, jagged theme in winds, springing from the ominous motif and propelled by vigorous string figures, builds to a violent climax before spending itself in spasmodic outbursts, giving way to a lyrical string theme.

The storm returns, interrupted by a soft, optimistic brass statement, and culminating in a tutti version of this statement—but in the "wrong" key: C! The music wrenched itself into the home key of D, but, despite the assertive "coda" which follows, victory is not to be so easily won. There follows a series of reminiscences of themes which builds to a surging, impassioned climax. The strings take up the jagged opening theme, softly; finally, the first movement's exuberant fanfares and trills return to re-introduce the brass statement—in the correct key this time—as a triumphant peroration crowds the work.

The First Symphony has become especially popular among Mahler's output by virtue of its appealing, folk-like melodies, its orchestral variety—Mahler's expanded orchestra providing a wide selection of distinctive, unmixed colors—its use of cyclic elements (re-appearing in the various movements), and its apparently straightforward structures (although neither of the outer movements adheres to a strict sonata pattern).

**KURT MASUR'S RECENT TELDEC RECORDING PERHAPS STRIKES THE BEST BALANCE BETWEEN THE QUALITIES OF PERFORMANCE AND OF RECORDING.**

Its standard Romantic-symphony length gives it an added advantage over some of its longer, more involved successors.

However, as often happens with popular repertory pieces, the music can be taken for granted. This is reflected in the surprising number of performance mistakes which can be heard on the current recordings, including solos which are missed (Slatkin) or inaccurate (Nanut, Urbanek, Muti), and entrances which are missed (Casadesus), premature (Abbado, Walter), or late (Neumann). These are, of course, momentary lapses rather than crippling flaws; but there's no reason to accept them except as passing blemishes on an otherwise first-rate performance. With so many recordings available, we can afford to be choosy.

We have no documents of Mahler's conducting of this music; but Bruno Walter and Jascha Horenstein, among his disciples, are represented. For three movements, Walter draws predictably stylish, sweet-toned playing from his West Coast pickup group. The first movement has a pleasant exposition (though minus its important repeat), a nice rhythmic lift in the soft horn fanfare, and a blazing recapitulation; the gravely lyrical Wayfarer episode is the highlight of the funeral march. But his Finale, after an incise, dramatic opening, too often succumbs to restrained, enervated temps.

Horenstein's unique feel for Mahler emerges clearly even on his mono recording. The technically substantial Vienna orchestra, with straggly high strings, gulpy horns, and waywardly tuned reeds, could hardly have been familiar with the music in 1952, but their playing is uniformly concentrated and committed. Horenstein's interpretation has a Klemperer-like ruggedness and integrity, warmed by sensitivity to the ebb and flow of a lyric phrase. The graceful Trio is serenely flowing, while tricky tempo transitions in the Finale flow with the utmost naturalness. On CD, the close-up mono sound is surprisingly clear, if unflattering to the orchestra. (Roughly contemporaneous with Horenstein's mono is Scherchen's, its polar opposite—fast, wild, and woolly; exciting, if unrefined.)

Horenstein's stereo remake benefits from the services of the London Symphony, which brings a higher level of technical polish to the task, if less personality than the quirky Viennese. By 1970, his response to the score had deepened—listen to the wistful suspended cadences in the Trio, or the arresting color change in the Finale at the transition to the second theme (No.15). The tempos are again resolutely steady, sometimes eschewing even indicated adjustments. This is worth seeking out as an import; its intensity and cumulative impact make everyone else seem neurotic by comparison.

Certainly Leonhard Bernstein, the Apostle of Mahler, didn't do nearly as well by his two outings. The New York recording clarifies some detail well—especially in the well-organized opening movement, with its atmospheric introduction and rhythmically alert funeral march. But the conductor's mannered "expressive" distortions render the Finale's opening disjointed and reach a nadir in the Scherzo's Trio, where no three bars seem to be played in the same tempo. His Amsterdam remake, at slower tempos, is less manipulated, but by this time Bernstein's manner had become heavy-handed: the unmarked glissandi at the start of the first-movement development are in questionable taste, the last klezmer episode in the march is rushed, and the Pesante coda is soggy. The Concertgebouw players are attentive to dynamics, but DG's close in-concert recording produces a thick, overbearing, somewhat congested tutti sound.

Sir Georg Solti is more successful—his London Symphony account, in fact, was widely recommended before the appearance of Horenstein's stereo version. Solti's straightforward, dramatic reading stresses line and detail, downplaying coloristic variety. Textures are uniformly clear, and London's sound has plenty of impact; on two midpriced CDs with
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Solti's fine performance of Mahler's Symphony 2 ("Resurrection"), this remains the best all-around buy. His digital remake is more relaxed and easygoing—the first-movement introduction and development are gratifyingly spacious, though the Finale's reminiscences have become static. The Chicago Symphony woodwinds play colorfully, but their sectional tuning in the Ländler is dubious. Too bad some smudged ensemble gets through; and too bad that the early digital sound—clean and pleasant without obvious spot-lighting, the reeds in proper perspective—lacks midrange presence.

Bernard Haitink's Amsterdam recording is an intelligent and musical interpretation, authoritatively and persuasively projected. He infuses his basically conservative tempo with ample momentum, while obtaining excellent clarity (in the Finale's rushing string figures, for example); and his precise observance of Mahler's hairpin dynamics and accents paradoxically helps maintain the music's long line. The engineering, capturing a measure of Concertgebouw hall resonance, produces a thick string sound; but detail is always clear, and the Finale's chorales have a strong impact. Haitink's remake, like Solti's, is less successful. In places, he draws more magical effects—such as the rapt stillness of the first-movement development—and the breath-taking color change in the Finale at the transition to the second theme; but the attention to detail is less consistent, and the performance doesn't cohere as well. The fresh Berlin string sonority is lighter than the Concertgebouw's, but the detailed, colorful recording is comparatively artificial.

Kurt Masur's recent Teldec recording perhaps strikes the best balance between the qualities of performance and of recording. His solidly traditional interpretation, at conservative tempos, features a firm grasp of the outer-movement structures and a fine sense of character. He draws beautifully translucent textures from the New York Philharmonic, which has not lost character in the process of improving discipline. Teldec's recording has excellent impact and exceptional depth, so that Mahler's frequent layering of reeds over strings emerges vividly as a texture—not just a color. Hans-Peter Frank comes from a similar tradition, but his imported concert recording comparatively lacks warmth, though the sound is admirably natural.

Klaus Tennstedt's first major recording was a Mahler First which displayed a deep understanding of the composer's style. The first-movement opening is therefor hushed, while its climax brings triumphantly whooping horns; the slow movement's Wayfaring episode sings intimately naturally; the complex tempo relationships of the Finale are well-judged. The playing is not ideal: the strings can be scratchy in running passages, and the forward surges are imperfectly controlled, not together. His Chicago remake, recorded in concert, is even more evocative of dreamy summyscapes in the first movement, and I like the broad, firmly sustained tempo for the Finale's perorations. Elsewhere it seems fuzzy or simply too slow, and in general Tennstedt's attempt to stress mass and weight here is at odds with his basically linear conducting style. The Chicago reeds again disagree on tuning in the Ländler.

Diehard audiophiles may gravitate toward the Eliahu Inbal or Leonard Slatkin recordings. Inbal's Denon account features exceptionally lucid, airy, realistic sound, neither clinical nor overresonant. It's an engaging performance as well, with accurate balances and mostly well-chosen tempos (the accelerandos in the Ländler are overdone). The orchestra is modestly excellent, though the horns struggle with matters of legato and tone in the first two movements, and one of the timpanists gets lost in the triumphant coda, so the long roll briefly stops. Slatkin makes some interesting musical points—the first-movement development has a uniquely restless undercurrent—but the Finale as recorded sounds disappointingly small-scaled.

I'm fond of James Levine's youthful, ardent reading, with its exceptional feeling for orchestral color. He tends to rush impetuously, however, even where Mahler has marked ritards, resulting in mild coordination problems; and energetic string attacks can be raspy. The sound is clear and vivid, though the Finale's opening sounds restricted. Seiji Ozawa is unexpectedly energetic and involved, with a firm pulse, aggressive attacks, and handsomely limned textures; but minor flaws have been permitted to remain—a few horn burps, and (again) iffy reed intonation in the Ländler—precluding an unqualified recommendation.
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James Judd's exceptionally cogent Finale boasts strong textural detail and structural command, but distracting, superficial tempo adjustments undercut his perceptive, detailed work elsewhere. Despite some interesting details, Andrew Litton's artless account is insufficiently sturdy, his brisk tempos feeling marginally rushed and glib.

James Judd’s EXCEPTIONALLY COGENT FINALE BOASTS STRONG TEXTURAL DETAIL AND STRUCTURAL COMMAND.

At the bottom of the heap are Abbado, overrefined for three movements and coarse in the Finale, like a compendium of Karajan's worst mannerisms; Segerstam, with his fitful rubatos, fussy commas, and apparent disdain for large-scale coherence; and Kaspzyk, with his random balances, approximate, slapdash ensemble, infirm line, and general technical incompetence.

At the super-budget level, once beyond the historical recordings, the choices are unalluring. Leinsdorf's genial Weekend Classics account is unfortunately deleted; his Victrola cassette—slow, stodgy, oppressively square, and marred by poor ensemble—is no bargain. But it is musical and unfussy, and the LSO sounds round and colorful; the imperfect control and limited sound bother me less than does the omission of both repeats. Kubelik is sensitive and flexible, the fast tempos notwithstanding, but his habit of breaking the line with "expressive" ritard becomes irritating, and the sound is claustrophobic. Neither of Mehta's tries succeeds: the Israel Philharmonic is enthusiastic but overtaxed; the New York performance is slack and lackluster—the horn fanfare in the first movement actually sounds dispirited—and the sound is dry and unexpansive. The East European orchestras under Nanut, Kosler, and Urbanek lack the necessary technique and stamina; Fischer's Hungarians are better, but they, too, seem restrained and underpowered.

The discarded "Blumine" movement, a lovely serenade, occasionally turns up as a filler for the symphony. Judd's is the most interesting, finding a chilly Expressionism in the central minor section. Rattle is all gossamer, in a gently rocking, fragile performance. Frank is brisk but naturally flowing and songful; and Segerstam and Kaspzyk are conventionally lush and untidy.

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Though the fourth collaboration of W.S. Gilbert and Arthur Sullivan, H.M.S. Pinafore was the first to be an international hit, and was unquestionably the work that forever established "G&S" as a trademark of quality and delight. This third Mackerras/Telarc G&S operetta is the best yet of a cycle that should prove definitive for years to come.

In its lampooning of Victorian melodrama, Pinafore is perhaps the silliest of all G&S operettas. It's also the freshest, the most sprightly, the most irresponsibly melodic. (And, as it's the shortest full-length G&S work, Telarc has for the first time in this series been able to include every note—including the overture—on a single CD.)

Sir Charles Mackerras has brought unprecedented stylistics to the task: never has this score been infused with such wit, grace, buoyancy, or sheer musicality. Mackerras conducts Sullivan's music with all the attention to dancing detail that he brought to the symphonies of Mozart a few years back (also for Telarc), with arguably greater success: everywhere are nuances of tempo and dynamics, and pointings-up of syncopation, that make even this life-long G&S fanatic delight in heretofore unsuspected treasures in what Sullivan himself considered disposable pop music. I found it impossible to listen without laughing aloud—not that I tried.

I'd recommend this recording for Mackerras alone, but luckily the singing is almost as good. Like the previous Mackerras/Telarc G&S recordings (The Mikado, The Pirates of Penzance), Pinafore is sung straight, with a minimum of comic affectation. This approach works superbly, as Mackerras and singers let the music and words provide the humor, rather than forcing the issue. The result is irresistibly tuneful music beautifully performed—and funny as hell to boot.

Michael Schade is a wonder as Ralph Rackstraw—by far the most sensitive and diffident sailor ever to join Her Majesty's fleet. Richard Suart continues to lengthen his stride in the G&S comic baritone roles, here singing Sir Joseph Porter with just the right blend of pomp, patter, and palpitations. Thomas Allen (a real baritone!) is likely the finest Captain Corcoran on record, and the seemingly immortal Donald Adams here enters his fifth decade of singing G&S as Dick Deadeye—and sounds almost as good as he ever did.

As in previous Welsh National Opera G&S recordings, the women are weaker. Felicity Palmer's Little Buttercup is the best of them, though she tends toward obsessiveness in dotting her rhythmic 'is. Rebecca Evans as Josephine has the same small, not-quite-in-control voice that made her Mabel in Pirates less than that fully operatic role deserved, and Valerie Seymour makes all too great an impression—a poor one—in the tiny role of Sir Joseph's Cousin Hebe: shrill and squally, with poor wandering tone. All of the singers, however, are excellent actors (not hams, as is all too common in G&S), and the WNO Chorus is ideally energetic. The sound is as good as I've ever heard from Telarc, and that's very good: the illusion of orchestra, chorus, and soloists singing in the WNO's Brangwyn Hall, Swansea, Wales is totally convincing. Whether or not due to Telarc's 20-bit recording and their use of the Apogee UV-22 redithering box, the highs are smooth, the midrange sumptuous, the ambience stunningly detailed.

The best G&S productions, whatever on disc or stage, are those that make each feel as clever and witty as W.S. Gilbert himself. By the time this Pinafore had ended, I felt no less than a genius.

—Richard Lehnerter

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**Record Reviews**

**RECORDING of the MONTH**
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**GILBERT & SULLIVAN: H.M.S. PINAFORE**
Richard Suart, The Rt. Hon. Sir Joseph Porter, K.C.B.; Thomas Allen, Captain Corcoran; Michael Schade, Ralph Rackstraw; Rebecca Evans, Josephine; Felicity Palmer, Little Buttercup; Donald Adams; Dick Deadeye; Richard Van Allan, Bill Boalstey; Welsh National Opera Orchestra & Chorus, Sir Charles Mackerras
Telarc CD-80374 (CD only). James Mallinson, prod.; Jack Renner, eng. DDD. TT: 73:42

*Pinafore* is sung straight, with a minimum of comic affectation. This approach works superbly, as Mackerras and singers let the music and words provide the humor, rather than forcing the issue. The result is irresistibly tuneful music beautifully performed—and funny as hell to boot.

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traversal of the Nine on period instruments differs from all such others in a variety of ways.

Purely on technical grounds, this set outshines its predecessors. Its engineering is superb—remarkably natural in timbre, with none of the harsh nasality of strings, squeaky rasp of winds, bleating brass, or unpleasant, overly prominent timpani that, in varying degrees, has infected many period-instrument productions. Although recorded in five different halls and including three in-concert performances, the sound remains remarkably uniform throughout: close, with a relatively flat perspective that exposes the occasional noise of fingers hitting the keys of winds. Even the notoriously reverberant All Saints Church, Tooting of London (where 6 and 9 were recorded) has a well-focused acoustic here. And throughout, a tight, solid bass adds harmonic definition without causing the roughly 60-piece orchestra to sound weighty. And it is certainly a fine orchestra. Virtuosic and disciplined, it plays with a crisp precision that matches world-class standards. In this regard, it exemplifies the great forward leap period-instrument execution has made in the last decade. And, obviously, it bespeaks Gardiner’s skill as a conductor.

This should surprise no one who has followed his work. In addition to knowing how to make an ensemble cohere, he has proven one of the more tasteful of period-instrument directors, his approach to familiar repertory suggesting he is more interested in music qua music than in historical rectitude for its own sake. As a result, his plunge into Beethoven generates considerable interest. Whether or not it will have broad appeal remains open to question.

So much about this set is unvaried from one performance to the next that broad generalizations are appropriate. In the main, Gardiner secures richly colored, sharply focused textures and favors relatively fast tempos in outer movements. Indeed, some of them—the first movements of 2, 3, 4, and 5, and the finales of 4 and 8—are pushed as hard as one is ever likely to hear. Even in slow movements, there is little lingering.

Given the proficiency of the orchestra, some of these tempos are made to sound convincing; the finale of 4, for example, has a clarity one would ordinarily think impossible at Gardiner’s speed. What makes such pacing seem all the more fleet is a rather unbinding rhythm. Little variation of pulse is employed: only where Beethoven calls for a ritardando (as in the beginning of 8) are things allowed to slacken.

Such an approach works well against the opening movement of 3 and all of 5, which become trivialized and two-dimensional. One of the great moments in 5, for example—and one that must have shocked Beethoven’s audience—the sudden modulation in the slow movement from A-flat to C, with trumpet fanfares foreshadowing the eruption of the finale. Gardiner underplays this moment, making it sound almost casual—something it most decidedly is not. Similarly, the rapid clip of the finale of 8 causes its intentionally crude explosions to lose their brusqueness, and its hilarious doodling arpeggios at the movement’s close to be drained of their humor.

The most convincing performances in this set are those of 1, 2, 4, 6, and 7. The first two symphonies are magnificent in their color, liveliness, and sharply etched detail. So, too, 4, where—as in 1 and 2—the lack of rhythmic inflection is no great drawback. In terms of pacing, Gardiner’s “Pastoral” is perhaps the most traditional account in the set. The first movement moves rather quickly, but no more so than with Toscanini, Kleiber, and Weingartner among the older generations of conductors, or than with Kegel and Karajan among more recent ones. The finale unfurls with an expansive, devotional simplicity made all the more expressive by Gardiner’s careful shaping of the movement’s grand architecture. Then, too, important countermelodies in the second movement that are often veiled in modern-instrument accounts are clearly audible in this one. And the “Sturm” has a drenching piquancy.

The outstanding traits of 7 are the aptly piercing color of the horns, especially in their highest range, and Gardiner’s control of the finale, which is paced more slowly than in many accounts and tightly reined through its conclusion, thereby heightening the dialectic of the movement’s restrained abandon. Many may feel that the first movement could have a bit more give and take, but the precision of articulation and the clarity of the reiterated dactylic pattern that defines the music’s shape carry the day.

Gardiner’s performance of 9 may be the most controversial in the set. The first movement is surely one of the fastest on disc. It has certain virtues in its clarity—the timpani in the recapitulation, for example, cutting through with a telling bite that heightens the drama. But the prevailing quickness and lack of inflection work against the movement’s innovative grandeur. The second movement is more conventional, the third—typical of period-instrument
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sounds and its complete contrast to the preceding movement and the following one, “God will wipe every tear from their eyes.” There is great tenderness here, the woodwind chords marked “like a caress” in the score.

The eighth movement is a little longer than the fifth in Wit’s performance, a little shorter in Chung’s, but, by contrast, dazzles with the brilliance of “The Stars and the Glory.” It resonates with birdsong, as does the next, “Birds from the Tree of Life,” although here only 18 woodwinds sing the 25 different songs, each in its own specific time-span. The penultimate movement, “The Way of the Invisible,” is turbulent and searching; there is no rest, the movement ending where it began, on a low C. Only in the final movement, “Christ, Light of Paradise,” is there repose.

This wonderful work is given excellent performances by both forces; but while Chung’s has the benefit of superior sonic control, Wit’s live performance has all the attention of his artistic spontaneity. Both have detailed notes, Wit’s including musical quotations, which certainly give the listener plenty of help and guidance. There is very little to choose between them, but I’d go for Wit . . . and urge you to try at least one of them!—Barbara Jahn

MOZART: The Unfinished Mozart
Nederlands Solistenensemble
Emergo Classics 3993 (2 CDs only). J. Stellingwerf,
eng.; J. Bril, J. Bogart, prod. DDD. TT: 107:42

This release fascinates and frustrates: on the one hand for the sheer beauty of some of the music it offers, on the other for the incompleteness of those offerings. In all, 28 selections are featured, comprising fragments of instrumental and chamber works for various combinations. Köchel numbers suggest that nearly all date from the last decade of Mozart’s life, when he was at the height of his career.

There is some music here having as much promise as anything Mozart composed. Particularly noteworthy are fragments of works for two pianos and four hands. One is remarkable for its motoric drive and motivic terseness; another consists of a complete sonata-form exposition and a few measures of an ensuing development that breaks off with cliff-hanging suddenness. There are fragments for violin and piano, one of which lasts ten minutes, rambling rather aimlessly for the first seven of those minutes and then meandering into a rather formulaic fugue. Clearly, Mozart was not always capable of imaginative invention.

Interesting, too, are fragments of string quintets and clarinet quintets produced at about the same time as were the composer’s great works for those instrumental combinations. Some of these fragments break off gradually, one voice at a time dropping out in a fashion that recalls Haydn’s “Farewell” Symphony. As already suggested, not everything here comes anywhere near top-drawer, but there are sufficient examples of first-class ideas to make this a riveting what-might-have-been smorgasbord of morsels.

Not everything here is (at least technically) a phonographic first. Many, though not all, of these items are available on Philips’s Complete Mozart Edition. There, however, they have been “finished” by a modern editor; furthermore, they are spread among several volumes and thus not readily accessible as a group. This Emergo release is, so far as I know, the first to bring them all together in a single release and in their original tonal state. The performances are stylish, and the sound is intimate without being excessively close; its only (very minor) shortcoming being a slight edginess to the string tone. For Mozarteans, a release that certainly should be heard.—Mortimer H. Frank

MUSORGSKY: Boris Godunov
Anatoly Kotcherga, Boris; Samuel Ramey, Pimen; Philip Langridge, Shuisky; Sergey Larin, Grigor/ Dmitri; Sergey Leiferkus, Ragnost; Marjana Lipov- sek, Marina; Geb Nikolaisky, Varlaam; others; Slovak Philharmonic Choir (Bratislava); Rudolf Kfichel Berlin, Tölzer Knabenchor, Berlin Philharmonic, Claudio Abbado
Sony SSK 58977 (3 CDs only). Michael Haas, prod. DDD. TT: 3:20:42

This note-complete (with the exception of some of the Simpleton’s music, which otherwise would be heard in both the St. Basil and Kromy Forest scenes) Boris, in Musorgsky’s own orchestration, is, hands down, the most beautiful recording available. I didn’t say “best” or “most moving,” I said “beautiful.” Producer Michael Haas, having left Decca/London, makes what I believe is his Sony debut here, and I don’t think I’ve ever heard a Boris more honestly or clearly recorded. The huge, massed choruses are perfectly captured, and the solo voices are balanced within the orchestral and choral framework with honesty and just the right amount of space. The whole affair is lush without being overblown—a stunning achievement.

The other point of beauty is the singing. Recordings of this opera invariably have at least one voice ugly enough to sink a ship. Not this one. Abbado, always a beauty-monger, almost knocks us out with sheer exquisite sound, miscalculating only once. People will disagree, but here goes: Samuel Ramey’s Pimen, divinely sung, is so divinely sung as to be undercharacterized. This Pimen is neither old nor, in the opera’s penultimate scene, frighteningly humbled yet ecstatic; he’s merely a great singer. (His Russian diction, by the way, sticks out like a sore thumb.) For some this may be enough; for me it’s not—but, frankly, he doesn’t spoil anything.

The others sound great and convince utterly. Anatoly Kotcherga is an imposing Boris—a troubled Tsar but a Tsar none-the-less in a caring father’s role with the necessary hold on his emotions to reign even for a few years in an atmosphere as heavy with intrigue as that period was. He doesn’t overwhelm with his feelings (like Christoff), isn’t on the verge of a breakdown (like Talvela), and doesn’t swallow everything whole with his brawn (like Ghiaurov). He’s dignified even in the Clock and Death Scenes, but with deep feeling; a leading man in that sense. And the voice is big and opulent. True majesty. Similarly, in Sergei Larin we get, for the first time on disc, a romantic Dmitri/ Grigory, one capable of seducing a nation and making love to a princess. And with Lipovsek as Marina, we hear the cunning and scheming. Add to them the sexy, dangerous Rangoni of Leiferkus, and you get the finest Polish Act available. The rest of the cast listed above, and all the smaller ones as well, are all taken by pros with healthy sounds; there’s not a lemon in the case.

If I was reserved up top about calling this set the “best” or “most moving,” it’s because Abbado, in eschewing melodrama and going for a quite breathtaking Italianate legato, has sacrificed some audience-grabbing which some have always found comfortable and convincing. Perhaps I’m used to the gimmicks—Boris grunting and yelling and resorting to Sprechgesang—and have been programmed to react to them. Equally, I’m comfortable with more extraverted behavior from Varlaam and the rowdy chorus. This is not so much a criticism as an observation. Low emotional level or not—and I’m not inferring for a moment that this carries the chill Karajan could bring to a score—I’ve returned to this recording now, complete, three times, and have highlighted parts for others. There’s no other available Boris about which I can make that statement.—Robert Levine

RACHMANINOFF: Symphony 2, Vocalise, Scherzo
Mariss Jansons, St. Petersburg Philharmonic
EMI CDC 55140–2 (CD only). Michael Cheyde,
John Frates, prod. DDD. TT: 67:13

RACHMANINOFF: Symphony 2, Vocalise
Yuri Temirkanov, St. Petersburg Philharmonic
RCA 9026–61281–2 (CD only). Tony Faulkner,
eng.; Anna Barry, prod. DDD. TT: 69:24

RACHMANINOFF: Symphony 2
Valery Gergiev, Kirov Orchestra, St. Petersburg
Philips 438 864–2 (CD only). Jaap de Jong,
Erwin de Corte, Jaap-Marie Heisterkamp, Engu-
barry, prod. DDD. TT: 59:04

RACHMANINOFF: Symphony 2, The Rock
Mikhail Pletnev, Russian National Orchestra
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Mariss Jansons conducts one of four recent versions of Rachmaninoff’s popular Second Symphony.

DG 439 888-2 (CD only). Rainer Maillard, Reinhard Lagemann, engls; Christian Gansch, prod. DDD. TT 64:26

It was something of a surprise to receive four new, all-Russian recordings of this magnificent work; until now, it has been primarily the darling of Western conductors and orchestras. But what’s far more astonishing is that BMG and EMI should run the risk of releasing simultaneously this already over-represented work by the same orchestra: the St. Petersburg Philharmonic. However, it does make for interesting comparison, as Temirkanov and Jansons steer very different courses through the work.

Jansons has set an enviable precedent in his Rachmaninoff series with fine performances of Symphony 3 (CD 54877) and, even more to my taste, Piano Concerto 3 and Pagani Variations with Mikhail Rudy (CD 54880). I very much like this performance of the Second too, complementing as it does my favorite ultra-Romantic versions by Previn, Bychkov, and Zinman. Jansons is a fine orchestral trainer; his musicians always sound well-rehearsed, playing with a Classical poise and finesse warmed by the more florid way of performing that he favors so well. Although I take exception to the huge ritennuto at the beginning of the Allegro moderato following the Largo opening of the Symphony, there is little else here to criticize. The climax to the third movement’s initial statement by the clarinet is exquisite, ushering in by contrast an almost sotto voce recapitulation and proving Jansons’s immense skill in handling dynamics. The work ends with great gusto; it says little new but is entirely convincing nonetheless. The “Mendelssohnan” Scherzo and the beautifully straightforward Vocalise are worthy fillers.

Temirkanov’s St. Petersburg Philharmonic is a very different animal. The players sustain well the rather slower speed he commands for the first movement, pulling back after the wonderful climax with a fine display of innate understanding despite the oddity of this request. And thus this rather indulgently subjective interpretation continues, the structure of the second movement dissolving into shapelessness, and the third, with its loose, relaxed rhythms, losing focus. What registers above all else, though, is how different a performance with very little dynamic contrast can be. Although only coupled with Vocalise (with the strings sounding in much finer fettle for Kurt Sanderling’s string orchestra arrangement), this disc appears better value for money as a result of Temirkanov’s exposition repeat in the first movement and his generally slower speeds. The production also boasts “20-bit technology,” but the sound is overblown and congested.

Gergiev may recently have been voted Conductor of the Year in the UK, but he still hasn’t managed to convince me. The first movement loses direction and purpose completely thanks to the extremely slow tempo—a pity when the Kirov Orchestra plays and sustains tone so well. The Scherzo is lively enough and seizes beauties busily, but, again, it lacks real focus. The Adagio is simply thrown away: it has neither drama nor romance, and the Finale would have to work miracles to save the day. Predictably, it doesn’t.

A relief, then, to move to Plenetv and the Russian National, who give a gritty, fiery performance that highlights the dour colors of this work by rendering down the fat emotionalism that has come to be expected into an altogether leaner, more exciting reading. The manically driven and white-hot mood of the Scherzo pervades the Adagio, where a lusty searching ensures no moment of peace. The Finale reaches a joyous apotheosis; the helter-skelter momentum of the constant guest is eventually rewarded with noble pride. I love this totally new angle on a work that can so easily sink into a mire of sentimentality; it is refreshing by its very difference and the surprises it has in store. Sonically, wind and brass balance could have been improved, the acoustic of the Moscow Conservatory over-blending timbre and often confusing Plenetv’s compulsively clean articulation. But with an unusual and little-known coupling, The Rock, this disc has so much to offer that I urge you to try it, particularly if you already know the Symphony well.

—Barbara Jahn

ROSSINI: Semiramide
Cheryl Studer, Semiramide; Samuel Ramey, Assur; Jennifer Larmore, Astar; Frank Lopardo, Idreno; Jen-Hendrik Rootering, Oroe; others; Ambroisian Opera Chorus, London Symphony Orchestra, Ian Marin
DG 43 797-2 (3 CDs only). Arend Proehm, prod. DDD. TT 3:27:22

Here is Rossini’s epic opera seria, his last opera for Italy, first performed in 1823. It’s a huge work (check out the timing), with arias and ensembles occasionally lasting a quarter of an hour, requiring great virtuosity and commitment from all involved. The edition used here is apparently absolutely complete; the old London recording, under Richard Bonynge and with the magnificent Sutherland and Horne in their primes, was somewhat cut (though long enough for most). I find Semiramide somewhat of a chore in the opera house; on discs it’s a pleasure—easy to analyze and enjoy, easy to wander during. This may sound like heresy, but it’s true—it’s a great work, but its longeurs demand patience.

This fabulous new set makes a good case for the opera. Conductor Ion Marin’s approach is thrilling, if a bit breakneck—he leans on the music rather than letting it float. The overture is like a house afire, and lots of the recitative whizzes by as if the characters are hysterical, but I didn’t mind—’tis exciting, if lacking a bit of class. If the idea was to take the opera out of the museum and make flesh and blood out of the characters, it worked. Studer, in the Sutherland role, is not as sheeplike as has been suggested, the grain of her voice implies more intensity than Dame Joan’s, and it’s most welcome. This is not to say that Studer is not up to the part’s pyrotechnics—she is. She zooms around the little notes, articulating each, and if her embellishments are not as purely Rossinian as Sutherland’s, well, she didn’t write them. (I believe Philip Glass did.)*

Samuel Ramey is the villain, Assur. The harder the music, the easier Ramey sings it; only later on, when real declamation and drama are needed, does Ramey pale a bit. Tenor Frank Lopardo is not afraid of Idreno’s fast, high-flying music, but no one can bring this character to life. Jan Hendrik-Rootering is a woolly Oroe, but fills out the bass line well.

Best is Jennifer Larmore’s Arsace—a role Marilyn Horne has all but owned for 20 years. Larmore is less masculine and aggressive than Horne was in this trouser part, concentrating instead on the character’s royal stature. Her voice is beautiful, her technique amazing—she alone is worth the set. Her duets with Studer—the opera’s high points—are cast in an entirely different mold than were Sutherland’s and Horne’s: the older pair went for absolute sound matches, while Larmore and Studer
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In contrast, the German Mass is not based on a traditional Mass at all, but is rather a group of eight liturgical texts in the vernacular set for chorus and an orchestra consisting of winds, timpani, double bass, and organ. Each of these settings, of itself, exemplifies prime Schubert, though none boasts the harmonic originality of the A-Flat Mass. Heard in succession, however, they become a bit repetitive in their lack of emotional contrast.

Weil and his period-instrument forces offer superb performances. The A-Flat Mass (here presented in Schubert’s 1825 revision of his 1822 original) is vibrant and richly colored with piercing brass, the growling trombones proving especially expressive. Tempos are bracing, textures well-defined, the chorus having a welcome sharpness of focus, the timbre of boy soprano and alto contributing to the music’s ethereal ethos. My only reservation about the performance concerns the use of a boy soprano and alto as soloists. Their tonal purity is attractive, but the music has an implicit emotional range that they are incapable of projecting. Let it be added that the “20-bit technology” recording is superb: free of harshness, wide in dynamic range, and having a perspective that suggests considerable depth. A most welcome release.

—Mortimer H. Frank

Plácido Domingo: with Kurt Moll and James Morris, one of several glorious voices miscast in James Levine’s new recording of Wagner’s Parsifal—Levine’s third recording of this massive opera in less than ten years, and his worst.


What James Levine’s first recorded Parsifal (from the 1985 Bayreuth Festival, Philips 434 616-2) lacked in world-class voices it made up for in cohesive drama, grippingly natural sound, and a sense of true occasion. The voice of Hans Sotio (Gurnemanz) was that of a classic Bayreuth baritone: not entirely pleasant, but good for you. Sotio had a strong sense of Gurnemanz as a gruff but devout old campaigner living out his last days as a monk. Waltraud Meier, certainly our finest Kundry, lacks a particularly large or rich voice, but she’s one of the best operatic actresses working today, and possesses unerring precision of intonation and consistency of tone throughout her range. Peter Hofmann gargled and warbled his way through the role of Parsifal, struggling to keep his head above the orchestral seas, but, despite or because of such inadequacies, was still believable as a pure innocent thrust into matters he couldn’t hope to understand. Levine himself conducted with a passion for the moment and a control of architectonics that remain impressive today, even if surpassped by Barenboim’s serenely profound Parsifal of two years ago.

The laserdisc/VHS version of the Metropolitan Opera’s dull-as-dirt stage production of Parsifal also boasted Meier (on whose astonishingly expressive face the director wisely kept the camera riveted throughout). Siegfried Jerusalem sang his butt off as Parsifal, an interesting setup for his true heldentenor turn in the same role for Barenboim. But Kurt Moll revived every cliché about what a colossal bore Gurnemanz can be, his big, smooth, rich, but hollow voice crooning for 4½ hours with no edge or bite. In the pit, Levine lovingly spread out every one of Wagner’s suspended chords as if for a Tiffany’s display, each note spotlight against blue velvet. Very beautiful, but more sentiment than substance.

This new set is Levine’s third recorded Parsifal in less than a decade, and by now it’s clear that he loves Wagner’s music not wisely but too well. Levine has honed and refined his vision of this most mysterious of Wagner’s works until all that’s left is beautiful playing and singing—it, not nearly enough. In Wagner, at least, Levine has become opera’s reigning aesthete, unwilling to sacrifice a single drop of sonic beauty in the name of an ugliness necessary to the greater, darker truths of which this work is full.

Nowhere is this more evident than in his casting—in addition to Moll again—of three high-ticket singers new to their roles: Plácido Domingo as Parsifal, Jessey Norman as Kundry, and James Morris as...
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Amfortas. Each shares Levine’s weakness for gorgeous sound above all. But there are other reasons why Domingo is wrong for this role. The voice is just too lush, too rich, too mature—Domingo sounds like a Pinkerton shanghaied on his way to a Butterfly rehearsal. His pronunciation is awful, and he swoops up under notes floridly— even in Parsifal’s final line, “öffnet den Schrein”—the last place anyone should grandstand (as Wagner made clear by not leaping up a major fourth on “Schrein”). A singer can get away with this sort of generically gulping passion in Lohengrin— as Domingo did for Solti. Lohengrin is much more a singer’s opera than is Parsifal, which requires a more deeply rooted passion from its principals than the sort worn on the sleeve.

As Kundry, Norman fares better. The voice is fuller, richer than Meier’s, but Norman shows surprising lack of control in her high register. Still, she does well in the long, crucial Act II scene with Parsifal; she’s emotionally present, taxed by the role’s complex emotional demands but rising to them more often than not.

James Morris as Amfortas is big and grand in the George London tradition, but never surrenders to the part: I always hear the singer, never Amfortas. And compared to the great and near-great Gurnemanzes of the past—Hotter, Tomlinson, Sotin—Moll, as before, makes of Wagner’s expositor little more than a mellifluous blockhead.

The playing of the Met Orchestra is flawlessly smooth and blended to a fault. The Bayreuth band played no less seamlessly in ‘85, but had hefty and a thick, dark texture that the Met, for all its newfound polish, entirely lacks. The very artificial—sounding recording is partly to blame, the sound homogenized until the orchestra sounds more like a vast organ or synthesizer. It’s smooth, clean, Olympian spacious— but body and soul are never engaged. (However, this set boasts the most persuasive Grail Bells I’ve ever heard.)

Levine’s third Parsifal is eight minutes shorter than his first, but feels an hour longer. Levine has refined, soft-pedaled, and dynamically micromanaged this performance to within an inch of its life. That a conductor and orchestra can slice diamonds so precisely is impressive until one realizes that the result is a perfectly faceted rhinestone. The result is enervated, soulless, dull.

In the hands of Knappertsbusch, Krauss, Goodall, Solti, and Barenboim, Parsifal embodies, and can engender in the sympathetic listener, a profound mystery—and not a particularly comforting or Christian one. At best, Levine’s new set is a monument to the tyranny of a towering technique. At worst, it constitutes a serious failure of nerve.

—Richard Lehner

Show Music

Margie Gibson: Say It With Music

Music and lyrics by Irving Berlin

Margie Gibson, vocals; Lincoln Mayorga, piano; Chuck Domanico, bass; Gloria Strasser, cello; Sheffiled Lab CD-36 (CD only). Dan Hicks, eng.; Doug Sax, mastering eng.; Lincoln Mayorga, prod. ?P.D. TT: 57:46

The CD booklet tells us that Margie Gib- son is a singer who has performed in clubs, studios, and concerts, in styles encompassing musical comedy, jazz, folk, pop, country, and big band. She’s been an opening act for Danny Thomas, Mel Tormé, and Bob Hope, who is quoted as saying that she’s “as good, if not better, than any singer I’ve ever worked with.” This is her first solo album.

Gibson sounds like a thorough professional, with a distinctive style and good rhythmic sense, and is at her best with the numbers from Annie Get Your Gun; in fact, she sounds a lot like Suzi Quatro on the most recent London Revival Cast recording. (My guess is that she’s done the role on stage.)

I’m sure that if I’d heard Gibson in a club, I’d be quite satisfied with what I heard. However, a record is something you expect to want to listen to repeatedly; having listened to the CD once, I had no particular desire to hear it again. Gibson’s voice is pleasant enough in its country-tinged way, and Lincoln Mayorga’s arrangements are sympathetic; but compared to Sylvia McNair and André Previn’s recent album of Jerome Kern songs (Sure Thing, Philips 442:129-2), Say It With Music is routine.

This being a SF edition release, sound quality can be an issue in its attentions; in this area, Say It With Music does not disappoint. Smooth, clear, and with a real sense of “aliveness,” the sound is every bit as good as one would expect from one of the premier audiophile record companies. The piano used in this recording was a Mason & Hamlin, which has a darker, more “woody” sound than a Steinway. The same piano was used in Sheffield’s recent Strauss/Dvorák release (reviewed in the November 1994 Stereophyl- e, p.213). Apparently, some audiophiles have found the sound of the piano on that recording to be too dull and dark, to the point that they’ve even questioned whether the piano had been correctly miked. A letter from Sheffield confirms that the sound of the piano on both recordings accurately represents the instrument in the hall. I haven’t heard the Strauss/Dvorák recording, but I’d describe the sound of the piano in Say It With Music as perhaps a bit mellow, but not lacking in focus or dynamics.

—Robert Deutsch

JERRY HADLEY: Golden Days

Jerry Hadley, Paul Gemignani, American Theatre Orchestra


Stout-hearted men falling in love under a beamng moon. Golden days, indeed. Sig- mund Romberg, Rudolf Friml, and Victor Herbert were holdovers from the Euro- pean operetta tradition—a genre that was about to be absorbed into the emerging American musical. I’ve always had great fondness for operetta—a fondness that my “serious” music–lover friends regard with an attitude similar to that of a health-food nut viewing someone who lists candy floss as a favorite food. I don’t care. Operetta plots often leave something to be desired, their lyrics may now strike us as dated, and they’re far from being politically correct, but what sentiment! What music!

Jerry Hadley has taken up the mantle of Mario Lanza as an interpreter of these songs, and the legacy of Romberg, Friml, Herbert, and, yes, Lanza, couldn’t be in better hands. Like Lanza, Hadley is Ital- ian American, and, also like Lanza, he’s the possessor of a beautiful tenor voice. Hadley’s sound is not as distinctive as Lanza’s, but he makes up for it with a lively musical intelligence. When I interviewed him in spring 1994 (published in the Winter 1994/95 Schwann Opus), he told me that Golden Days was a real labor of love for him, the music close to his heart.

This delightful album is unlikely to dis- appoint anyone with a love of this sort of music. (If you hate this stuff, go back to John Cage.) He does most of the expected songs (“The Desert Song,” “Serenade,” “Marianne,” “Every Day Is Ladies’ Day with Me,” “Softly, As in a Morning Sun- rise,” etc.), plus a few unexpected ones, like “I Love to Go Swimming with Wimmin” —a duet with Tony Randall.

Golden Days’ album jacket boasts overdub- bing the voice of Mario Lanza. Hadley told me that Steve Vining, the record’s pro- ducer, suggested he do this, and that he agreed to do so only if the final mix came across as homage rather than self-aggran- dizement. I think Lanza himself would have been pleased with the result (I’m told that Lanza’s daughter is very pleased); the two voices go very well together, and the listener is left with a bittersweet feeling.

The orchestrations are by William D. Brohn, and they’re generally excellent—I love the varied styles he uses to represent “The Streets of New York.” I have one complaint: The CD’s first track has Hadley making a heroic sound with the verse of “Song of the Vagabonds”; but rather than launching into the song’s stirring chorus, he segues into the chorus of “Stouthearted Men”—a good tune in its own right, but a great disappointment if you’re waiting, as I was, for “Sons of Toil and Danger.” (he picks up the “Vagabonds” chorus later). I’ve listened to it repeatedly, and still find it wrongheaded.

Sonically, the recording is a disappoint- ment—not up to the standard I expect from BMG. Hadley’s voice is often too sibilant (“Golden Days” is the worst), the orchestra has a certain, recorded-in-a-booth am- bience, and the Harvard Glee Club sounds as if they phoned in their contribution. These sonic deficiencies aren’t bad enough to preclude recommendation, but Hadley’s first two crossover albums (Standing Room Only and In the Real World) are much better in this respect.

—Robert Deutsch
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For audiophiles, the place to start on Mirror Puzzle is Charles Fambrough's bass solo at the beginning of Kei Akagi's composition "Too Much Remembered." Particularly on the LP, it is as clean and precise, as woody and present a sound as I've heard on recordings. It makes one wish that AudioQuest might record Dave Holland, Ray Brown, and Charlie Haden as well as Fambrough.

Then there's the sound of Akagi's piano. His neat style, never over-pedaled, is perfect for an audiophile recording, and the big, rich, percussive sound he gets is captured beautifully here. We hear that sound immediately on Akagi's innovative arrangement of Wayne Shorter's "Lester Left Town." Shorter's piece was a casual-sounding tribute to Lester Young, who had just died. Akagi makes it a tribute to friends of his whose fate seems less harsh, even to determined city-dwellers: they've left Los Angeles. He introduces the piece cleverly, with grandiose and then more modest statements by the solo piano alternating with exemplary digital sound by the whole quartet. It's a kind of conversation between interior and exterior selves—when the theme comes in, it's a surprise.

Some of Akagi's titles, such as "Splinter Unity" (found only on the CD), elucidate the music. "Splinter Unity" begins with a drum explosion and soon has Willie Jones keeping a fast beat on the ride cymbal and tapping out rhythms on the snare that suggest a separate beat. Sad, tone and bass entwine in a similarly fragmented style.

But there's little trickery on Mirror Puzzle. Akagi, a talented mainstream player who has appeared with Miles Davis and Art Pepper, was disturbed by Davis's latter-day reliance on pop tunes. His own pieces are more challenging, and his band rises to those challenges in this bright, well-recorded playing. As is usual on my system, the LP sounds more live, but the CD has exemplary digital sound. In either case, I soon found myself listening intently to the music and ignoring the format.

—Michael Ullman

Carey Bell: Heartaches and Pain
Delmark DD-666 (CD). Ralph Bass, prod. AAD. TT: 38:47

Jimmie Lee Robinson & the Ice Cream Men: Lonely Traveler

Henry Qualls: Blues from Elmo, Texas

Luther Allison: Soul Fixin' Man
Alligator 4920 (CD). Jim Gallo, prod.; Niko Lyras, Jeff Powell, engs. TT: 53:59

They know how to record blues at Delmark. From the legendary Junior Wells's Hoodoo Man Blues to the two here, Delmark captures all the sweat and grease without sacrificing clarity or intimacy.

Carey Bell & Co. sound like they're tearing up your living room with the opening bars of "Carey Bell Rocks," a harmonica instrumental in the Little Walter style. Energetic but never frenetic, CB whoops and hollers all through Heartaches and Pain.

This 1977 recording has all the attributes of the classic Chicago style: a jazz-like, interactive approach, and tons of swing. Bell is a master of the old school, but what makes this, or any blues record, rise or fall is the rhythm section: Aron (60) Burton's funky, fatback bass (especially on "Black Eyed Peas"), and the late Sam Lay (of Paul Butterfield's early band) on drums.

Unfortunately, son Lurrie Bell's guitar is merely adequate, but this record's spirit and sound more than make up for it.

If you like your blues raw, Delmark offers Jimmie Lee Robinson. Also from the Windy City, Robinson's blues owe more to the tin-roofed honky-tonks of the South than to the bars of the Southside. Backed by the Ice Cream Men on second guitar, drums, and harp (no bass), Jimmie Lee plays an eclectic kind of rent-party music that has been all but lost.

From the "Hit the Road Jack" vamp of the title tune to the Hooker-style "Leave My Woman Alone" (where the echo-drenched harp of Scott Dirks shows that effects are fine if they serve the music), to "Robinson's Rang Tangle," featuring quotes from "Steel Guitar Rag" and "She'll Be Comin' Round the Mountain," JL's music covers the waterfront.

Recorded in '92 and '93, Lonely Traveler shows that Delmark is still bringing us blues that are vital and alive without being gussied-up and slick.

Nevertheless, compared to Henry Qualls, Bell and Robinson sound like Michael Jackson. Recorded live to two-track, this 60-year-old Texan's recording debut has the back-porch feeling of Muddy Waters's classic acoustic Folksinger album. Though Qualls plays electric here, the feeling is no less starkly intimate. Once again, a terrific rhythm section (Ron Green, upright bass; Marc Wilson, drums) affords strength and sensitivity, allowing every one of Qualls's many years of emotion and experience to shine through.

In Henry's hands, the Newbeats '60s pop hit, "Bread and Butter," shows its field-holler roots, and Blind Willie Johnson's "Motherless Children" regains the plaintiveness lost in Clapton's peppier version.

With tunes like "Death is Movin' Cross the Land" and "Death Valley Blues," Blues from Elmo is for those 3am dark nights of the soul, and is recorded in a manner that befits the mood.

At the opposite end of the spectrum, Luther Allison's Soul Fixin' Man gets the full-production treatment. Fortunately, the man at the helm is Jim Gaines, who coaches Luther's playing and singing in Memphis funk much as Booker T. did for Albert King. Unlike the MG's, this rhythm section sits on top of the beat—edgy rhythms for edgy times. Allison floats above with a fat, singing tone distilled of early electric blues and a appeal to the rock crowd without having all its personality compressed out of it.

Soul Fixin' Man abounds in good tracks ("Bad Love," a nod to Little Milton; and "She Was Born That Way"), but two stand out: Allison's voice paralleling Ernest Williams's gospel organ breathes new life into the Guitar Slim warhorse "The Things I Used To Do"; and the final cut, "Free-dom," with its adventurous use of Kpe Lyece's African percussion and a full gospel choir (not daring in rock circles, perhaps, but revolutionary in the reactionary world of blues) combine with liberal use of space and a solid groove and still remain as true to the form as any barroom shuffle.

Like Jimmie Lee, Carey, and Henry, Luther is one of the decreasing number of older bluesmen still working. With Albert Collins and King recently gone, and Buddy Guy grandstanding to the cheap seats, B.B. must be getting pretty lonely out there.

—Michael Ross

Dave Brubeck: Just You, Just Me
Dave Brubeck, piano
Telarc Jazz CD-83163 (CD only). Jack Renner, eng.; Russell Gloyd, John Snyder, prods. DDD. TT: 58:28

Before Just You, Just Me, Dave Brubeck hadn't made a solo record since 1957; but he's hardly inexperienced. At virtually every performance, he plays one or two solo numbers. He has also previously recorded many of the numbers on Just You, Just Me: his own "Salute to Stephen Foster" and "Strange Meadowlark," the rather wan depression ditty "Brother, Can You Spare a Dime," and several of the ballads. What distinguishes this new recording is the relaxation with which he plays, and the lyricism he allows himself. He's not experimenting here with polyrhythms, and not indulging himself in the thickening textures of his more excited productions. He does work on polytonality of a gentle sort on " Tribute to Stephen Foster," but mostly this is Brubeck "alone and very exposed,"
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and willing to let his songfulness carry the day.

All of the pieces except "I Understand" were recorded in single takes—they're shapely improvisations. Brubeck plays a little stride on "Just You, Just Me," enters into a mock-fugue in a Bach-like passage that forms one of the variations on "Brother, Can You Spare a Dime?" and virtually sings his "Lullaby." He revives songs forgotten (by me at least), such as "I Married an Angel" and "Music, Maestro, Please!" He plays a warm-sounding, well-recorded piano that minimizes the clutter of his touch.

"Just You, Just Me" will please Brubeck fans, but that's a given. It will also engage any-one who wants to hear an excellently recorded, commandingly played set of jazz piano.

—Michael Ulman

DAVID GRISMAN/TONY RICE: Tone Poems
Acoustic Disc ACD-10 (CD). David Grisman, prod.; David Dennison, eng. AAD. TT: 55:38

I've been pretty silly about this disc ever since I first heard it. I recommend it right and left as great musically and sonically. Simultaneously, I carp about how I would have done it differently—a sure sign that it's gotten under my skin in a big way. True love is like that.

It's been almost 20 years since David Grisman and Tony Rice changed the way that we hear bluegrass music when—as members of the original David Grisman Quintet—they made it contemporary and vital, wedding modern jazz sensibilities to staggering instrumental virtuosity. I was working in a record store when their first album came out, and remember fights breaking out among the staff as to whether it should be filed under country or jazz. (In case you're wondering, we filed it under country, because, as I explained to my co-workers, Bill Monroe had originally incorporated jazz into the mix of his "high lonesome sound," and all Grisman was doing was using the post-bop jazz of his era. Besides, I was bigger.) Through the years, both Grisman and Rice have led their own bands, honing their chops and refining their acoustic artistry.

Thus, it seems appropriate that this is a disc of duets—17 traditional American songs, standards, and original compositions—full of intelligent interplay, near telepathic communication, and simple beauty. That would be enough to ask of any recording. But Tone Poems is more ambitious; it's a record of the handcrafted musical instruments that have shaped the music of the last century, inspiring players and seducing listeners. The recording celebrates the diversity of the American lutherian's art: on each track, Grisman and Rice play a different pair of vintage instruments.

Both players collect instruments and contribute examples from their personal collections; they've also scoured the country for appropriate candidates, ranging from an 1891 Martin 1-21—small-sounding to ears conditioned by the modern taste for dreadnoughts—to the ur-country duo of Martin D-28 and Gibson "Lloyd Loar" F5, instruments that forged the sound of post-war popular music from mass-prod- duced, affordable, Depression-era Stewarts and Regals to examples from such extraor dinary contemporary craftsmen as Richard Hoover and Stephen Gilchrist.

The high prices of instrumental collectibles actually gave extra impetus to their project: Instruments have increased so steadily in value that they have begun to attract non-playing investors; so the disc can also be seen as a lament for "dead" instruments—guitars and mandolins that are no longer making music. The CD is accompanied by a 40-page book that features informative historical essays and color photos of the rare instruments. Definitely a classy package.

The sound is good, clean, detailed. Care was taken to keep the recording chain relatively pure by recording in analog at 30ips—with no noise reduction, EQ, or compres sion. Purist microphones were employed, namely Neumann's KM-85 and U-90 (on the guitars) and KM-84s (on the mandolins). The microphone placement remained constant throughout the sessions: extremely near-field, in an attempt—I think—to capture the tone right off the string and top-plate of the instrument, portraying the sound in a way analogous to what the players themselves might hear.

Unfortunately, this is an impossible trick to pull off, because the players themselves become part of the sound, feeling the tone even as they produce it. Segovia put it best: "Lean your body forward slightly to support the guitar against your chest, for the poetry of the music should resound in your heart." As listeners, we necessarily lack that tactile element.

Now I'd pull the microphones away from the popular music, out to the room, and record the instruments—and their environment—looking for the bloom and richness that I love. Grisman chose not to do it that way; he was aware of the tradeoffs, and made his decision with his eyes open. As much as I respect him, I wish that I agreed with him. I notice that Grisman and

Joe Henderson: two boxes, twelve CDs, all Joe.

Dennison resorted to using Lexicon processing for spatial enhancement; I suspect this was done in an attempt to mitigate the dryness that resulted from their micro phone technique.

Nevertheless, this remains the finest acoustic-music disc I've heard all year. The tonal differences and projection characteristics of the individual guitars and mandolins come through convincingly. Grisman and Rice have distinctive instrumental voices that remain personal, even as they range from instrument to instrument. In fact, one of my favorite tracks is "Vintag e Gintage Blues," where they play a Regal "Le Domino" and a Stewart "Snow Queen" on inexpensive, mass-produced, Depression-era instruments, showing us that it's the player, not the box, that makes the music.

The disc should also lay to rest that tired audiophile rap about "the sound of the acoustic guitar." The point of this disc is that acoustic guitars manifest many sounds, just as other instruments vary widely in tonal color. Actually, I'd love to hear a project similar to this one implemented with Fender Stratocasters of various vintages. But even if no one picks up on that idea, I'll have Tone Poems.

This disc rarely leaves my CD player. I listen to it because I enjoy the high level of music-making, the unusually clear sound, and because it's an entertaining primer on instrumental differences. Besides, when you're infatuated, minor differences of opinion don't matter.

—Wes Phillips

JOE HENDERSON: The Blue Note Years
Blue Note CD9 89287 2 (4 CDs only). Alfred Lion, Duke Pearson, Sonny Lester, Michael Cuscuna, Stanley Crouch, Rene Rosnes, Kazanori Sugiyama, prod.; ADD. TT: 4:38:17

JOE HENDERSON: The Milestone Years
Milestone MCD 4413-2 (8 CDs only). Orrin Keep new, Joe Henderson, prod.; Evin Campbell, George Sawtelle, Bernie Grundman, Norio Yoshizawa, Jim Stern, Rick Heenan, Kenny McNabb, engs. ADD. TT: 8:07:00

It's likely that neither of these packages would exist if it had not been for Joe Hend erson's success with a third label, Verve, for which he has created two Grammy-winning discs. Since the 1992 Lush Life, the tenor saxophonist has become a bona fide
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star. It could have happened at any time. In the late ’60s, Henderson told me, a friend kept saying, “You’re next.”

“Next” hardly came soon enough. The earliest recording in these anthologies captures him in 1964 playing “In the Out” with trumpeter Kenny Dorham—one of the first recordings to make jazz fans notice Henderson. Soon he was the favored sideman and bandmember of the likes of Grant Green, Horace Silver, Duke Pearson, Andrew Hill, Lee Morgan, and Freddie Hubbard—all of whose mid-’60s Blue Note recordings are sampled on The Blue Note Years. In his mid-20s, Henderson joined a new generation of accomplished players who had absorbed bebop, reveled in soul, and dabbled in free jazz. They played funk, ballads, and modal tunes in front of powerhouse rhythm sections. Players like Bobby Hutcherson and Herbie Hancock energized each other and spurred Henderson on. No wonder he, like the others, became known for his flexibility, for his ability to sound like himself, with his tart tone and richly nuanced style, in any situation.

We can hear much of the best of the mid-’60s Henderson on The Blue Note Years, which turns out, incidentally, to be an excellent anthology of that company’s catalog of the period. Many listeners will remember Horace Silver’s “Cape Verde Blues” and Lee Morgan’s “The Rump-Rollers,” they’ll be just as pleased to hear organist Larry Young’s “Unity” and Henderson’s own “Inner Urge.” Those were glorious years for Blue Note, and for the young Henderson.

He left at the end of the ’60s to join Milestone, where, according to producer Orrin Keepnews’ admission, he made every kind of record except a hit. Maybe they tried too hard. The first sessions on The Milestone Years were the much-heralded 1969 album The Kicker, which presented Henderson performing with a band that sounded similar to a Horace Silver quintet. Other fine sessions followed, such as the live At the Lighthouse and In Japan, with its brilliant solo introduction to “Round Midnight.” Evidently, producer Keepnews wasn’t satisfied.

As the collection progresses, we see Henderson and Keepnews fumbling with the fall of the ’70s. The acoustic piano is replaced by the electric, and, in the last discs, we encounter arrangements that include stolid overdubs by a horn section that might have been playing in its collective sleep, and find Henderson cavitoring before a big band assembled unhappily to play endless riffs on numbers such as “Soulution.” What’s lost is not merely the brisk, expressive sound of Henderson’s saxophone, but the sense of his musical personality. “Soulution” could have been made by anybody.

Luckily, there’s a lot more here. Fans will want The Milestone Years as well as the indispensable The Blue Note Years for its many gems, beginning with the duet with Lee Konitz on “You Don’t Know What Love Is,” and including Henderson’s live solo in Japan on “Blue Bossa.”

The Henderson revival came not when he started rehearsing with Blood, Sweat and Tears, but when he re-signed with Blue Note and made in 1985 two illuminating trio albums, both entitled The State of the Tenor. The path had been cleared—Dexter Gordon had passed on, Sonny Rollins seemed less imposing, and the young generation of beboppers spurred by the Marsalis had prepared young audiences to hear what Henderson could do in an exposed setting. The jazz world was looking for a go-to snake, and it may well be. He’s been close for long that no one will begrudge his fame, or need envy his position.

—Michael Ullman

ROBERT HURST: One for Name sake

Robert Hurst, acoustic bass; Kenny Kirkland, piano; Elvin Jones, drums.

DIW/Columbia CK 66236 (CD). Robert Hurst, Kazunori Sugiyma, prod.; Patrick Smith, eng. DDDS TT 6617.

Since it appeared on the scene as a hard-to-find Japanese import label in the late 1980s, the DIW imprint promised the leading edge of acoustic jazz, played by some of the music’s most adventurous musicians. As often as not, what was recorded was a strong sonic signature. Now that an alliance has been formed with Columbia, DIW’s “hard-to-find” problem has gone away. These two releases verify that the label’s musical values remain intact.

Robert Hurst and James Carter are both from Detroit. Hurst is best known as Branford Marsalis’s bass player. Carter is brand new, but a strong buzz about him has been heard on the streets, started (as is usually the case) by other musicians. Wynn Marsalis has called him “a tremendous player,” and Lester Bowie has already anointed him “the tenor of the future.”

One for Name sake is a piano trio album in which the bass player is the genuine leader. Hurst composed all but one of the 11 tunes, and his solos inform the album’s pensive atmosphere. Pianist Kenny Kirkland is tasteful, intelligent, and picks his spots beautifully, and the drummer is Elvin Jones himself. Elvin, playing mostly with brushes, spatters telling accents and snatches polyrhythms from thin air. But Hurst’s solos are the reason for every song. He commands imagination, speed, and a gigantic tone. (He is, after all, half the rhythm section and the chordal accompanist in the Branford Marsalis Trio.)

Though not the least expressive of solo instruments, in the very struggle to sing aloud through its thick deep voice it can touch you where melody instruments can’t go. The title piece, a eulogy for Hurst’s father, returns again and again to a two-note refrain which he hangs in the air like knells of finality. (Kirkland leaves silences between his slow chords in order to share in the emptiness.) “In Your Own Sweet Way” is an extended bass meditation in which the affirmation of the Brubeck theme emerges from the continuum of throbbing, only to vanish and then reappear.

James Carter announces himself from the rooftops on the opening title track of JC on the Set. He screeches and grows and snorts gutbucket blues for eight bars, then sets off fusillades of sixteen notes. He pauses to stomp and shinny before ascending in wild trills which go on for so long you worry when he’ll breathe again. When he returns, an entrancing waltz tune tellingly tells you why people are talking about Carter. He’s just 25, but already sounds like no one but himself on all three of his instruments (tenor, baritone, and alto saxophones, in that order). His playing is an ardenalin rush, startling and exhilarating in its violent contrasts: whispers to shrieks, deep squawks to keenings, basic funk motifs to stream-of-consciousness to blues.

But there’s more to Carter than raw energy. He’s interested in the music’s history, and even plays ballads (though they always seem on the verge of bursting their self-imposed fetters). “Worried and Blue” by Don Byas, references both the composer and Ben Webster in Carter’s gitty vibrato and grand, sweeping brush strokes. Two Duke Ellington compositions are taken on baritone. “Caravan” starts with a scattering of fragments—bowed bass, drum rattles, breathy fingerings—which suddenly cohere and slam into the theme with guttural expletives. “Sophisticated Lady” also comes up from the bottom of the horn in slow, shuddering eruptions—a bold approach to Ellington’s delicate erotic sentiments.

This early in his development, Carter’s exaggerated gestures and abrasive tenor can exhaust the listener. When he learns that he doesn’t have to show us every lick he’s got in every solo, he’ll be lethal. He’s already dangerous.

These two albums were recorded at opposite ends of the US (Carter in New York, Hurst in Burbank), and are a sonic continent apart as well. The Carter is classic DIW digital: squeaky-clean edges and in-your-face dynamics. When the baritone sax blasts on “Sophisticated Lady,” it’s crunch time for your amplifier and woofers. The glare can be harsh—and can exacerbate the fatiguing aspects of Carter’s style. But this reviewer prefers thrills—even cheap ones—to the soft focus of the Hurst disc. Engineer Patrick Smith has gone for a more “traditional” jazz mix, blending instruments closely. Kirkland’s gauzy piano could have been recorded by Rudy Van Gelder (that’s not a compliment).

Sonic caveats notwithstanding, if you want to stay up-to-the-minute in jazz, One for Name sake and JC on the Set are important to hear.

—Thomas Conrad

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Joshua Redman may have graduated summa cum laude from Harvard, but he wants his music to evoke moods rather than erudite discussions: "Jazz is for your heart," he tells us in his highly articulate notes to MoodSwing, Or hearts. His compositions, with titles such as “Alone in the Morning,” “Chill,” and “Rejoice,” suggest to Redman his varying emotional states. They remind me of his fluidity and quicksilver expressiveness, as well as his lack of what late Victorians called “side”: swagger or pretentiousness. Saxophonists of an earlier generation—Dexter Gordon, John Coltrane, Booker Ervin—sounded planted, combined assurance with impressive solidity. No wonder they were called giants.

Redman is more elusive, less declamatory. “Past in the Present” begins with a Trane-ish declaration, but then Redman seems to sidle away, preparing a gentle path for pianist Brad Mehldau. If Redman reminds listeners of an older player, it’s likely to be Joe Henderson rather than Coltrane or Redman’s father, Dewey Redman.

More important than his stylistic genealogy is the beauty of Redman’s playing: the insinuating slides up to the melody notes of “Sweet Sorrow,” the imposing walk of “Chill” (there should have been a movie for this one), and the harder, squarer sound of “Obsession.” Redman would prefer not to talk about technique, but it’s his instrumental prowess, of course, that allows him to play the angular leaps, the sustained pianissimo sections, the powerful initial statements of his best solos.

His compositions—such as “Obsession,” with its Latin beat on the bridge—open up well to his band. “Obsession” becomes a drum solo. Bassist Christian McBride is featured on electric bass on the funky last number, “Headin’ Home.” By then, the quartet must have felt they had something to celebrate.

The recording clusters the band together toward the center of the stage, and reproduces their playing in respectable digital sound, if one excepts the spread-out piano image. At times, the piano seems to have the band surrounded. —Michael Ullman

JIMMY ROGERS: Blue Bird
Jimmy Rogers, vocals, guitar; Carey Bell, harmonica; Johnnie Johnson, piano; Jimmy D. Lane, lead guitar; Dave Myers, bass; Ted Harvey, drums Analogue Productions APO 2001 (LP/CD*). Mark Ettel, ed.; Chad Kassem, prod. AAAAAd+; TB: 49:36, 57:51

Fans of Chicago blues aren’t going to get any new recordings better than Jimmy Rogers’ Blue Bird. Rogers was there at the beginning—he took Muddy Waters to a guitar shop on 18th and Halstead to buy a pickup. At a time when more urbane blues players were singing titillating ditties in the tradition of “Tight Like That,” or imitating the horn-backed rhythm and blues of Louis Jordan, Waters helped initiate a new, electric form of Mississippi blues. Jimmy Rogers was frequently his lead guitarist, and worked with Sonny Boy Williamson and Howlin’ Wolf as well. Rogers also made some of his own recordings for Chess but never had a hit, despite having written intriguing titles such as “Money, Marbles and Chalk.” On Blue Bird, he revisits several of his older songs, such as “Walkin’ by Myself,” which he first recorded in 1956, and sings gently rocking versions of the hits of other bluesmen: Howlin’ Wolf’s “Howlin’ for My Darling” and “Smokestack Lightning,” and Jimmy Reed’s “Big Boss Man,” which Rogers takes at a much faster pace.

Rogers seems to be a generous man: he gives ample space to the vigorous harmonica playing of Carey Bell, who may be the instrumental star of the show, and to pianist Johnnie Johnson, best known for his decades of work with Chuck Berry. The bonus track on the CD is a jam-session medley of an unamed boogie—woogie and a boogie—woogie “St. Louis Blues,” whose source is the 1940 recording by Earl Hines. Both feature Johnson.

Still, Rogers, his gravel voice, and gently rocking style are the focus on Blue Bird. Generally he sounds upbeat, whether pleading “Let me be your lemon squeeze,” or intoning traditional Delta lines, with their pleasing non-sequitors, such as “The train I ride, 16 coaches long/ Sitting here wondering [if it’ll] bring my baby home.” He learned “Smokestack Lightning” from a source prior to Howlin’ Wolf—perhaps from the Mississippi Sheiks, as we can tell from his reference to the refrain “Now don’t you hear me cry.” He gives each song his own stamp.

One of the reasons for the startling impact of this recording is the clear, resonant sound provided on both the LP and CD by Analogue Productions (Blue Bird is AP’s first non-reissue release), which shows its values by including the recording engineer in the group picture on the inside cover. To my ears, the LP has greater presence; the CD has an extra track. The choice is yours.

—Michael Ullman


This is not so much a review as a warning label. To paraphrase a writer who once slumped in the back of this magazine, this album SUUUUUUUCKS!

How much? Zingalamaduni is just as bad as Arrested Development’s first record 3 Years, 5 Months, 2 Days in the Life of . . . was wonderful. This is the kind of sloppy, preposterous mess of an album that’s the result of a band spending all their time reading their press clippings and not a second looking at the world around them.

If only the whole album were as bad as “Achim for Acres,” which begins with these words to live by “All of you coffee drinkers / I want you all to know that I don’t drink coffee / Coffee makes you go to the bathroom.” But it gets worse, much worse. “Warm Sentiment,” which oozes with the kind of sexist, patronizing crap that gives black manhood a bad name, is as offensive a song as anything a gansta rapper ever committed to tape. Our hero, Speech, “for-gives” his girlfriend for having an abortion (“After I scold U, I hope I can mold U”), after referring to the birthing process in this sensitive line: “I wish you had let it drop.” Three guesses as to who would handle the 3am feeding. I’d pay to see Alvin Willis walk right up and clock him upside the head.

This is a prohibitive favorite for Worst Album of the Year, so save your money and send it to the United Negro College fund. We can only hope that, before releasing another fraud like this one, Arrested Development changes its name to Autism.

—Allen St. John

BBM: Around the Next Dream Virgin 397282 2 (CD). BBM, Ian Taylor, prod.; Ian Taylor, eng. TT: 51:54


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Baker's other project. Though Going Back Home is touted as a return to Baker's jazz roots, it bears no resemblance to Charlie Watts's nostalgia trip. Baker's drumming may be more reminiscent of "Philly" Joe than Elvin Jones; still, he sounds right at home with the other members of his trio: modernist Charlie Haden and post-modernist Bill Frisell. Yes, you read right: unlike as it seems on paper, the sound is pure delight.

Frisell and Haden often play together in Paul Motian's group, and Baker's loose, rolling style offers a similar underpinning without sounding at all the same. Baker also shares with Motian an instantly recognizable sound, as well as underrated skill as a composer.

"I Lu Kron" and "Ain Temmouchant" base improvisations on simple, folky-like melodies—a style that Frisell and Haden know well. Each supplies offerings of his own, in keeping with the lyrical nature of Baker's work. Frisell's "Rambler" and "Where We Go," Haden's "Spiritual," Ornette's "Ramble," and Monk's "Straight No Chaser" combine in the hands of these masters to make music that resonates beyond jazz or rock, back to the primal sound that is a large part of Baker's drumming.

Going Home is also a blowing session, serving as a rare showcase for Frisell the guitarist. With no composing chores, or cellos or horns fighting for space, Mr. Bill gets to develop ideas at length in his influential, inimitable style. Space is an integral part of that style; Baker gets plenty of room to shine.

The final tune, "East Timor," features Baker intoning a Kipling-esque poem about a recent massacre—ignored by the media—brought on by the insanity of international politics. Underneath, the trio begins with a dirge over which Frisell layers parts in real time, building into an open blues more akin to Cream than anything on the BBM disc.

Kudos to critic Chip Stern for producing this live to two-track with the warmth, balance, and intimacy of a classic foreign film. And to Atlantic for having the nerve to release music that transcends categorization. But, then, wasn't that what Cream was all about?

—Michael Ross

BLACK CROWS: America

Nothing is as sure as change. Except in rock 'n' roll, of course, which contributes to a certain comfort factor in those of us who find a certain calming mantra, a certain assurance of the continuity of universal truth, in a dirty fourfour beat and lyrics and visuals about babies with tattooed tits.

On nights we revisit those glory days with a coupla Buds, there'll always be room for one more talented band which thinks about 14 years old, and male. Once it was the Rolling Stones, who thought the height of wit was an album cover designed by Andy Warhol. (In either an homage to himself or an effusion of exploded neural pathways, Warhol's design for Sticky Fingers—inspired by a zippable Levi's fly—reːpired his debut outing for The Velvet Underground: a banana that peeled.) Now it's the Black Crows, who thankfully sound like The Rolling Stones in their blues–and–boogie–soaked formative years and plant a tinct of inimitable sex decked in scanty panties cut from an American flag on the cover of—Their Satanic Majesties Request? No, America.

Ho ho. Very teenage. Very Allman Brothers and Georgia Satellites and Lynyrd Skynyrd and one in the eye for Jesse Helms, but that's exactly what the Black Crows are all about—very, very good dirty Southern boogie ("She Gave Good Sunflower"). "High Head Blues," handily played and delivered with the vocal skill of Edgar Winter on a real good day, by a buncha Southern crackers just barely outa high school.

That's the sum total attraction of The Black Crows. They're nothing new, but they're recorded good, and they're for real.

—Beth Jacques

GREG BROWN: The Poet Game

Something, listening to him all those years on Garrison Keillor's Prairie Home Companion, I never took Greg Brown as seriously as I should have. Brown always sounded so relaxed, made it sound so easy, that I figured his loose, slightly off–kilter songs—which sounded as if he'd scribbled them on his cuff a few minutes before the on–air light went on—really wære that easy to write, and just as neighborly and unremarkable as his big, foggy, friendly, nasal honk of a just–getting–over–a–Minnesota–head–cold voice.

Boy, was I wrong.

Red House Records (which Brown co–founded) recently sent me Brown's previous nine albums, recorded over the last dozen years; they ended up being some of the most enjoyable background research I've ever done. They start out down–home/
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back-porch comely but grow increasingly dark, introspective, even bitter as they approach the present. But even the best of them— the remarkable Dream Cafe of two years ago, which collected much critical praise at the time—pales in the face of The Poet Game. This new album contains the best new songs—by anyone—I’ve heard in years: lived-in, dark, scary, and intelligent as hell.

And I do mean hell. Half of these songs aren’t just glimpses into the lower circles of bleak despair, but long, leisurely tours that don’t miss a single scenic overlook. This sort of unblinking stare into the black hole of one’s own soul can’t be faked. “Bal-lingall Hotel” is a slow, lurching blues darker and more frightening than anything John Lee Hooker ever sang, though Brown’s shuddering, stuttering vocal owes a debt to the Hook. The Ballingall is an “ugly old hotel,” a kind of Desolation Row whose every closet contains the rotting corpse of an old regret, an unrightable wrong, or some hippie-gibbering existential fear: “One night I knocked on the wrong door / One night I knocked on the wrong door / And myself as an old man answered, so drunk, so poor... so poor...” Yup—been there, done that. Remember: No matter how bad things are, they can always get worse.

Which they definitely do a few tracks later. “Sadness” comes to stay forever, Brown sounding increasingly terrified as he describes, “Go away, leave me alone.” “She lay down on my bed / she opened her thin legs / she raised up her arms and said / ‘Honey, I ain’t too proud to beg.’” // She said, ‘Don’t you remember what you did to that one / and to the other one too / I just come to do exactly the very same thing to you.’ Brown threatens to “kill her within an inch of her life,” but it’s clear that this Whore of Karma is as unkillable as remorse itself.

Bad as things get, Brown’s not even sure he wants God’s help, as he explains in a country waltz called “Lord, I Have Made You a Place in My Heart”: “Oh Lord, why does the Fall get colder each year? / Lord, why can’t I learn to love? / Lord, if you made me, it’s easy to see / that you all make mistakes up above / But if I open the door, you will know that I’m poor / and my secrets are all that I own / O Lord, I have made you a place in my heart / and I hope that you leave it alone.” Do country lyrics get any better than this? Not that I’ve heard.

It’s hard to believe that anyone these days could still write a good song about Elvis, but then there’s “Jesus and Elvis”: “Jesus had some water, said ‘Wine’d be better yet’ / Elvis picked up a git-tar and made all the women wet / Elvis he died young—Jesus he a bit younger / Elvis died from too much—Jesus died of hunger.”

But maybe “Brand New ’64 Dodge” best illustrates Brown’s ability to tackle the Big Subjects while remaining firmly rooted in the particular. He begins to tell of the girlfriend he had when he was 15... but look where he ends up: “She’s got short red hair and blue eyes / and her swimsuit’s also blue / and her little brother is retarded / but Jesus loves him too. / And Jesus loves our President / even though he is a Catholic. / There’s a lot for a boy to think about / as he walks along the railroad tracks.” This is a perfect verse—almost as rare as a perfect song. You find a lot of both on Poet Game.

And then’s jes’ on’ the words, min’. Brown’s singing has just gotten braver and more expressive over the years, his tunes—smithing more timeless and more varied at once. The arrangements here are straightforward—no one could ever call this album overproduced—but deeply rooted in a century of American music. The core band of two guitars, Hammond B-3, bass, and drums provides perfectly balanced support, with plenty going on if you listen for it. Guitarist Bo Ramsey plays electric, acoustic, and lap steel with unerring economy and style, smooth or raunchy as required. And as if all that weren’t enough, the sound is rich, honest, full-bodied, and deeply spacious, Brown’s big voice front and center and warmly natural.

Bob Dylan says enough great songs have already been written that he may as well just reinterpret them and take a break from composing. With a songwriter like Greg Brown around, I don’t expect to miss Dylan at all.

—Richard Lehnert

SHAWN COLVIN: Cover Girl
Columbia CK 57875 (CD). Shawn Colvin, Stewart Smith, David Kahne, producers; Julie Last, Steve Addabbo, Ray Martin, Mark Ender, David Kahne, Chris St John, co-producers. AAD. TT: 44:33
BEAT THE RETREAT: A Tribute to Richard Thompson
Featuring: Baezorelli, Shawn Colvin, Ivan Dando, the Five Blind Boys from Alabama, Los Lobos, J. Macis, Bob Mould, Graham Parker, R.E.M., Syd Straw, Loudon Wainwright III Capitol CDP 7 95929 2 (CD); John Chelew, producer; Joe Schiff, eng. AAD. TT: 66:53

I think I was there the night Shawn Colvin got the idea for Cover Girl. It was at the Bottom Line, and headliner Richard Thompson had a typically Thompsonian generous/crue! idea: there’d be no opening act. Instead, he and Colvin would take the stage together and alternate songs. I can only assume that Colvin was so flattered that she lost sight of the fact that there is no one on the face of the Earth with whom you’d less like to swap songs than Richard Thompson.

Sure enough, midway through the set, Thompson followed Colvin’s very nice cover of The Band’s “It Makes No Difference” with a version of “1952 Vincent Black Lightning” that summoned angels and Ariels to West Fourth Street, leather, chrome and all. Colvin moved to the mike, trying to decide which one of her songs would be next led to the laughter. “Isn’t he the greatest?” she stalled. Thompson pounced: “Oh, yes! I’m the greatest! You’re the greatest! We’re all the greatest!” Colvin stood there for a long second before beginning “Twilight,” her second Robbie Robertson song in a row.

So Cover Girl did not have an easy birth, and some forceps marks still show. On the one hand, the record reveals that Colvin would be one heckuva DJ. Her all-but-unerring song selection ranges from half-forgotten classics like “Twilight,” Tom Waits’s “Heart of Saturday Night,” and Steve Earle’s “Someday,” to lovely obscurities like Greg Brown’s “One Cool Remove,” and the entirely forgotten Judee Sill’s “There’s a Rugged Road,” to true surprises like Sting’s “Every Little Thing” [He] Does Is Magic” and the Talking Heads’ “This Must Be the Place”.

What keeps this from being a great album is the brittleness of Colvin’s presentation. I’ve never been partial to her thin, breathy voice, but even her fans will admit that her range is, at best, limited. To make matters worse, instead of playing it straight, Colvin and her production team compen- state by layering on the reverb. Even on the live cuts, she sounds like she’s singing in a separate room... that the reverb and sonics added up to a coveralbum that sent me in search of my Tom Waits records.

Beat the Retreat, the latest Richard Thompson tribute, shows in no uncertain terms why Colvin was smart to fly the white flag. This is mostly Thompson’s B—material—the tuneful, popsy numbers that lend themselves more easily to interpretation—but, cut for cut, the writing is as strong as on any album you’ll hear this year. And unlike a previous RT tribute attempt, The World is a Wonderful Place, there are some wacky and inspired matches made here. The easy-listening highlights include Bob Mould’s transcendent slab of “Turning of the Tide,” in which he matches Thompson riff for cathartic riff; R.E.M.’s lovely country-tinged version of “Wall of Death,” and Graham Parker’s power-pop take of the previously underussed “Madness of Love.”

On the darker side, there’s a stunning electric gospel reading of “Dimming of the Day” by the Five Blind Boys from Alabama, and Los Lobos’ aching version of

1 Minimonitors owners be warne—it’s 100dB or bust on this one.

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World Radio History
“Down Where the Drunkards Roll.” And, bearing no ill will, Shawn Colvin even teams up with Loudon Wainwright III for a warm and cozy “A Heart Needs a Home.” On the other hand, Evan Dando (“For the Shame of Doing Wrong,” with Syd Straw) hasn’t gone back to working at Burger King yet, and ditto for J. Macis of Dinosaur, Jr. (“I Misunderstood”). And, strangely, Beausoleil’s version of “Valerie” never quite takes off.

The sound is downright exceptional. The slightly laid-back perspective is consistent from cut to cut, the instrumental tracks are wet without being sloppy, and everything is detailed without being pushy. My only complaint with Beat the Retreat is that the song selection was played too close to the vest, leaving dark and deep Thompson masterpieces like “Devondise,” “End of the Rainbow,” and “Love in a Faithless Country” uncovered. Bet that wouldn’t have happened had Stereophile’s DJ of the Month, Shawn Colvin, been on the case. It’s a shame when you miss your calling. —Allen St. John

FRENTE! Marvin the Album
WILD COLONIALS: Fruit of Life
DGC DGC4-24625 (CD). Tchad Blake, prod.; Tchad Blake, eng. AAD. TT: 56:14

I have this recurring dream. It’s 1972, and I’m sitting in the lotus position in my electric-blue bean-bag chair with a big glass of Tagn in my hand. The phone rings. “What’s happening, man?” It’s RL.

“Far out,” I reply, as I turn off Love, American Style.

“Not to be a bummer on your scene, bro, but what about those eight-tracks I laid on you?”

“Just groovy, Richie Stardust. That new Santana, it’s like so with it. And that Melanie, she’s a poet, man.”

“What about that Springsteen album, Greetings from Perth Amboy? The dude over at Columbia laid it on me that he’s the new Dylan.”

“Bummmed me out, man. Blinded by the Light? Wrecked up like a douche? I just don’t see where that cat’s coming from. Like, no waaaaaaaay.”

And then I wake up. It’s the reviewer’s worst nightmare: that buried somewhere in the pile of unlistenable dreck that shows up on the doorstep every month is a true gem. You put on the first cut, decide it’s crap, and move on to the new Megadeth live set. Like that Frenel! EP RL liked so much. If I’d cued up “Labour of Love” and nothing more, I might have dismissed them as an Edie Brickell tribute band. And if the Wild Colonials’ debut disc wasn’t also Tchad Blake’s production debut, it too might not have gotten a second listen. And that woulda been a shame.

These two albums, different though they are, both feature eclectic acoustic rock, Commonwealth-scented singers named Angela, and are both, in their own ways, small but not insignificant gems. The Frenel! album—his friends call him Marvin—is, I think, even better than the EP. Angie Hart’s Down-Under vocals are downright infectious, and the anything-goes orchestration is in keeping with the playful tone of the music.

“Accidentally Kelly Street” is just about the best song about simple pleasures since “The 59th St. Bridge Song,” by Mr. Edie Brickell (oh, no—flashbaaaaaak). And it takes a certain youthful chutzpah to release “Lonely,” which degenerates into a knock-off of Barry White’s “Can’t Get Enough of Your Love, Baby.” The sound isn’t reference quality, but the thin, almost disembodied treatment given to Hart’s vocals, and the rounded-off quality of the acoustic guitar strum and snare drum attacks, are completely appropriate to the album’s light and breezy feel. And, to my knowledge, this is the first album in rock history to include an android—Star Trek: The Next Generation’s Commander Data—on the album acknowledgements.

Getting my colors analyzed recently (careful draping revealed to me to be a Winter) has changed not only my life, but my approach to reviewing. So while I dub Marvin a Summer album—compatible with bright colors, bare feet, and drinks with umbrellas in them—the Wild Colonials record is definitely an Autumn. Its tones are a little darker, a tad more melancholy—a nice Merlot, if you will. This Angela—Angela McCluskey—has a more mature voice, with a tinge of a brogue, and not a little power behind it. The arrangements are also eclectic, but here the tin whistle, cello, and tablas are used to more somber effect. And no android influences here. “Philadelphia Story” pays homage to Cary Grant.

Tchad Blake’s production is distinctive. Building on his best engineering work with Mitchell Froom (most notably Los Lobos’ Kika), he shows an ability to introduce sounds into the mix and make them work like music without smothering the song. Soundwise, there’s a little congestion during some of the busier passages, but the instruments are beautifully recorded, and there’s a formidable amount of low-bass information and a well-focused soundstage with a good sense of depth. Well worth hearing.

So my worst nightmare has been averted for at least another month. Summer’s turning to fall, and I’ve got albums for both seasons. The lava lamp’s packed safely away with my chartreuse bell bottoms, and I’m finally hearing RL’s voice during my waking hours. Now, about that Melanie box set... —Allen St. John

Like J.J. Cale, with whom he now shares a label, Brian Ferry keeps making the same record over and over—not necessarily a bad thing when you’re as good as these two are. The work of many great artists is but the continuation of one theme, but Mamouna may be pushing it even for Ferry fans.

His last record, Taxi, took a lot of heat for being a holding action of cover songs while we awaited the next opus. I found it a welcome breather from the sameness stretching from Bete Noire back through Boys and Girls to Avalon. Don’t misunderstand—I love every one of those records. But Taxi, Brian’s first collaboration with Robin Trower, offered a refreshingly stripped-down version of the Ferry sound. Also, the cover tunes were actually tunes, a respite from his usual atmospheric skeletons—a style that’s pushed to the limit on Mamouna.

The return of Brian Eno to the fold merely means that the atmospheres are a little different from those on Bete Noire—a little edgier, more dissonant. The grooves remain the same: ’70s funk. The lyrics tout the same romanticism: “Too fast to live / too young to die”; “Where do we go from here / your place or mine”; “Can’t control my feelings”; “Mad desire.” You get the picture.

But I have the sneaking suspicion that I’m hearing actual riffs and melodic lines stolen from previous Ferry songs. A common enough practice, he should have hid them a little better.

Phil Manzanera and Andy McKay also make guest appearances—not that you’d notice. What Ferry needs is not a return to Roxy Music, but to move ahead, to reinvent himself—a strong producer (Trower, an outtakes sheet voice on Taxi, is all but silent here), some new grooves, a writing partner, a religious experience, something. Bob Clearmountain is a mixing genius, but Bete Noire derived much of its distinctiveness from his rare absence.

Like J.J. Cale’s, Ferry’s records have differed subtly but significantly over the years. Mamouna, too subtle for even this Ferry fan, needs a little more signification. —Michael Ross
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for musical ability, acting talent, fashion sense—what to add to what Sandra Bernhard has so adequately summed up as “unimaginative”?

In fact, she hasto be. Like anyone aiming for volume turnover, Madonna is the ultimate follower of fashion who can’t ever afford to be anywhere but one season behind, where Claude Montana’s cone-shaped underwear—as-outwear, for instance, has ceased to be the toast of Tout Paris and is now available in K-mart polyester. (The runways, like the fine art world, are littered with the wrecks of genuine pioneers—the ones with arrows in their backs.)

Yes, the masses are where the money is. Even David Mamet, no slouch with the four-letter word himself, who sought to stock his Broadway play Speed the Plow with “masses of asses in the seats,” cast her against Ron Silver and Joe Mantegna, to the enormous detriment of the production but a buoyant bottom line. The difference is that Mamet writes his own one-liners; Madonna, having learned something about overreaching, calls for a script and make-up.

But it was ever thus: Marlene Dietrich, Dom Perignon in the world of the blonde bombshell, spawns California cuvee (“Mari-lurn”), and, inevitably, cheap and bloody Italian sparkly. It’s a fact, however, that every Christmas Moet White Star outshums Cordon Rouge; if this derivative CD of warmed-over, R&B-tinged teased (this year, the woman got sw) but parsley sampled “street credibility” (The Gap Band?) from a babe who, by rights, should be doing Mae West instead of Heather Locklear’s older sister is any indication, this year, thank God, Madonna’s carriage turns back into the pumpkin. The first six months she played sex kitten it was cute, but Madonna’s never been anything musically more than the sum of her producers, and these days Ru Paul looks more like the real deal. Pray Ms. Maverick reads the writing on the wall and turns from recording to a licensed line of schlocky clothing, cheap perfumes, and a series of guest-host slots on HSN. Asi Spumante can make you really sick.

—Beth Jacques

KATE MacKENZIE: Let Them Talk

Now that Emflyou Harris fills the ever-longer stretches between her new records with Best-Ofs and recompositions, along comes Kate MacKenzie’s first solo album: the closest thing to the sort of stylish, impeccably tasteful roots-country songbag Harris and ex-husband/producer Brian Ahern used to turn out like clockwork once a year from the mid-’70s through the mid-’80s. In fact, with Harris giving MacKenzie her double blessing by singing harmony on MacKenzie’s “Waitin’ Out the Storm” and allowing her own “Heartbreak Hill” to be covered as the album’s opener, Let Them Talk almost is an Emmylou Harris album.

And isn’t. MacKenzie’s taste in songs and sidefolk is her own, and every bit as good as Harris’s, and her deeper, richer voice can carry off a country blues a whole lot more convincingly and knowingly than Emmylou ever could. Here are songs by Los Lobos, Greg Brown, and the Delmore Brothers, plus judicious selections from contemporary country (Kieran Kane’s oughta-be-a-classic “Forgive and Forget”) and the public domain. The overall bent is acoustic Appalachian, with a dash of honky-tonk and plenty of bluegrass.

There are plenty of high-class Nashville/Newgrass players—Sam Bush, Stuart Duncan, Alison Kraus, Bela Fleck, Russ Barenberg—plus septuagenarian gospel quartet The Fairfield Four on “He Knows How Much We Can Bear.” Sound is living-room natural—something I’m beginning to expect from Minneapolis-based Red House Records, the label all Prairie Home Companion regulars—MacKenzie, Greg Brown, the Chenille Sisters, Pat Donohue, Prudence Johnson, Peter Ostroushko, Bill Staines, and Stoney Lone-some, among others—seem to sign with when they graduate from the show.

All in all, a class act and a sure bet. No one who likes country music—as opposed to Nashville, or the clean-boy/girl-country rock that’s rapidly taking over American pop music—will dislike this album.

—Richard Lehner
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laid tales about Jackson Browne punching out Darryl Hannah ("Not to Blame")? I mean, it'll probably be a made-for-TV movie. At one point I've yet another song about Vincent Van Gogh ("Turbulent Indigo"): not only has it been done before, but this version is nothing more than a rehash of things Joni said a lot better in "Judgement of the Moon and Stars" (about Beethoven). It may be that the best things about Indigo are Joni's nifty paintings adorning the threefold cardboard CD package.

To be fair, I have to say that when she hits a good theme, Mitchell still writes pop-music poetry (a worthy genre in itself) with the best of them. "The Magdalene Laundries" is as neat a statement on convent education as you're likely to find, and "Sine of Sorrow" might have been set to music by Gesualdo in another age; but these are the only such examples here, and "Sine" has the distinction of being the only tune on the disc that isn't destroyed by the hideously sterile production that Joni and Larry affect of late. This deadly similarity of sound only emphasizes the fact that the melodies themselves are just as distressingly similar.

I don't like writing pieces such as this. I also recognize the presumption inherent in trashign an artist whose guitar I'm not fit to tune. It comes with the territory. I know that—Joni Mitchell told me so a long time ago.

—Les Berkeley

DAVID BOWIE: The Rise and Fall of Ziggy Stardust and the Spiders from Mars Rykodisc RCD 80134 (CD). David Bowie, Ken Scott, prod.; Toby Mountain, Jonathan Wyner, digital engs. AAD. TT: 56:10


With these four discs Ryko launches their AU20 series, selections of "sonic bests" from the Rykodisc and Hannibal catalogs. This marquee applies to audiophile-quality editions transferred to 20-bit digital masters and Super Bit Mapped to 16-bit, the CD's playing time HACK. My review CD is the hard one to justify sonically, as this recording has never sounded realistic. Leader, reduced HF, unfocused—it screams early-'70s multitrack. But Ziggy Stardust was the record that made all of us realize that Bowie wasn't just the UK's this year's Dylan, and I've always loved it—especially the suite comprising side two of the album. Ryko's reissue released an LP remix in the early '80s that actually sounded more bloated than the original (I know because I bought it and gave away my RCA LP, figuring the MoFi had to be better). Ryko hasn't made a silk purse out of this pig's ear, but it betters both the original and any subsequent reissue that I've heard—including their own earlier CD, which I found bright unto nastiness. Plus it has some cool filler. Not the unreleased mixes and B sides, but Bowie's demo recordings of two of the songs from Ziggy. They're very different, sounding more vulnerable than the album tracks. I'd gladly buy the whole album's worth of demos—if Ryko would only release them.

Ryko's Shoot Out the Lights definitely bettersthe original LP's superb sound—although analog purists even more fanatical than I may disagree. Bass lines are a tad leaner, which I hear as tighter and better-defined, but you could argue that they're warmer on the LP. Sounds like Rotosounds on that Fender to me, so I say leaner is more accurate. Highs are both sweet and biting, as appropriate. Soundstaging is good, as is the pace and swing. This disc couldn't be better served. Now, how about something really depressing, like I Want to See the Bright Lights Tonight?

It takes guts to reissue an audiophile touchstone such as Dafos. Ryko just has to know that there are fanatics out there who want them to blow it. Too bad, fanboys, they don't do the job good. Now, maybe I've just smoothed out those teeny-tiny HF grooves on my much-played 45rpm original, but I hear a lot more detail on the over-tone structures of the Gamelan and other chimes. The decay on those overtones is sustained and gradual, with no tendency toward heavy digital brick-wall cessation. And the Beast falls to the floor with an incredibly authoritative, subwoofer-straining kee-rash!

Yeah, there's a difference in spectral balance between the LP and CD, but which one is truer? Can't say, don't care. Neither is particularly "purist," and I enjoy the moody atmospheric music on both; but there's extra music on the CD, and the songs are sequenced differently—musically better, I think. Plus, I don't have to get up in the middle. A winner.

Planet Drum sounds great on paper—it's a celebration of world drumming that brings together master drummers from various traditions: Brazil's Airtio Moreira, Nigeria's Babatunde Olatunji and Sikiru Adepoju, North India's Zakir Hussain, Madras's T.H. Vinyakram, all coordinated by Mickey Hart. It sounds great on the disc, too—at least sonically. It has gobs of detail, good atmosphere, and is articulate as hell. No need to play it very loud.

The only problem is that it doesn't so much celebrate diversity as homogenize the traditions into a non-specific drumfest. It reminds me of Chesterton's assessment of his own work: "I have spoilt a number of jolly good ideas in my time." It is a great idea that, unfortunately, falls short of its avowed goal. Sounds great, less filling.

Ryko's first AU20 release is uniformly superb sonically, and shows great promise for future reissues. Definitely a major addition to the audiophile soundscape.

— Wes Phillips

LENA WILLEMARK/ALE MöLLER: Nordan Lena Willemark, vocals, fiddle; Ale Möller, mandola, flutes, harp, shawm, cows-horn, hammered dulcimer, accordion; Palle Danielsson, acoustic guitar; Jörgen "Edén," drums, marimba, bongos, triangle, banjo, brass, harp, balalaika, fiddle, Swedish bagpipes; Jonas Knutsson, saxophones, percussion; Tina Johannson, Björn Tollin, percussion ECM 781 (8-21536-2 CD only). Manfred Eicher, prod.; Jan Erik Kongshaug, eng. DDD. TT: 65:01

World Music: a) a blend of different musical traditions from around the world; or b) music that plumbs its own traditions so deeply that it transcends cultural boundaries to become a universal language.

Nordan satisfies both definitions. Vocalist Lena Willemark and multi-instrumentalist Ale Möller have chosen 16 of the oldest surviving Swedish folk songs, some of which date back to the Middle Ages: bleak, tragic love songs and ballads, and fiddle and bagpipe tunes. Producer Manfred Eicher has surrounded them with tablas, saxophones, jazz bassist Palle Danielsson (of Keith Jarrett's "Belonging" quartet), and ECM's spacious, deep-focus sound. It's astonishing how well Danielsson's bass and the soprano and alto saxes of the icy lyrical Jonas Knutsson blend with the traditional instruments.

Nordan is stark, spare, darkly moving, tough and tender by turns, and unemotingly musical. Willemark, a sensitive, gutsy singer, effortlessly negotiates this music's hairpin transitions: from belting field voice ("Trilo") to whispered intimacies to a sudden Hup! pushed from the gut to eerie, high-pitched keening ("Vallsiv"). Her lack of vibrato is reminiscent of early music's other ornamentals and greennotes invoke the Middle East, and shawms in Swedish; although the booklet offers only the barest synopses, I found myself convinced that I knew exactly what she was singing about.

The accompaniment of Möller, et al is equally supra-cultural: the oriental of "Kom Hele Hende," the haunting quartet of "Knat Hauling," the Bulgarian-style bagpipes and shawms, and the Appalachian-sounding fiddle tunes. (The sprung rhythms, bent notes, and devil's trills of the brief "Jemsken" will turn your sense of time inside-out.)

This is music meant to be sung in the fields and across the waters, and the meticulously detailed sound is as big as all outdoors and twice as resonant. If you like the Le Mystère des Voix Bulgares, you'll love Nordan: I can't imagine a recording more atmospheric, or one which more irresistibly demands to be met on its own terms.

— Richard Lehnhart
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"Judging by the quality and sonic superiority of the Golden Dragon 12AX7 and EL34, this venture is the best thing to have happened to tubes since the heyday of the likes of M-O Valve and Mullard... the Golden Dragon goal of premium tubes rivaling the best ever made appears to have been realized."


TWIN TRIODES

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**Manufacturers' Comments**

**Infinity Epsilon**

Editor:
I would like to thank Tom Norton for the very positive review that he gave the Epsilon. It's gratifying, from my perspective, to be able to focus my efforts toward the advancement of high-end audio again. An acknowledgement of that effort from a magazine as well respected as *Stereophile* is very much appreciated.

I have a number of comments about the review that will help to clarify some of our thoughts in the development of Epsilon. I will address them in the order in which they appear in the review.

• In the construction comments, I think it's important to note that the grille is not removable, and in fact the grille structure was very carefully designed to integrate the planar drivers and the cabinet. It is an essential part of the Epsilon's low-diffraction design.

• The SCU (Servo Control Unit) that controls the woofer provides for both balanced XLR and single-ended RCA types of hookups. Both work well, however, whichever method the customer chooses, all connections must be of the same type. Mixing inputs or outputs will result in abnormal bass gain and will distort the performance of the system for the reasons Tom pointed out in his review. The manual is being corrected to indicate that fact.

• We are currently working with Krell to determine the cause of the apparent incompatibility between Epsilon and the KSA-300S when used in the woofer system.

• An addendum to the owner's manual indicates that when the system is used in the balanced mode, the rear servo-loop gain pot must be reduced by 6dB. When properly adjusted, the amount of feedback around the woofer is 27dB. The squeal Tom encountered when he first set up the Classé M-700 was a result of too much gain in the feedback loop. We have found that a simple and very effective way of making this setup adjustment is to turn on the system with the servo-loop gain pot turned all the way down. Then turn up the pot until the woofers begin to squeal, and back off about 3dB. This will properly adjust this part of the circuit to within 1dB of the optimum setting. We've learned these little tricks as we've gained experience setting up a number of systems with different amplifiers. Tom's system setup was correct, even if he got there without our help.

• The fourth setup problem—transient spikes triggered by external sources—is new to us. We have not encountered this elsewhere. We will work with Tom to determine the cause.

• A comment is in order about the use of dedicated woofer amplifiers. As Tom correctly pointed out, the additional expense of this feature would have raised the price of the Epsilon. It also would have made the design of the woofer section much easier. However, our market research indicated that our dealers and distributors wanted their customers to be able to choose the amplification for the system, even the woofer section. In this case, Engineering lost out to Marketing in the design process.

• We find the soundstage of the Epsilon to be not only realistic, but actually one of the more remarkable features of the monopole planar design. Unlike many systems, whose exaggerated soundstages are the result of numerous phase distortions, the Epsilon presents each instrument where it was recorded, and separate from the others—as it would be in a live performance.

• Designers are often faced with the necessity to make tradeoffs in order to accomplish their overall objectives. For example, the Epsilon needed speed as well as power in its bass region to properly match that of the planars that were designed for the rest of the system. A 12" IMG woofer was chosen for that task, not only because it possessed exceptional dynamic capabilities, but also because of the package size requirements that were needed for the system. A single 12" woofer can put out a significant amount of bass; however, you can only take it down to around 30Hz and still expect the system to play at live performance levels. I am using a Mark Levinson No.235 for the bass region of my Epsilon System, and I must say that I have never wanted for more, even when used in a Home Theater application. The left channel seems to be the one running out of steam at Tom's house; I can only assume that there may be a problem with his system in that area. We will investigate.

• When measuring large multiple-driver systems, it is important that the microphone be placed at enough distance to properly show the integration of the sound coming from each of the drivers. For the Epsilon, we recommend a minimum listening distance of 8'. When designing the system, we used an anechoic chamber with a flat response down to 90Hz, and a measuring distance of almost twice that used by *Stereophile*. Even though the measurements achieved in the review were quite respectable, the actual response at a normal listening position would be better. This is due to the vertical directivity of each of the drivers. For example, the front tweeter of the Epsilon is located at a height of 52'; therefore, a measurement of the system taken at a distance of 45" and a height of 37" would be the equivalent of a measurement of that driver taken at a height of 20' at the recommended listening position. The Polar response at ear level at the proper listening position is flat, with almost no tilt.

Cary Christie
Christie Designs

**Home Headroom**

Editor:
My first thought, as I read the Home HeadRoom review preprint, was, "Oh, thank you, God. It's a good review." But within the first few pages, that thought was rapidly replaced with the growing realization that Wes Phillips was doing a better job of explaining HeadRoom products than I ever had—I was amazed. All this headphone psychoacoustic gibberish is conceptually quite complicated. "Time differences at these frequencies give this impression of up or down but overwhelmed by amplitude variations in this way," blah, blah, blah. Psychoacoustics, as usually described, goes on and on and on and on. But Wes manages to succinctly synopsize psychoacoustics simply and elegantly. Bravo! Psychoacoustics is a great study subject for audiophiles. It helps us judiciously mediate between science and art as we struggle to understand and reproduce audio. I'm glad there are talented writers out there like Wes who can bridge the gap. I'm also glad *Stereophile* is the kind and caliber of magazine that can attract such writers.

Okay, on to the review itself: First, at the risk of repeating what I just said, the review is astonishingly accurate. I can't tell you how many times I've read reviews and felt that the reviewer didn't quite get it. Not so here. As I write this paragraph I've re-read the entire review to find a single mistake, and there ain't one. (That includes TJN's measurements. A pretty hard nit-picker to pick nits is he.) One minor area of confusion, however, is with regard to the filter switch.

The filter brightens the signal to compensate for the warming that occurs through the processor. The problem is,
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much of the warming that happens is desirable—it is part of the Diffuse Field Response of the hearing system. But the EQ changes are only by-products of the more important time delays at 10 kHz or above required by the hearing system. Turning the filter on, although it makes the frequency response more accurate, also destroys some of the phase relationships within the audio signal that are useful in conveying the sense of coherent imaging. All in all, I just tell people, "If it sounds too dark, turn the filter on. If it's too bright, turn it off." Generally, I like the filter off, but only the flatest most recent and slightly brighter electronics.

The current version has a 3dB down point at about 45kHz, as opposed to the reviewed version's 25kHz. This makes the unit slightly brighter subjectively, requiring the filter to be used less often. (On current versions we are recommending the 20kHz filter be used with the Sennheiser 580, and is optional for the 590. Our notes that TA recommended in the January '94 HeadRoom Supreme review.) Speeding up the electronics must be done with great care, as too much speed may get you an edgy—or bright-sounding result. Getting this compromise right in HeadRoom amplifiers is complicated by the fact that many people use them in secondary listening systems with portable CD players, or as a quick and dirty (or a awful good-sounding) Home Theater. These sources may be far from audiophile quality, and overly accurate reproduction can be irritating. If there is any room for a bit of art in making headphone amps that consistently sound good, it boils down to "Keep it Smooth."

Tom also noticed the fact that the Home HeadRoom does not spec as good as the Supreme reviewed in January of last year. Well, I'll let you in on a little secret: As you go to higher class amps, the Home HeadRoom, most of the specs get slightly worse. Which is strange, because the electronics module in each unit is exactly the same; only the amplifier supplies are different. In listening, however, the Home is clearly better-sounding than the Supreme.

Tom says, "Adding an AC power supply... is no trivial matter." Frankly, it was trivial in that odd sort of way. We can make an affordable product. If we were to spend hundreds of hours tweaking around with highly integrated audio-circuit/power-supply designs, we'd have to charge big bucks. We use a very simple power-supply design with state-of-the-art components. (It's basically "Aunt Corey's" power supply with a few updated parts. We do publish the power-supply schematic in our manual, which is free for the asking to our 800 number.) It's measurably more noisy (you really can't hear the noise), but the dynamic performance is controlled, predictable, and, most importantly, sounds great. It's a perfect example of the specs not telling the whole story. I have little faith we will ever find a small set of standardized measure-

ments that completely quantifies the subjective performance of an audio product.

Having said that, I'll promptly applaud T.J. and Stereophile for their work in consistently publishing the most useful bevy of measurements of any audio magazine. Just because I believe specs won't tell you everything doesn't mean I'm gonna stop looking at them. Heck, one of these days some smartass is going to figure out what they mean and tell us all—I hope.

Now—in the "Damn, I wish I'd said that!" category, you got me beat hands down. Wes, I hope you know I plan to plagiarize a few of your turns-of-psycho-acoustic phrases in my next White Paper. Sincerest form of flattery and all that, eh? Do me a favor and thank Dierdre for me. She gives me great hope. TELL HERTSENS President, HeadRoom P.S. Readers might want to take Wes's cue and go to their local University library and check out a couple of books on psychoacoustics. It's the wonderfully complicated story of how nature adapted to sound waves.

EAD DSP-7000 II & T-8000 Editor:
We deeply appreciate your review of the DSP-7000 Series II digital processor and T-8000 transport. We are pleased that the DSP-7000 Series II has earned a place in Stereophile's "Recommended Components."

We are ever more anxious to hear Mr. Holt's reaction to Series III with Digital Flywheel™ and HDCD™. Like Mr. Holt, most audiophiles are not enthralled by the inherent limitations of 16-bit PCM digital audio. The HDCD process substantially overcomes this 16-bit brick wall through some highly sophisticated algorithms, as well as (in certain critical respects) the 20kHz bandwidth limitation imposed by the Nyquist theorem. (The latter is achieved in part by preserving critical phase information in the reproduction of musical transients.) The results are absolutely phenomenal.

Up to 20 bits of resolution can be achieved with HDCD, rivaling the highest-quality analog master tapes. Digital Flywheel provides the jitter suppression necessary to reproduce 20 bits of musical resolution upon playback. Our listening experience with Series III has been a revelation—an awakening as to what digital can be, and what it has not been so far. Unfortunately, Series III was not available in time for Mr. Holt's review. It is now, and we will get it into Mr. Holt's hands as soon as possible.

Finally, we should remind the reader (as Mr. Holt himself was quick to point out) that comparing the DSP-7000's sound quality to a vinyl master that has been converted to digital using a Sony DAT player is not really a fair comparison. The A/D conversion is even more technically demanding than D/A, and the Sony DAT recorder is not up to the challenge. Better to use the high-quality A/D function in EAD's new TheaterMaster™, or, better still, Pacific Microsonics' latest HDCD A/D encoder. Amazingly, critical listeners who have performed this test have been hard pressed to identify any deterioration in sound caused by conversion to digital and back.

T-8000: The T-8000 Universal Disc Transport has been extremely popular with our customers as an audiovideo transport. As a video transport, as Mr. Holt points out, the T-8000 has exquisite color saturation and color balance, and is a pleasure to behold. With respect to sharpness, its performance in comparison to the Pioneer Elite CLD-97 (a formidable competitor that served as our video reference in designing the T-8000) depends on exactly what monitor and/or line doubler is used, and whether composite or S-video output is selected. In our home theater system (latest Runco projector and some doubler using the T-8000's S-video output), it is slightly sharper than the CLD-97. Similar findings have been reported by many of our excellent high-end Home Theater retail showrooms throughout the country.

More important, the machines to which the T-8000 is compared have no reclocked digital audio outputs and are (in our opinion) less suitable for high-end audio or Home Theater applications.

Moreover, in keeping with EAD's non-obsolescence, owner upgrade policy, the T-8000 is upgradeable to accommodate Dolby AC-3 5.1-channel surround-sound, whereas I am aware of no such upgrade program with any other transport, including the CLD-97.

For these reasons, we are confident that the T-8000 will continue to be a best-selling audio/video transport for a long time to come.

JOHN S. HAGLIN, Ph.D.
Dir. of Engineering
ALASTAIR ROXBURGH, M.SC.
Dir. of Research

Enlightened Audio Designs

PINK TRIANGLE DA CAPO Editor:
Pink Triangle's policy is one where discussions on the subjective content of a review are never entered into. Our interest is in factual correctness. Any individual is free to express their subjective opinion on a product and eventually to exercise their right to purchase whichever product they choose. The information path to forming these opinions is, of course, something we are interested in.

Given the importance of this review, the first review of a long-heralded worthwhile addition to improve the inadequacies of compact disc, we at Pink Triangle have welcomed HDCD™ with open arms. The reviewer, likewise, seems to have gone gung-ho, wanting the scoop—but it appears at any cost, and Pink Triangle has had to bear the brunt of the events that have taken place.

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products arrived "damaged during shipping." Cracked case, parts rattling, nothing serious you understand. Despite this—and, I admit it, because of the "scope" he continued with the review, but ultimately deemed the product unreliable. . . ! This unit was the selfsame unit that had operated out of the box at Pacific Microscopics, prior to receiving their stamp of approval! Pacific Microscopics would not have released such an important product if it had not passed their highest standards of performance—sonically! Which indeed it did at their lab, with a price near the middle of their design range, together with company president, Mike Ritter, present. The DaCapo was compared directly with PMI's in-house discrete reference DAC, built to the highest standards.

As for unreliability? Are Pink Triangle, for all their sins, now to be considered cou- riers as well?

It is assumed of the damage, Pink Triangle, acutely aware of Mr. Harley's time constraints and in order to circumvent the possibility of a repeat incident of damage to their product, and, further, in accordance with editorial policy that states "Manufacturers have the right to set up piece of equipment in one of our listening rooms," etc. (cf. "The Final Word," Stereophile, December 1994), offered to fly over from England, hand-carrying another and unbroken (sic, fully operational) unit to the reviewer. The meeting need only have lasted an hour or so. Given the importance of the review, imagine then our disappointment—nay, incredulity—that we were not afforded this option. A second unit was therefore duly dispatched by UPS, and Murphy's Law did indeed operate. This second unit also seems to have suffered a similar fate to the first. After 15 years, we are hardly going to set ourselves up with just a faulty unit, the selfsame one that we would have hand-carried. Or are we regarded as that stupid?

As you were unable even to measure the unit (listen to the unit?), we suggest that your results were formed on the basis of damaged product. We don't think, there- fore, that you are in a position to know the product, never mind comment on it.

Your results do not even tally with the experience of other reviewers, DaCapo having won awards for sonic excellence, and its unique use of discrete technology, etc. With a history like that, you have shown no interest in your correctness. Just HDCC. Would it then be unreasonable for one to regard the review as tantamount to the review of a motor car that had arrived with a crunched wing and damaged suspension generating gaucherie and noise, with the conclusion: "It handled badly, but wasn't the air-conditioning silent, if only it could have been evaluated above the noises!"

In your haste as journalists, you do not appear to have followed your own guide- lines. Again we quote: "Every unbroken sample we audition is included in the final review." We assume, therefore, the converse holds: Broken samples will not be reviewed. Given the context in which the events have transpired, what a tragic, pathetic end to both a fine product from a proud, quality manu- facturer and an otherwise laudable maga- zine. No one likes sour grapes, but in the light of not being offered a constructive out—not a cop-out—our final word re the power of the press, who always have the last word, regarding herein what we can only consider to be a non-review: Publish and be damned! Arthur Khoubesserian Technical Dir., Pink Triangle Projects Ltd.

We apologize to Pink Triangle, for not being able to allow them to personally visit Robert Harley with another sample of the DaCapo. The com- bination of Bob's personal schedule and that of the magazine did not make this possible in this instance. However, as RH noted in his review, we intend to publish a Follow-Up review. I invite Pink Triangle's Arthur Khoubesserian to New Mexico to set up third samples of the DaCapo and its DC power supply so that RH can perform this Follow-Up.—JA

CLASSÉ M-700 Editor:
We were thrilled with your very favorable review of our M-700 power amplifiers and your final thoughts when you stated, "Of all the solid-state gear I've heard to date...the Classé voicing...strikes me as the most musically convincing of all."

As you mentioned, we felt our long- term evolutionary design approach makes this kind of performance and reliability possible.

Our present lineup of amplifiers and preamplifiers has now enjoyed market suc- cess for approximately five years, mostly without change. Classé takes this opportu- nity to announce at this time a new generation of products.

The 700 Series amplifiers (700W mono, 200W stereo) are being superseded at approximately the same price with our very exciting new CA-300 model power amplifier (300W stereo, 1000W mono).

Once again, thank you for such an out- standing review of our products.

GLEN GRUE
Vice President, Classé Audio

MANLEY 175 MONOBLOCK Editor:
We thank Stereophile and DO for reviewing our Manley 175 monoblocks. DO shares our admiration of the 6L6/881 family, and seems pleased with our resulting design and execution. However, as has become his predictable stance, he usually prefers his choice of tubes to those fitted by the manufacturer/designer. Indeed, he clearly states that we who design and build tube equipment are at the mercy of tube selection; furthermore, he reports that 50% of his positive reviews would have received adverse judgments from him with the stock tube complement. (On re-reading his reviews over the last two years, I actu- ally make it nearer 75%.) He implies that he has a "flat" (or is it knowledge?) that we as a group lack; that we regularly do not fit the optimum tubes out of stupid- ity, poor taste, cheapskatedness, sheer cussed unwillingness, or...? Notice, please, that our Manley 175 (with factory- spec tubes) wildly fluctuates from "the world's best," to "10," to "a Georgia Peach," to "a heap of jelly," and then back again (after fitting his choice of tubes) to "a finely tuned instrument." Any trace of exaggera- tion or self-congratulation here? And does it not occur to anybody that, when DO con- fers his blessing on a piece of equipment only AFTER fitting his preference of tubes, he sadly compromises his position of unbiased neutrality—the reviewer's most valuable asset?

He gets the supply position so wrong, too. Of the thousands of wonderful N.O.S. pieces he alleges are readily available, his prime source (Gold Aero) had precisely 112 pieces of GE 6L6GC and 16 pieces of Syl- vania on their shelves as of November 28, 1994. Furthermore, Frank Morris con- firmed, that he does not know of any quantities available at any price! Truly, this dis- or misinformation from DO must cease pub- lication. Too, Stereophile's worldwide reader- ship should be taken into account as to what constitutes "readily available." Tube- equipment manufacturers do know the supply situation—locally and worldwide.

I have talked to most of the substantial tube-equipment manufacturers over the last few months. Without exception, they deplore, as do I, DO's routine removal of factory-fitted tubes (his "standard operating procedure," as he described to me by phone and letter), and we wish to God he'd review the equipment the way the factory ships (and warrants) it. Please believe me when I say that we take great care in selecting a tube type on which to base a model: it must be one that we have thoroughly tested, can therefore fully warrant, and, most importantly, is available and will stay so. We really want the best for the cus- tomer/buyer, and to imagine that we would wish otherwise is just plain nonsense. For the record, I have used over 15,000 Sov- tek 5881s and have proved it to be—all things considered—one of the two or three finest pieces I have ever worked with in my 30+ years of vacuum-tube experience.

Returning to the Manley 175 mono- block for a moment: In the (almost one year) period that DO has had them, we have added some optional choices the buyer can make besides the standardly sup- plied "Ultranear" version reviewed. They can be ordered fixed in triode or tetrode, or (at an extra cost of $400) fully switch- able between these three operating modes. I mention this because these options give a listener a wide range of system-matching possibilities—and in a factory-approved manner.

DAVID MANLEY
Manley Laboratories

CLEARAUDIO SIGNATURE Editor:
We at Discovery Cable wish to thank Ste-
Benz–Micro Ruby

Editor:

Music itself is a complex balancing act, interweaving its harmonic, melodic, dynamic, and rhythmic qualities, leading the listener through its ebbs and flows of development and change.

As such, we greatly appreciate the sonic descriptions set forth by both JE and JS regarding the Benz Ruby and its essential musical balance. An exaggerated phono cartridge is imprecise and colors the entire audio chain. Balance is the key in designing quality audio components and accurate music-playback systems, the music without end.


Why does the Ruby have such a low output? For an ironless moving-coil, it has relatively high output. Labor-intensive coil-winding techniques create its special low-mass generator, which, to quote JE’s description: “Sounds began, sustained, and stopped, as musical sounds do.”

Lukaschek has designed the new PP-1 phono preamplifier for the Ruby, and now we introduced the revised PP-1. New circuit layout and parts improvement result in increased focus and improved bass performance (to better balance its tonal sweetness and soundstage layering). The PP-1 revised retail for $1350; current PP-1 owners can make an appointment for a free upgrade at the Swiss factory. In addition to our PP-1 and the other units mentioned, many other phono stages and complete preamps will synergize with the Ruby.

Of course, Benz–Micro offers the largest selection of moving-coil cartridges and output levels. One can choose a low- (Reference, LO.4, Gold), medium- (MO.9, Glider), or high-output (H2O, Silver, MC20E II) moving-coil to optimally match with each of your preamp and system.

We applaud the numerous warnings regarding the importance of proper component matching (balance), which is critical in high-end audio system design. One must always factor the true cost of any component with one’s overall system plan or goal. That is why we recommend selecting a qualified dealer to work with in realizing your dream system (most people have to climb their way up the mountain to audio nirvana).

Does high price mean “setting new standards” or providing “spectacular” sound as opposed to balanced and musical performance? The Ruby is our most expensive cartridge because it is the most demanding to build. It is our “best” model because it comes closest to our concept of perfection: exact musical balance. We are not looking to “push the envelope” in just one parameter of performance, but in all directions.

JE and JS agree with DO, in his Benz Reference review of February 1993 (Vol.16 No.2), that Benz–Micro cartridges do not allow hi-fi artifacts or exaggerations to get in the way of the music.

“Believably life-like”, “breath, dynamic, and emotive”, “a blend of detail resolution and harmonic richness”, “subtle, nuanced, and expressive”, “powerful, fulsome, and hair-raising!”, “overall extension, clarity, and power of its bass”; “the reproduced stage was wide and deep, with layers in each direction.” Do these descriptions of the Benz Ruby balance against “a thoughtful combination of sonic compromises,” with “nothing about it that really grabbed me” on that note, we will lower our Ruby into the groove, relax, and enjoy the music.

Albert Lukaschek  Garth Leeper
Lukaschek Hi-Fi  Musical
Elektronik  Surroundings

Ken Erickson
Editor:

We at Nitty Gritty are sad to announce the
passing of Ken Erickson, co-founder and co-designer of Nitty Gritty Record Care Products. Ken, loved and respected by those who knew him, was an asset to the audio industry and will be deeply missed by all. Nitty Gritty will continue Ken's work, with quality production and customer service our #1 objectives.

In loving memory...

Gayle J. Van Syckle
President, Nitty Gritty

Accuphase T-109

Editor:
We would like to thank Mr. Steven Stone and Stereophile for the thoughtful words and wonderful review of the Accuphase T-109 FM tuner [November '94, Vol.17 No.11, p.192]. First of all, we would like to point out a correction to the heading used in the headline title, which notes the T-109 as an "AM/FM tuner." Please note that the T-109 is an FM tuner. This may be a small point, but an important matter for readers who may be interested in an AM tuning section. However, this point may be moot, since our readers of good sense may have noticed that nothing was mentioned about an AM tuner section. Despite all this by way of confusion, it does not mar the wonderful comments about the tuner in the review.

Mr. Stone's comments about the sound and soundstaging characteristics delighted us, as this was one of our primary design goals. Unlike many other tuners, whose main function is just to receive a signal, our T-109's most important task is to reproduce high-fidelity sound. The T-109's design is based on advanced RF and demodulation techniques such as computer-controlled PIN attenuator, multi-tuned RF section, and Advanced Differential Gain Linear Circuit. Our many long years as a manufacturer of analog amplifiers also played a critical role in developing this great-sounding FM tuner.

Since the FM tuner is one of the music sources in an audiophile's system, along with the CD player and phono cartridge, its main concern and priority is musicality. Understanding this, the FM program must be an important music source. However, it is a pity that most FM stations transmit nasty sound. It is also a fact that most people do not care how nasty or how musical the sound is because nobody really knows or can recognize what is good and what is bad. In light of these circumstances, we have a high opinion of your position when it comes to critical listening to the FM signal from the viewpoint that it begins with the FM station and is further enhanced through the FM tuner. True, as stated in the review, we can enjoy good FM programs if we have a high-quality FM tuner. In other words, once we know that we can receive a high-quality FM program, the FM stations cannot deceive us anymore with poor-quality FM programs. As a matter of fact, Mr. Stone's program sources which allow a more critical test of FM tuners is greatly encouraged, since our ideal is to present the listener the direct access to the studio and live hall.

Again, thanks to Steven Stone for the wonderful review.

Masumi Dehara
President, Accuphase Laboratory, Japan

CAT SLI Signature

Editor:
I'm happy to see that Russ Novak's first professional review was about a preamplifier (the Sonic Frontiers SFL-2 line stage, November 1994), particularly because I share his view that "The brains and heart of any system is the preamplifier." I'm pleased that RN found the CAT SLI Signature to be the "no contest" winner for "palpable presence," with "a clear advantage in dimensionality and sweetness," and that "depth extended from the speakers to forever." (Can I use the last one in my ads?) Unfortunately, the rest of the description contains a couple of errors.

RN observed that the SLI appeared to reduce or even eliminate noise in the source CD. Would that this were true! The SLI would be the world's only perfectly quiet preamp. Unfortunately, no preamplifier, whether low-priced or high, eradicates noise.

The problem here is that RN has fallen for one of the most common "perceptual crossovers": that between loudness and dynamics. The SLI is so dynamic that people tend to play it at lower, more realistic levels. Conversely, when dynamics are compressed, we turn the volume up to compensate for the loss of impact. When adjusting comparable volumes whether by ear or by meter, it is essential to use a non-dynamic, non-music signal such as noise or a test tone. If RN had adjusted the CAT's volume upward so that the noise on the CD measured the same as the other preamps, and hence was equally audible, the ensuing music would have seemed much louder than with the compressed preamps. Use of an SPL meter, however, would have revealed it to be the same. It is Stereophile's policy that reviewers adjust volume levels by measurement. RN obviously did not.

RN also writes that the Jads JPL has more extended treble and is more transparent than the CAT, in contradiction to Jonathan Scull's (Sept. 1994) comparison of the CAT to the Jadis JP 80 (which has a better line stage than the line-only JPL). Further on, he writes that the Melos 333 has even more treble than the JPL, and hence the CAT, contradicting Jack English's review of the Melos 333 in the same issue.

I'm sure that this problem is due to one or both of the following: First, the tubes are either past their prime, or have been replaced by some of the "romantic" tubes preferred by some tube-lovers. Second, perhaps RN used his Clear Image Audio T4 Power Line Isolator on the CAT. Our owner's manual clearly warns against this. I would say RN, or the owner of the CAT, didn't give us a call to find out what the problem was. Perhaps the CAT sounded so good it didn't occur to him that it might be performing below par.

Had RN corrected the above two problems and equalized volumes between preamps, he would have found the CAT to be neither as soft as the Jadis or Melos, nor as bright as the SFL-2 or the ARC LS5, despite its being, at 600kHz bandwidth, the fastest of the five. It also would have been much more transparent and dynamic, with even greater "palpable presence."

But would RN find the properly functioning CAT to be to his liking? He gives us the answer in his comments on the Melos 333 in the same issue. RN describes his speaker as "dark" and states, "any combination of components that lightens the overall sound appeared to be letting more information through." (This is a good example of yet another common "perceptual crossover": between brightness and apparent detail.) Obviously, on RN's scorecard, the brightest preamp wins. Hopefully RN curtails his "brighter is better" philosophy at some point, or soon he'll be using a Japanese receiver.

Perhaps the most disturbing idea put forth by RN is on p. 153, column 2, where he suggests that one should choose a preamplifier to complement the weakness of the speaker. Obviously, when RN decides to upgrade to a better speaker, he'll have to buy a better preamp at the same time! Imagine if one's entire system were compromised in this way. Upgrading would become nearly impossible, both financially and logistically. Wise audio-

---

Straight Talk....

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Stereophile, January 1995

World Radio History
Who Should Remaster Classic Jazz Albums?

Analogue Productions offers Audiophiles a Choice:

Analogue Productions president Chad Kassem has released gold CD reissues of two fifties jazz classics: "Snoopy Rolfs and His Pepper Out West" and "Art Pepper Meets The Rhythm Section." In a move unprecedented in the history of the recording industry, the audiophile-oriented company has simultaneously released masters versions made from the original tapes by two of the world's most respected engineers: Doug Sax of The Mastering Lab and Bernie Grundman Mastering.

Why both Sax and Grundman versions of the same Contemporary Records classic?

Kassem explained that while Doug Sax had mastered the 180 gram vinyl, pure analogue versions of both the Rolfs and Pepper albums as well as all of the other highly-acclaimed reissues in the Analogue Productions catalogue, John Koenig, son of Contemporary Records founder Lester Koenig, who had run Contemporary himself for nearly a decade, interceded on behalf of his friend and colleague, Bernie Grundman, who began his career at Contemporary, simultaneously having been referred to the elder Koenig by the legendary Contemporary engineer Roy DuNann.

John Koenig, a record producer himself—as well as an attorney and cellist—told Kassem that "Art Pepper Meets The Rhythm Section" was one of Grundman's all-time favorite records, and that he was disappointed at not being given the opportunity to remaster the LP reissue of an album he knew intimately, both as a mastering engineer and as a fan.

Kassem, a perfectionist, was faced with difficult choices. Should he risk insulting Sax by giving the job to Grundman? Should he play it safe and let Sax do it, thereby missing an opportunity to hear what Grundman, a veteran of Contemporary studios, could do with the transfer? Or, should he let them both do it and release the better-sounding one?

Kassem's solution: a friendly competition. Release two versions of each recording, one mastered by Sax, the other by Grundman, both under the supervision of John Koenig. Dozens of analogue to digital converters, painstaking EQ decisions and various echo devices and chambers later (DuNann designed the Contemporary recording and mastering facilities so that the original two-track tapes were recorded "dry," so that reverb and other minimal processing could be added, if needed, in the mastering process—which makes a faithful remastering job thirty-five years after the original recordings were made that much more difficult), both versions of the two records are being released on gold CDs pressed in Japan by Superior.

Whose mastering job does Kassem favor? He's not saying, preferring to let audiophiles and jazz lovers make up their own minds.

Art Pepper: Meets The Rhythm Section (Doug Sax—CAPJS 010) or (Bernie Grundman—CAPJG 010), Snoopy Rolfs: Way Out West (Doug Sax—CAPJS 008) or (Bernie Grundman—CAPJG 008) $30

Plus, many other Jazz Classics—call for titles.

RDL MINI-REFERENCE

Editor: Kristen Weitz's first comments on RDL's Mini-Reference speakers ("Getting Real," November 1994, Vol.17 No.11) were: "For $173/pair, I'd recommend them to a Real Worlder in a heartbeat."

Ms. Weitz said that she liked her music loud and her bass deep, and so she was even more impressed with an NHT three-piece system that includes a powered subwoofer—a system that costs more than five times the price of the Mini-References. She then combined the Mini-References and the NHT subwoofer, with predictable results. There was a big lump in the upper bass, created by neither the RDL speakers nor the NHT subwoofer, but by the considerable overlap in low-end response between these incompatible speakers; the Mini-Reference's bass extends to 55Hz, much lower than the bass of the NHT satellites. Ms. Weitz described the bass of this mismatched system as "real thick and muddy"—an accurate description, we think, of a system whose upper subwoofer response extends well into the low end of the full-range speakers.

Sam Tellig (May 1994, Vol.17 No.5) said the Mini-References sound "more like a
good pair of small British $1000–$1500 speakers," but he wasn’t comparing the bass of the Mini-References to that of subwoofers. RDL has completed development of a subwoofer specially designed for the Mini-References, whose response extends deep into the lowest musical octave. It will be available soon both as an add-on and as part of a three-piece system. The price will be similar to that of a pair of Mini-References, which makes the price of the total system well under half that of competitive three-piece combinations.

ROY ALLISON
RDL Acoustics

TUBES BY DESIGN KT88
Editor:
Tubes By Design joins Sam Tellig in his “most enthusiastic thumbs up” for the new version of the Golden Dragon KT88. This tube, available since July 1994, is winning the hearts and minds of many audiophiles for its close faithfulness to the original Gold Lion tube in sound and reliability. While it’s fair to say that the “King of the Valves” is truly back, it is already being challenged by new developments from the same stable. Golden Dragon engineers have combined the mechanics of the rugged Telefunken EL156 with the electrical parameters of the KT88 to produce a superb new version of the KT90. This robust behemoth is currently undergoing torture testing in our facility, and should be available by the time this reaches print.

The Golden Dragon KT90 will also be available with titanium anodes as the KT90-LX. The Telefunken EL156 mechanics are also the basis for a completely new KT66 Super, which will be of interest to users of the KT66, the 6L6 family, and the 5881.

Tentative prices for matched pairs are:
KT90, $142; KT90 LX, $164; KT66 Super, $142.

As the North American importer for Golden Dragon, we thank the audiophile community for its support and comments in the continual development and manufacture of ever better audio tubes.

KEVIN M. HAYES
Tubes By Design/VAC

VAN DEN HUL CABLES & CARTRIDGES
Editor:
For more information about van den Hul cables and cartridges, as described in “Dutch Master,” Tom Norton’s interview with A.J. van den Hul in the November ‘94 Stereophile, contact Vanguard Distributing, P.O. Box 231003, Encinitas, CA 92023. The phone number is (619) 436-3051.

JOYCE FLEMING
Vanguard Distributing

GENESIS II.5
Editor:
Paul and I almost blushed after reading Bob’s wonderful review. We believe that we succeeded in what we set out to do—really make you almost believe you have been transported to the concert hall. Thank you again, Bob; we truly appreciate your dedication and subsequent enjoyment of our Genesis II.5 product.

ARNIE NUDELL & PAUL McGOWAN
Genesis Technologies

EPOS ES 14
Editor
I’m overwhelmed. I didn’t think any speaker could make sense out of Kraftwerk’s Electric Cafe. These ES 14s must be better than even I thought. I’m happy that John thinks so highly of the speakers. I do disagree with his observation that the speaker would have an exaggerated sound when used with high output-impedance tube amplifiers. Some of the best-sounding ES 14 setups I’ve heard used tube amps. Just a couple of things I would like to clarify about the ES 14s: They come with a foam grille for those who must have one, and they’re available (at the same price) in a beautiful mahogany finish. Chocolate ice cream, indeed!

ROY HALL
Music Hall

P.S. Robin Marshall now works for (can you believe it?) Mission!

HARBETH BBC LS5/12A
Editor:
I truly appreciate the ability to respond to
Hook up your speakers with telephone wire?

Would you hook up your high end speakers with telephone wire?....Of course, you wouldn't! Then why attempt purchasing a quality system over the phone? It's just as ridiculous! And, any salesperson who tries to design a system, or claims that they can improve your present system over the phone, is not really looking out for anyone's best interest but their own....they're basically just taking a guess!! That's right! A Guess! Do you want to play a guessing game while someone is taking your money? Well, that's exactly what's happening when you decide to shop for high-end equipment over the phone.

There are so many factors and variables to consider, that only by person to person, one on one service, can a truly effective system be designed or improved.

At CSA Audio we've always taken that extra step in providing the necessary time and service to ensure your dollars aren't being thrown away. We don't play any guessing games. We let your ears be the judge every day in our demo rooms or yours. We do not recommend or encourage consultation over the phone! Why?.......

...Because we know what a true disservice this can really be! So make an appointment today and leave the guessing games in Las Vegas where they belong!

JA’s review in the same issue as it appears, even given the time restraints imposed. I received the faxed review on Monday, November 28 at 1pm PST, and was requested to respond by noon the following day. This whole matter is further complicated by Alan Shaw of Harbeth Acoustics being on tour in the Far East, where the Harbeth Compact 7 has just been named Component of the Year. Alan had the review faxed from England to Malaysia and has communicated some preliminary thoughts. Upon Alan’s return to England, we may wish to send additional comments.

Harbeth does offer a range of nine real-wood veneers (five of which are regularly available in the US), and, of course, other products (including the aforementioned Compact 7).

JA really likes the “simply stunning midrange” and “astonishing amount of sound” from the LSS/12, no doubt a contribution of the mid/bass driver. This unit’s 2.4k peak, as described by JA, is an intrinsic quality of the Dynaudio woofer speced. The prototype LSS/12A was introduced in September 1993, and, at Harbeth’s insistence, a complete redesign was implemented to improve performance at the top end of the bass unit. We believe that this has now reduced this drive-unit characteristic to an inaudible level. Obviously, the perfect driver does not yet exist; however, Harbeth is at the forefront of this quest, as evidenced by our Radial™ driver in our new Compact 7.

The crossover network is, in point, complicated because of the conjugate load matching, which flattens out the normally rising impedance in the mid frequencies. All network components are individually tested and measured before assembly. Regarding the BBC’s “Golden Ears”—the intention was to mimic the sound of bigger BBC loudspeaker models that are the de facto standard in the BBC. This was the primary judgment for the final balance. JA describes at great length his listening room and measurement techniques, but fails to talk much about his positioning of the LSS/12A in his room. He appears to have used only one set of components and cabling (see the Wilson X-1 review in December 1994). In my experience, and typical of a very-high-resolution design, the LSS/12A is extremely sensitive to system matching, speaker—stand height and coupling technique, and room placement. Harbeth’s own brochure specifies that the LSS/12A is optimized for use in free space at least 1m from room boundaries.

When I sent the speakers to Stereophile, I inquired about the associated equipment to be used, emphasizing to JA my experience with the S/12A with different amplifiers and cables. I offered to send the pair of 28” Sound Anchor stands custom-made for the S/12A. I was quickly assured that everything was under control.

The review states that JA used 24” lead-shot-filled Celestion 24” stands with the LSS/12A, interfaced with small pads of...
Blu-Tack. In my experience, a stand height of 24” is too low (except in the case of a very low listener position), and results in a brighter tonal balance. With the tweeter slightly higher than ear level, there is an added richness to the upper-mid/lower-treble region, and increased soundstage palpability. My findings with speaker coupling also reveal that Blu-Tack tends to over-fatten the speaker’s bottom end. To date, my preferred method of interfacing the LS5/12A to most metal stands are three of the SimplyPhysics small Delrin Tonecones, point up to the speaker. My preferred positioning of the LS5/12A is to spread the speakers rather far apart with the toe-in angle placing the drivers on-axis with the listener. This greatly opens up the soundstage with layers of information typically starting behind the speakers. If the spread gets too wide, one loses image palpability, and the speaker’s amazing disappearing act is somewhat compromised. I only wish I had had more opportunity to work with JA in these matters.

JA excepts Eric Braithwaite’s LS5/12A HFN/RR review, but fails to include that it is “markedly ‘bright’... compared to previous small luminaries such as Celestion’s SL700.” Braithwaite’s overall conclusion is that the LS5/12A is a “small but dynamic, superbly detailed and lively loudspeaker... Unequivocally, these monitors are worth every penny.” We may attribute this to preferring chocolate to tutti-frutti.

Harbeth, Musical Surroundings, our dealer network, and satisfied customers thank Stereophile for their continued endorsement of the LS5/12A (“Editor’s Choice” in 1994) and our HL P3. We urge all music-lovers to seek out an audition of the Harbeth BBC LS5/12A, as well as all of our models, and decide for themselves.

GARTH LEERER
Musical Surroundings

AUDIO SCULPTURE & MATIÈRE

Editor:
In Markus Sauer’s report from the Frankfurt High-End Show (December ’94, pp.56–57), he mentioned the French Audio Sculpture amplifiers designed by Jean-Jacques van Leeuwen. Audio Sculpture is imported and distributed in North America solely by Marigo Audio Lab. With Jean-Jacques’ agreement, I changed the [brand name] to the name of his manufacturing facility—Audio Matière. Stereophile will probably receive some calls about this equipment. I would appreciate it if you could pass out our phone number: (708) 674-1265.

RON HEDRICH
Marigo Audio Lab
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Way back in 1978, PS Audio announced the industry with the first true solid state outboard DAC converter. The new PS Digital Link Generation III breaks new ground with true 18-bit architecture Analog Devices DAC, Burr Brown LPF, extensive jitter reduction, pure Class A buffered output stage, & remarkable sound for the price. PS Audio Digital Link with Ticolor Tested, $205/600 inputs, plus FREE S&H USA digital cable, only $995.00.

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WorldRadioHistory
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WorldRadioHistory

Stereophile, January 1995
T H E  F I N A L  W O R D

P atience—I always feel I have too little. Like waiting for the Stereophile Guide to Home Theater, which is finally at your local dealer (see "Where to Buy Stereophile"). We worked 30 weeks on that one 216-page issue, and I sometimes thought it would never get off to the printer. Well, it finally did, and now I’m impatient for the second issue to come out—even though it’s nine months off. (Scheduled release date: first week of September 1995)

Sometimes, I’m almost ashamed to say, I also get impatient with our readers. When I saw Mark Huff’s letter in the December issue (p. 28), I almost burst at the seams: “I challenge the reviewers of Stereophile to participate in...a rigorous blind...test...levels must be adjusted to within 0.1 dB of each other...” This guy just doesn’t get it, despite apparently having read Stereophile for quite some time.

For the umpteenth time: We do not do blind testing as our main reviewing methodology because for us they don’t work. They’re a pain in the ass to carry out, and the results are almost always confusing. Because you have to put every speaker in the same room location, for instance, almost none of the speakers are optimized for room location. This makes a major difference to any speaker, and no self-respecting Stereophile reader or reviewer would fail to optimize room placement. Where does that leave the results of the blind test? In need of the same kind of sighted, optimally adjusted review we normally do, which is why we insist on publishing these along with our blind speaker evaluations.

We do publish reviews on more products than anyone else, and we do put out more editorial pages than anyone else, and we do work our butts off already. But should we hire twice the staff, just so all our useful reviews could be accompanied by less-useful blind tests?

I can absolutely see why Mr. Huff would like blind evaluations of all the equipment we review. But we don’t do it. He should just go out and buy a magazine which does. But he can’t. With the exception of a few recent issues of Stereo Review, none of the so-called “objective” magazines do blind testing. I bet they don’t like conducting blind tests any more than we do, and probably wouldn’t find that they’d given their readers much information if they did.

My impatience comes from Mr. Huff’s insistence that we be something we’re not, nor want to be. We don’t claim to be scientists—though, in fact, the engineering backgrounds of our Editor and many of our writers are superior to those of their critics. We write carefully carried-out, well-documented anecdotal reviews, with almost every variable controlled. We are following in the footsteps of Stereophile’s founder J. Gordon Holt, who pioneered the meaningful review of hi-fi equipment in the most obvious way: He listened to it, and wrote up his observations. We do the same. I’ve always thought that any reader should assess our conclusions by listening to the same equipment we review. Then he or she will know how much credibility to accord us. If none, stop reading. If some, keep reading.

I’m even more impatient with people who talk about the demise of the High End. This includes our own Jack English, whose “R.I.P. High-End Audio” was published in January ’94 (Vol. 17 No. 1). The theme is once again sounded by Robert Grost of Unity Audio in this month’s “Letters.”

Folks, it just ain’t so. Every audio manufacturer I’ve talked to lately is busting his/her/its butt just to keep up with all the business. US retailers are even optimistic—and that never happens. Some of the business is in this country, whose market is stronger than it’s been in years; some of it’s overseas, where the ups and downs have more or less balanced themselves out. But the business is there.

High-end audio is not going away. It’s all Home Theater, you say? People buying great sound exclusively for music meets your definition of high-end, but people buying great sound for both film and cinema doesn’t! Well, excuse me! That kind of idiotic nipping could lead the public to believe that the High End is demoted, but people out there buying great equipment couldn’t care less. So, please—the High End is thriving. Don’t say it isn’t. (As our new Senate Majority Leader would say, “Stop lying about my record”;) from the 1988 Republican Presidential primaries.)

From the tone so far, you might think I’m unhappy. Nothing could be further from the truth. I’m just impatient waiting for the truth to be revealed, the revealed truths to be exposed, the marketing strengths of high-end to shift into overdrive—or even fourth gear—and for all great things to happen.

I’m hoping that as many great things happened to you this year as happened to us at Stereophile. This has been our busiest and best year ever. Although our size change caused some controversial comment early on, by now it feels like this size is the only one we’ve ever had. It’s much more attractive to read, which also makes it easier to read. Thanks to the economic strength of high-end, we’ve had by far our best year of advertising sales (and sales increases), and, more importantly, we’re reaching more of you than ever before—more than 70,000 for 1995.

It may have taken 30 weeks, but the Guide to Home Theater is out, and I think it’s great. At first I thought of it as just a 13th issue of Stereophile, but it’s actually a whole new publication. It has its own Editor (Lawrence B. Johnson), its own identity, its own design, and its own readership. Our Los Angeles Hi-Fi Show in 1995 will be by far the best we’ve ever done—don’t miss it. Reserve a room early, because, at $90/night, they’re going fast. For the last three years we’ve also published the Schwann Record Guides—Schwann Opus, Schwann Spectrum, and Schwann Artist—and they’re finally breaking into the black, and the listings are now far more complete than ever. Get one of each—if you listen to music, that is.

All in all, Happy New Year! It’s gonna be one exciting ride!

Larry Andzulis

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