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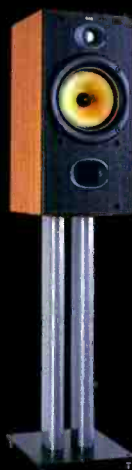
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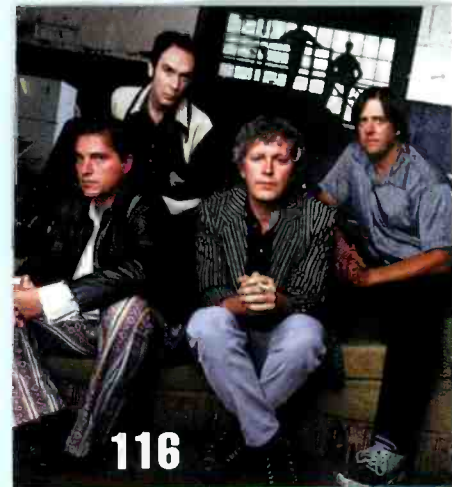
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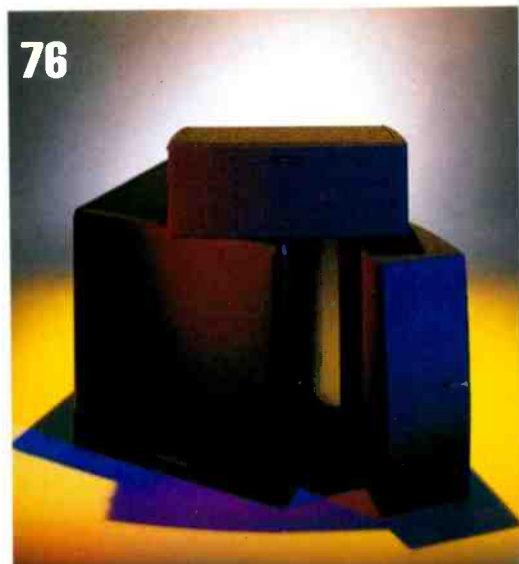
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Secrets of Home Theater, March 1999

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Home Theater Mag., May 1997

"The ultimate six-channel amplifier... this is as good as it gets."
Bound for Sound, June 1997

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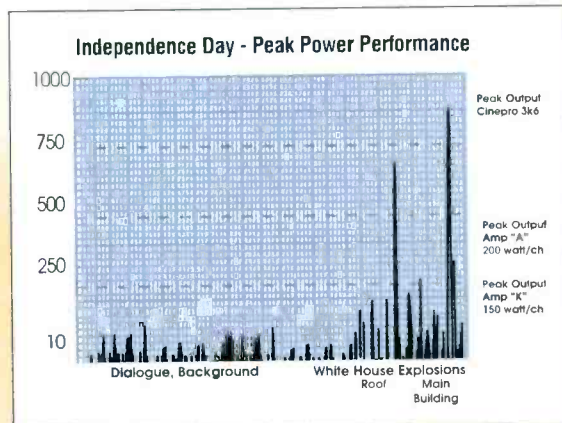
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ABOUT OUR CONTRIBUTORS

WILLIE GLUCKSTERN is the best-selling author of *The Wine Avenger*, a no-holds-barred wine guide for real people, published by Simon & Schuster. He is also the founder of Wines For Food, a New York City consumer wine school, and teaches "The Wine/Food Workshop" at Peter Kump's New York Cooking School. Gluckstern has written the wine lists for more than 200 Manhattan restaurants, and he is the purchasing director for Nancy's Wines, a New York City wine shop specializing in German wines. He is also a wine importer, the host of *The Wine Avenger* radio program on WMTR in New Jersey, and thinks Erich Wolfgang Korngold is one of the 20th century's greatest composers, no matter what you think. You can visit Gluckstern, curse him, praise him, or just talk back to him on his Web site: www.wineavenger.com.

DOUG NEWCOMB is executive editor of *Car Stereo Review*. He has written about audio for such publications as *Rolling Stone*, *Men's Journal*, and *Playboy*. Newcomb detoured into audio journalism from a background as a music reviewer, and he still gets out to hear live music (everything from Alternative to Zydeco) at every opportunity. He blames his lifelong obsession with music on having been born in the Mississippi Delta and raised in Louisiana's bayou country. Newcomb lives and works in L.A.'s Topanga Canyon and divides his time between his family, music, and surfing, though he admits that the surf usually dictates which one gets top priority.

PAUL TATARA comes to *Audio* from CNN.com, where he enjoys skewering the sad state of American movies as one of the site's regular film critics. Also a screenwriter, he is currently revising his original screenplay for the film *The Almost Perfect Game*, which Woody Harrelson is set to produce and star in for Paramount Pictures. Growing up in Arab, Alabama (pop. 6,800), Tatara became obsessed with rock and jazz, particularly the music of Bruce Springsteen, The Beatles, Bob Dylan, Randy Newman, Lou Reed, Miles Davis, and Thelonious Monk. Tatara is marrying the awe-inspiring Jill Hilycord on October 16th of this year. The couple has sent a wedding invitation to Mr. Bruce Springsteen. If The Boss can't attend, they will happily accept a very expensive blender.

JIM WILLCOX has spent the last 14 years covering the consumer electronics and computer industries for a variety of publications. Now the editorial director of Riffage.com, an MP3 music site, Willcox was most recently senior editor at *Twice*. As a freelancer, he has written for newspapers such as *The New York Times* and *The Philadelphia Inquirer* and for a variety of magazines, including *Audio Times*, *Consumer Electronics Monthly*, *Men's Journal*, *Popular Mechanics*, *Stereo Review*, *Unlimited*, and *Video*. When not listening to music or reviewing audio gear, he can usually be found ripping around town on his motorcycle or playing guitar—two hobbies he has not yet figured out how to safely and enjoyably combine.

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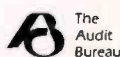
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Local Hero

I've just read Ed Foster's May review of Sony's DVP-S7700 DVD player and, on the whole, agree with it. It is an excellent DVD player and CD transport. However, its CD-R capability is as erratic as other DVD players'. That this happens with a dual-laser pickup does not make sense. I borrowed a demo unit of the DVP-S7700, and it played everything—including CD-Rs—perfectly. After looking around further, I bought one, and that unit didn't have trouble finding the table of contents, though it did exhibit dropouts and occasional lockups. The same CD-R discs played fine in other CD players.



Sony's customer-service department indicated that it did not promise CD-R support. Someone named Mark at SoundPro was kind enough to open another one up to try, and it

had similar dropouts but did not lock up in a short listening period. I ended up swapping him for the original demo, which continues to operate fine. This experience raises the question as to whether there was an in-line production change between early samples like your review piece, my demo, and current production units. It also demonstrates the need to have a dealer like SoundPro that will work with you to get it right.

*Les Auber
via e-mail*

The Real Deal

When I opened the June issue and saw Edward Foster's review of the SONY DVP-S7700 DVD player, I first dismissed it as another "me too" article singing the praises of Sony's latest product. However, the line "This is one DVD player that begs to be seriously listened to" caught my eye.

Had Foster truly answered the questions of an audiophile on a limited budget? Had enough of the technology Sony imbued in its CDP-XA7ES finally trickled down to a level affordable by mere mortals?

After diving into the text, I discovered that not only has the technology trickled

down, in at least one case—if I read Foster correctly—the DVP-S7700 actually outperformed the legendary CDP-XA7ES. Yessss! This is the kind of stuff I want to hear!

What I've been looking for is a player for around \$1,000 or less that will give me excellent audio now and will be able to play the new 24-bit/96-kHz discs. (The earlier DVP-S7000 didn't quite fill the bill.) The fact that it also is an excellent DVD player is a bonus. While I'm not quite ready to get into that arena now, I know it's in the near future.

None of the A/V reviewers were as concerned about the analog audio output as Foster. Only he took the time to compare it with an audiophile-grade piece of equipment. This makes me especially glad that I recently renewed my subscription to *Audio*.

*Frederick Hart
via e-mail*

Anamorphia

DVD reviewer Rad Bennett apparently is oblivious to the fact that a lot of DVDs, such as *My Fair Lady* and *West Side Story*, are made with the anamorphic enhancement that adds 33% more vertical resolution to the image than the regular wide-

screen or letterbox format. For TVs with anamorphic playback capabilities, it should be the option of choice. The visual gains can easily be seen even on regular TVs by simply setting the DVD player on the 16:9 option (with distortion of images and all); far more detail can be perceived.

Our current DVD playback machine with progressive-scan capabilities cannot take advantage of this enhancement because our multimedia LCD projector doesn't allow this option through the SVGA computer input, but we are able to through the video input by simply



selecting the "Wide" setting. We prefer progressive scan over an interlaced widescreen image even if it is anamorphically enhanced, but we will be looking for another projector that can allow progressive-scanned anamorphic playback for the ultimate in image quality. A projector with 16:9 panels will do.

So it continues to amaze us just how many reviewers don't seem to be aware of or to care about the extremely important anamorphic enhancement, let alone demand it from the movie studios.

*Frank Manrique
The Home Theater Society
via e-mail*

Power to the People

In Michael Riggs' May "Fast Fore-Word," he stated that the record companies are already working out ways of "locking up their property much more thoroughly than they could on CD." He was referring to the proposed encryption scheme for DVD-Audio. I predicted this would happen on one of my Web sites, "The Price of Privacy" (www.cdc.net/tubedude/privacy.html).

What's next? I'll tell you. DIVX-Audio. Pay-per-listen music discs. And guess what? It would be no trouble at all to have the players incorporate a modem to allow the record companies to keep tabs on your listening and charge your credit card every time you decide you want to hear that disc

AIR CARVER

Nine years ago, for my sixteenth birthday, instead of asking for a car like most teenagers, I begged for a Carver Magnetic Field amp. I want to thank *Audio* for the interview with Bob Carver (February). In a society that puts overpaid athletes on the hero pedestal, I am proud to say that growing up, Carver was always a hero in my book.

*Tom Werk
via e-mail*



again. Moreover, you would need a separate license for each player in your house. Your friend wants to borrow a disc or two? Fine. He'll just have to pay another licensing fee, that's all.

Even if the first-generation DVD-Audio players do not incorporate a modem, later ones could, and by simply waiting for all the older units to be replaced the record companies would gain a market full of unwilling "licensees" who did not know that when they bought those first audio DVDs that they would later have to pay to play them.

What we as consumers must remind the record companies of is that once we buy a recording it is *not* their property anymore. That's what the word "buy" means—to transfer ownership of property from one party to another, in consideration of value received. As long as you don't go into business for yourself by selling bootleg copies of the latest Madonna CD, you can make all the copies you want for your own use.

We are already hamstrung by DVD movies that we can't videotape for our own use because of copyguard signals (although there are ways around that), and the software industry has already fooled everyone into agreeing to "licenses" for the use of software that was purchased outright. DAT died as a consumer medium because of the RIAA's threat to sue any manufacturer who brought it to market in America as a consumer product. We do not need this kind of greed and privacy erosion from the record industry. The simplest way I can think of to remind the record company execs of their proper place is to refuse to buy encrypted music in any format.

I urge *Audio's* readers to boycott any new format that limits the ability to use the recorded media in any way the user sees fit. No copyguard, no encryption, no watermark, no pay-per-listen. Music is expensive enough, and neither the record companies nor the artists they represent are going hungry. Vote with your wallets folks, and we can stop this nonsense.

Scott Grammer
Chattanooga, Tenn.

Was It the Weed?

Thanks to Anthony Cordesman for reviewing the Pass Labs X600 amp (July/Au-

gust). While I'm not in the league of audio folks who can afford Nelson's creations, I nonetheless got a great deal of vicarious enjoyment from his review.

I first met Mr. Pass in Sacramento, Cal., at the embryonic Threshold shops on Tribute Road. It was 1976 or 1977, I believe. I worked in the offices next to the Threshold bay, and I kept hearing strange mechanical sounds all day. So I walked over and introduced myself to this guy who turned out to be Nelson Pass.

One thing led to another, and I ended up doing some casual listening tests to several "modified" Threshold amps that Nelson was playing around with. They had some



JBL 12-inch studio monitors (with the grilles off!) hooked up to a couple of off-the-shelf Stasis amps, and they sounded great. Then, the engineers pulled the Stasis amps out of the system and put in these "experimental" Nelson Pass amps. Maybe it was the beer or the weed or just the time in my life, but it was a virtual epiphany for me. The same music, the same front end, the same speakers, but a beautiful, devastating emotional experience. You are never the same after that. Those Nelson Pass amps, even in 1977, were truly astounding. So I can appreciate when Cordesman writes about falling in love with these amps. I did 20 years ago, and I will always remember the experience.

John F. Paxton
via e-mail

MP3: Not Bad

Corey Greenberg is quick to claim that while MP3 is fun, it is neither fast nor of sufficient quality to rival CDs ("MP3—What Does It *Really* Sound Like?" June). I feel obliged to remind him of the old "garbage in/garbage out" standard all good engineers (be they digital or analog) must abide by.

While I am not familiar with the MP3 encoders or players that Greenberg reviews, I have tinkered extensively with numerous

others and have discovered that there is a tremendous difference in quality between them.

My system uses a 333-MHz PII, with 128 megabytes of RAM, and a Creative Labs Encore EIDE 2x DVD-ROM drive. For encoding MP3s, I use Xing's reworking of the venerable Audiograbber program, called AudioCatalyst (Version 1.5). This remarkable little program eliminates the need for making .WAV files prior to the actual MP3 coding, shortening up the transfer process tremendously. I can convert an entire 74-minute CD to 128-bit/44.1-kHz MP3 files (replete with artist, track title and time, and recording date information via AudioCatalyst's way-cool CD Data Base search engine that scours the Internet for TOC data that matches the serial number of the CD) in less than a fraction of the time Greenberg says it takes him.

For playback, I use the continually updated Winamp, which contains its own EQ. All of this is then piped out through an incredibly cheap Ensoniq PCI 16-bit audio card to my old, trusty Onkyo Grand Integra preamp and matching amp, and then on to my loudspeakers.

The end result? Sound far closer to the original CD's than you would imagine. Not perfect, but in many cases extremely close. And I record a lot of classical music, as well as heavy metal and New Age.

I would also suggest that Greenberg try using any one of the many MP3 codecs that are available free on the Internet in place of the one that most likely came pre-installed in the encoder program he employs. They are no more the same than the multitude of A/D and D/A converters in the zillions of CD players, preamplifiers, and what-have-you.

So MP3, while certainly not as convenient as one might wish for, is certainly a viable audio format. Not a long shot at all, as evidenced by the legions of MP3 fans worldwide, not all of whom are young music lovers. I was raised in classical concert halls and hard-rock venues, and I think I know what constitutes an accurate (or nearly so) reproduction of a musical performance.

Rolf Hawkins
via e-mail

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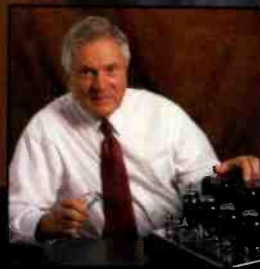
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ing feeding frenzy, as glowing proof that the Golden Age of the Tube is here, just as its father retires. And what a statement it makes: exacting attention to details never collected in one unit before. Ceramic tube sockets. Special long-life capacitors. Gold-finished chassis. Hand-selected KT88 tubes, "kid gloves", tools and polish arrive in a special presentation box. An engraved plaque bears the designer's name, and a certificate authenticates production number and total production run. Performance? As Rolls-Royce used to say, "adequate" for any reasonable demand. You would expect nothing less from this — the MC2000 — the Monumental McIntosh.



Double Capstan Trouble

Q My three-head cassette deck wouldn't calibrate tapes properly and was creasing them as well, so I had it serviced. The repair center replaced both pinch rollers (the old ones were returned, but they still looked new). Now the tapes sound dull, as if the high frequencies were rolled off. The parts cost only a few dollars, but the labor was more than \$50. Did I get ripped off?—S. L., Houston, Tex.

A The labor charge was justified—almost. Here's the problem: Decks that use dual capstans and pinch rollers tend to have better wow and flutter specs than single-capstan decks. But when they malfunction, they wreck tapes, as you now know.

The main reason dual-capstan decks fail after many hours of operation is that the pinch rollers tend to become glazed and slightly tapered. Consequently, they no longer pay out tape evenly because the tape path is skewed. When the skewing is excessive, tapes wrinkle. Those old pinch rollers may look fine, but what you won't see, along with the aforementioned glaze, is their slight taper. And it's just enough to squeeze the tape out of its path.

Replacing the rubber pinch rollers is an important first step. It usually takes some tricky adjustments of the rollers' positions so the tape once again runs true, but what tends to happen after the repair is that the tape path is no longer in perpendicular alignment with the heads. Tapes newly recorded on the deck will sound great, of course. But older tapes recorded before the repair will lack highs. The heads must be realigned; moreover, the head guides may also force some perturbations in the tape path, which may cause severe skewing and subsequent wrinkling of the tapes. Again, the pressure rollers' positions must be readjusted and then the head alignment reset. This rather tedious process must continue until the tapes sound right and the tape path is correct. (Incidentally, the thinner the tapes, the greater their chance of wrinkling.) I really hate repairing these cassette decks, but it is possible to get them working correctly.

You shouldn't attempt this repair yourself unless you're familiar with dual-capstan transports and have a factory service manual at hand.

Repairing Damaged CD-Rs

Q I have two irreplaceable CD-Rs that have developed cracks extending from their center holes almost to the matrix numbers. Would a tiny amount of Crazy Glue brushed into the cracks with a pinhead keep them from spreading? Or would the circular, foil-backed, archival CD labels make a better fix? (These adhesive labels are not recommended for long-term storage.) Is there any danger of adhesive penetrating the foil layer?—David Andrews, Pittsburgh, Pa.

A I think Crazy Glue would suffice so long as the cracks you plan to fill don't extend into the recorded area of the discs. You probably should heed the warnings about not using adhesive labels over the long term; adhesives can become gummy or run after long periods.

Instead of worrying about the cracks, why don't you just copy the defective discs to new CD-R blanks? If you made these discs in the first place, you likely have the necessary software to make clones of them. Making such copies is no different from copying from one conventional disc drive to another. Once you've copied the damaged CD-Rs, you can try repairing them, knowing that if the repair fails you have a working copy to fall back on.

Using Digital Y Connectors

Q I have a single-disc CD player, a carousel changer (both with coaxial digital outputs), a DVD player with Toslink and coaxial digital jacks—and a dearth of digital inputs. Will Y connectors work as well for digital signals as they do for analog signals?—Eduardo A. Benet, Key Biscayne, Fla.

A Though I admit I've never tried it, my best guess is that a Y adaptor of coaxial cable will feed the signal from a single coaxial digital output into two input circuits. (I doubt you could

do this with fiber optics; in fact, I've never seen an optical Y adaptor.) However, I think you should avoid having two digital (coaxial) outputs feed a single digital input circuit. I suspect this would load down both output circuits. And don't even think of having both digital outputs feeding digital information to a single input at one time!

Subwoofer Considerations

Q Although my main speakers are specified (on paper) to have a frequency response of 43 Hz to 23 kHz, when I listen to them, they seem to lack bass. Will a subwoofer add more bass, especially the rumbles on sci-fi movie soundtracks? Should I get one that has the deepest conceivable response or one that just produces deeper bass than my main speakers? Will a sub really make my system sound better? Will the use of a subwoofer affect sound localization, especially with sounds moving across the stage?—Michael Mild, Evansdale, Iowa

A Yes, a subwoofer should improve the overall bass response of your system. When selected properly, it can extend the bass response considerably—as much as an octave or more below that of your main speakers. And if you regard deep bass, as I do, as supplying the very foundation of music, supporting the broader spectrum of musical (and non-musical) sounds, then of course your system will sound better.

Certainly there are subwoofers that produce bass no lower than that of your present speakers. They may have greater output, but you won't get those floor-shaking rumbles you seek. So when selecting a subwoofer, be sure that its bass response extends as far down as possible—obviously deeper than 43 Hz. Unless you're a fanatic for the large orchestral bass drum (some of

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its frequency components are at 17 Hz) or the comparatively rare 16-Hz organ pedal tone, aim for 25 Hz. A sub with genuine, in-room response that's essentially flat to 25 Hz will reproduce the low-frequency rumbles and effects of 99% of movie soundtracks. And it won't break the bank—there are plenty of powered subs capable of such performance that are priced well below \$1,000, even a few for \$500 or less.

Next, you have to select the transition, or crossover, frequency between your main speakers and that of the subwoofer. It must fall comfortably somewhere in the upper range of the subwoofer and the lower range of the satellites. About 60 or 80 Hz is a good starting point. Most subwoofers should be able to work that high, and your satellites should be reasonably flat to 60 Hz.

The subwoofer will have virtually no effect on the localization of sound so long as the crossover frequency is below 100 Hz. Deep bass tends to be nondirectional in character compared to the directionality of higher frequencies. That's why you can place the subwoofer virtually any-

where in a room without its distorting the soundstage.

Fixing Boomy Bass

Q *When I use my main speakers and powered sub in my rectangular listening room (roughly 15 x 12 feet, with an 8-foot ceiling), I have a terrible problem with bass response. I can hear a 40-Hz signal at the side walls but not in the sweet spot, and a 60-Hz signal in the sweet spot but not at the side walls. Is there anything I can do to create smoother bass response without adding more subs or tearing down the walls? When I heard my speakers in the showroom, they had wonderful bass.—Karl Franzen, via e-mail*

A What you describe is a chronic listening-room problem provoked by room resonances, or standing waves. These cause wildly uneven distribution of bass energy, yielding boomy bass in some locations (often nearest the side walls and at the far ends of the room) and inaudible bass at other spots—typically at several points near the middle of the room. Any room with opposing walls is sus-

ceptible to standing waves, and the frequencies at which they develop are determined by the room's dimensions and the wavelengths of various sounds.

The least problematic and most cost-effective solution to smoothing out the bass is to place the powered sub in one corner. The sub will energize the maximum number of room modes and should significantly even out the bass response. It won't be ideal in all locations, but it will be as smooth as you are likely to achieve using one subwoofer. Experiment and try different corners of the room; one may yield better response, depending on the location of your listening seat. To ease the task of placing the sub, try this trick suggested by Dolby Labs: Put the subwoofer in your usual listening position, where the chair is, and, as you listen to a variety of music with deep bass, walk around the room to different locations. The spot where the bass response is smoothest is where you should then relocate the subwoofer.

For more detail on subwoofer placement, see Tom Nousaine's articles, "Birth of the Boom" (June 1998) and "Placing the Bass:

INTRODUCING DIGITAL WITH A DIFFERENCE.



Two Subs in a Corner Beats Five in the Round" (June 1996).

Converting a CD to an LP

Q Do any studios still cut 12-inch, 33 $\frac{1}{3}$ -rpm acetates? I want to have a CD transferred to an LP so I can hear it (I don't own a CD player).—Darwin Maurer, Perkasio, Penn.

A Because LPs are still manufactured, I am certain you will find a studio that can cut an acetate disc for you. However, the work will be expensive—a single disc may cost \$40 or more. Look in the yellow pages under "Recording Studios" and check out those that advertise disc mastering. Try searching the Internet as well.

A freshly cut acetate rivals Compact Disc in its signal-to-noise, but after a few plays, the noise will increase as the disc deteriorates.

If the CD is full-length, it may be difficult to accommodate on an LP. Much depends on the dynamic range of the CD and on how much bass is present. In addition, the

amount of difference signal, or stereo information, can create problems for the technician doing the work.

Obviously, it won't take many cutting sessions to equal the cost of a CD player. Indeed, nowadays portable players sell for as little as \$40. And a CD will maintain its audio quality for thousands of plays—many more than you are likely to give it. In fact, CD players are so common that perhaps a friend would let you play your disc on his system.

Subwoofer Connection Problems

Q Although I am reasonably content with my front speakers, I'd like to add a powered subwoofer to reinforce the low bass. My A/V receiver, however, lacks a subwoofer output, but it does have two tape loops. Can I connect the subwoofer's line inputs to the extra tape loop? If not, what options do I have?—Anthony Virone, Middle Village, N.Y.

A You can't connect the powered subwoofer to the extra tape-monitor loop because the loop is

ahead of the volume control. Thus there is no way for you to adjust the subwoofer volume in sync with the volume of the other speakers. Does your receiver have a pre-amp-out/main-in loop serving the front channels? If so, use this loop to connect your powered subwoofer. If not, be certain you shop for powered subwoofers that have "speaker-level" inputs and outputs; then you can connect your A/V receiver's speaker outputs to the sub's inputs in parallel with your main speakers.

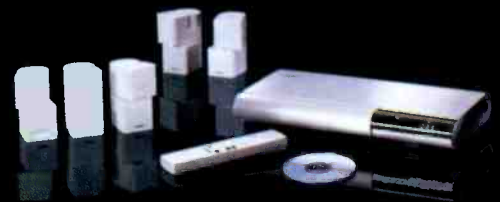
You'll also need to adjust the subwoofer's crossover settings to achieve a smooth blend of the sub's deep bass with upper bass, midrange, and highs from your main speakers. Consult the subwoofer owner's manual for recommended crossover frequencies, but you could begin by using 80 Hz as a low-pass setting. In any case, the idea is to obtain a seamless transition from your main speakers to the subwoofer with no blatant deviations or holes in the bass response.

You also might want to check with the maker of your present speakers to see if he offers a matching subwoofer. **A**

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Sony Super Audio CD Player

The Super Audio CD (SACD), based on Sony's Direct Stream Digital (DSD) recording technology, has arrived, and with it Sony's SCD-1 Super Audio disc player. DSD uses a 2.8-MHz sampling rate and 1-bit data and is said by Sony to be capable of higher performance than PCM. Telarc, Sony Music, Delos, Water Lily Acoustics, and dmp have SACDs in a hybrid, dual-layer format; one layer is compatible with existing CD players, while the other is playable only on SACD players.

Price: \$5,000. (Sony, 201/930-1000)



Mitsubishi DVD Player

Equipped with a 10-bit/27-MHz digital video processor and 24-bit/96-kHz audio processing, the DD-4000 also detects and passes a DTS or Dolby Digital 5.1-channel bit stream from its coaxial digital output jack. There are S-video, composite, and component video outputs, an enhanced black-level adjustment, search modes by chapter or time, digital forward and reverse scan, three slow-motion speeds, still-frame and frame-advance modes, A-B repeat and random playback modes, and a 10-key direct-access remote control with a zoom function. Price: \$499. (Mitsubishi, 800/332-2119)



AudioControl Digital Processor

Two 24-bit Motorola 56303 DSP chips capable of executing more than 160 million instructions per second (MIPS) enable the Diva processor to apply graphic and parametric equalization to as many as eight channels, from 20 Hz to 20 kHz. The Diva, which is compatible with Dolby Digital and DTS, also incorporates adjustable multichannel dynamic compression, expansion, and limiting. And 24-bit digital interchannel delay enables signal alignment that is said to be accurate to 1/8 inch. Diva stores 24 custom setups in a non-volatile flash memory. Price: \$8,900. (AudioControl, 425/775-8461)

Newform Research Speaker

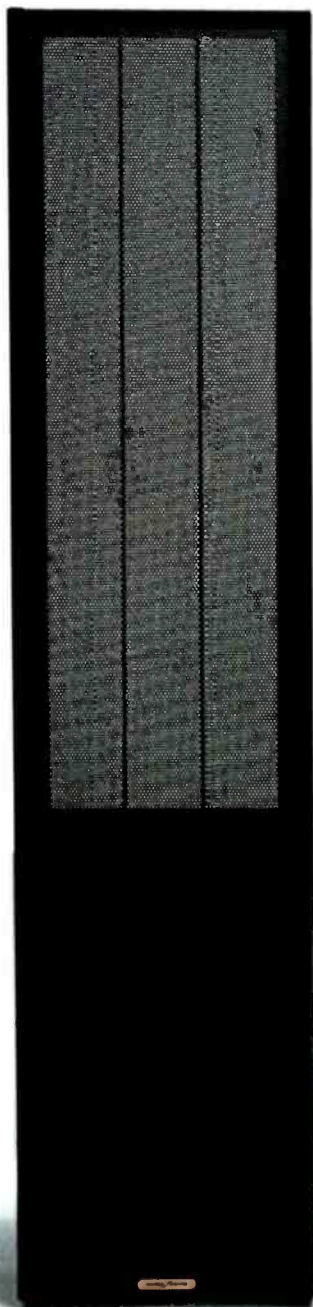
Standing nearly 6½ feet tall, the R645 two-way hybrid uses a 45-inch ribbon that is said to retain the detail and transparency of large, classic electrostatic panel speakers. Dual 6½-inch cone drivers handle the bass and midrange frequencies. Rated sensitivity is 91 dB/1 watt/1 meter. The company says the ribbon's wide, horizontal dispersion and minimal diffraction enable easy placement of the R645 in any room. Price: \$2,265 per pair, factory-direct. (Newform Research, 705/835-9000)





Terk A/V Multiroom Network System

Using one transmitter, one receiver, and existing telephone wiring and jacks, the HomeNetwork system transmits analog signals from A/V sources (like a DVD player) to any room in a house. Because home telephone wiring is engineered for optimum signal transfer, the company claims that the HomeNetwork's balanced circuitry ensures that picture quality at the remote location will be almost identical to the source's. Any line-level A/V output signal is compatible, and extra receivers may be located in various rooms. HomeNetwork's effective range is 500 feet. Terk says its system will not interfere with normal telephone service. Price: \$179.95 (one transmitter and one receiver); extra receivers, \$99.95 each. (Terk, 800/942-8375)



Sensory Science MP3 Digital Recorder/ Player

Using its internal, 64-megabit flash memory, the pocket-sized raveMP can record and simultaneously store—or play back—as much as 60 minutes of MP3 music (downloaded from the Internet), 1,000 phone numbers, 20 pages of notes, and 10 minutes of voice memos. Adding 16- or 32-megabit optional flash-memory cards—at \$49.95 and \$89.95 respectively—ups its music storage capacity to 85 or 102 minutes. The raveMP's distortion is pegged at 0.1%, signal-to-noise at 90 dB, and frequency range at 20 Hz to 20 kHz. Price: \$299.95. (Sensory Science, 602/998-3400)



InnerSound Speaker

A biamped, hybrid system, the Eros XA-2 combines a 42-inch electrostatic midrange/tweeter panel with a 10-inch dynamic woofer operating in a transmission-line bass enclosure. Each 10-inch woofer is separately driven by a 200-watt bass amp housed in the active crossover/amp unit supplied with the speakers. System frequency response is rated at 20 Hz to 27 kHz, ± 2 dB, with a sensitivity of 90 dB/1 watt/1 meter. The Eros is 5 $\frac{3}{4}$ feet tall, 15 inches wide, and 18 inches deep. Price: \$4,995. (InnerSound, 770/838-1400)



A cool MP3 digital recorder/player, handsome stands 'n' racks, and a hybrid electrostatic from InnerSound!

Bell'Oggetti Speaker Stand

Italian-designed and forged of heavy-gauge metal with a black, high-impact thermo finish, the 3-foot-tall SP-200 features a 7-inch-square metal top plate that can accommodate speakers weighing as much as 100 pounds. Rubber strips for the top plate are supplied as well. Price: \$200 per pair. (Bell'Oggetti, 732/972-1333)

StudioTech Equipment Rack

Designed to hold as many as eight components or a 35-inch TV set, the Alpha Series AW3 comes with wood-veneer shelves finished in black or cherry. Its rigid steel legs are supplied in black or silver. Said to be easy to assemble, the AW3 is 48 inches wide, 22¼ inches high, and 22¼ inches deep. A modular design permits addition of extra shelving. From top to bottom, the space between the shelves is 7 and 9 inches, respectively. Prices: \$399 in black, \$499 in cherry. (StudioTech, 800/887-8834)

Bright Star Audio Isolation Units

The Reference Series Ultimate Isolation System is said to achieve a new standard of vibration control. It does so by isolating a component in a sandwich combining the Air Mass Reference (a combination of heat-fired glass crystal, high-density polymers, and a dual-layer air cell), the Big Rock Reference, and the Little Rock Reference. All display a black pearl finish with solid hardwood trim. Prices: Air Mass Reference, \$650 to \$750; Big Rock Reference, \$450 to \$500; Little Rock Reference, \$500.

(Bright Star Audio, 805/375-2629)



B&W Powered Subwoofer

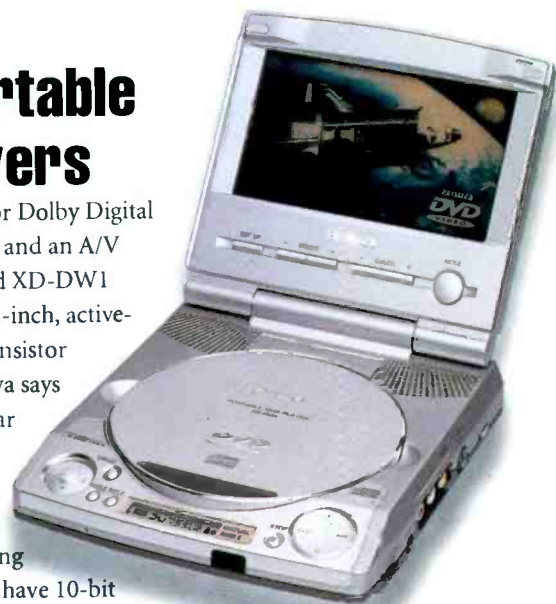
The ASW 4000 combines a massive, 15-inch driver (developed for B&W's Nautilus 801 speaker) with a 450-watt amp in a computer-engineered, vented enclosure. The sub's rated frequency response is 17 to 140 Hz, ± 3 dB; the amp is rated to deliver 450 watts continuously from 10 to 250 Hz, with a short-term output capability of 1,000 watts. The ASW 4000 has line- and speaker-level inputs and outputs, an adjustable low-pass filter, and dual selectable inputs that accept separate feeds from low-frequency effects and subwoofer outputs without recalibration. Price: \$3,000. (B&W, 800/370-3740)

American Wood Tall Equipment Cabinet

Finished in natural cherry, the 9802 version of the Tall Equipment Cabinet has four shelves (three that are adjustable) and an elegant bronze glass door. It's 4½ feet tall, 24 inches wide, and 20 inches deep—large enough to accommodate most A/V components, says the manufacturer. A double-vented, removable wooden back panel is provided to ease equipment installation. In addition, the cabinet is equipped with levelers. No assembly is required. Price: \$899. (American Wood Furniture, 800/323-3216)

Aiwa Portable DVD Players

Besides outputs for Dolby Digital and DTS bit streams and an A/V input, the 2½-pound XD-DW1 (right) includes a 5¾-inch, active-matrix, thin-film transistor LCD screen that Aiwa says delivers a bright, clear color image. The otherwise identical XD-DP1 lacks an A/V input and viewing screen. Both players have 10-bit video processors, 24-bit audio D/A converters, S-video outputs, remote controls, and still and slow playback modes. Prices: XD-DW1, \$850; XD-DP1, \$600. (Aiwa, 201/512-3600)



Stax Electrostatic Headphones and Amplifier

Using polyester diaphragms 50% larger than those in Stax Lambda and Sigma headphones, the SR-007 is said to reproduce transparent sound from deepest bass to delicate treble. A gold-plated, drilled copper electrode replaces the woven mesh electrode employed in previous models. To drive the SR-007s, the SRM-007t dedicated amp uses high-voltage 6FQ7/6CG7 output tubes in a parallel configuration. Price: \$6,000, including amp. (Stax, c/o Morishita & Associates, 416/244-6200)



JVC A/V Receiver

With its RF/infrared remote and RF Receptor, the RX-1028VBK will respond to commands from anywhere in a home, feeding different source signals simultaneously to two rooms. In addition to five video, four audio, and four digital (one coaxial and three optical) inputs, the RX-1028VBK features separate subwoofer and S-video outputs and 5.1-channel analog inputs. Dolby Digital and DTS decoders are internal, as are the five amps, which, in surround mode, are rated at 100 watts each into 8 ohms (1 kHz, 0.8% THD). Price: \$900. (JVC, 800/252-5722)



Westlake Audio Speaker

The design of the Lc3w10 is said to have been inspired by the celebrated bookshelf speakers of hi-fi's golden age in the 1960s and 1970s. This three-way bookshelf system, housed in a ported enclosure, has a 10-inch polypropylene woofer, 5-inch midrange, and 3/4-inch tweeter. Specified bandwidth is 42 Hz to 20 kHz, with a sensitivity of 88 dB/1 watt/1 meter. Power handling is rated at 80 watts, continuous. The Lc3w10 is 12 1/4 x 21 1/2 x 13 1/2 inches and is supplied in mirror-imaged pairs. Price: \$3,838 per pair. (Westlake Audio, 805/499-3686)



Maxell DVD Lens Cleaner

Designed to clean the laser lenses of DVD players only, the DVD-LC disc uses Maxell's Thunderon brush system. Interactive user instructions are displayed on-screen in English, French, and Spanish. In addition, the DVD-LC contains audio test signals to verify proper Dolby Digital operation. Price: \$14.99. (Maxell, 800/356-0180)

sum·mit (sum´it) *n.* [*< L. summus, highest*]

1. the highest point; top
2. the highest degree or state

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SDMI Grounds The Rumors

Faced with the threat of uncontrolled music distribution via the Internet, the recording and electronics industries jointly formed the Secure Digital Music Initiative group (SDMI) late last year. In early May (remarkably fast, for an inter-industry working group), it announced it had “achieved consensus on a possible framework for the treatment of music to be played on future computers and consumer electronics devices, . . . [dealing] with both protected and unprotected music in a consumer friendly manner while still creating a mechanism to limit future piracy of copyrighted music. . .” [harrumph, harrumph].

The stuffy imprecision of committeespeak is easily mistaken for deliberate evasion, so SDMI’s vague announcement started rumors flying. To quash them, SDMI soon released some concrete details of its intentions—and reasonable ones at that.

To begin with, the consensus applies only to portable players for downloaded music. And it will not restrict their operation now but merely set them up for compliance with SDMI technologies yet to be developed. So forget any rumors you’ve heard that SDMI-compliant portables will refuse to play MP3 or other music files. The only feature mandated by the SDMI’s Phase 1 standards will be a “trigger” that will prompt you to upgrade the player’s control software to full SDMI compliance. Phase-1 devices will be able to play music in any protected or unprotected formats (there are several). You’ll still be able to copy music from CDs to compressed digital files for playback on



Illustration: John Ueland

other devices or for Internet transmission. “All the portable-device spec will mandate is that devices be ready to block pirated copies of new music,” says Susan Lewis of the Recording Industry Association of America (RIAA).

Phase 2 begins once SDMI comes up with an acceptable usage-control signal that’s robust enough to survive reduction to MP3 or other file formats. Attempting to play CDs or music files carrying that signal will trigger the program that prompts you to upgrade the player for the new technology. Without that upgrade, new SDMI-compliant music won’t play—but with it come some modest restrictions on how the player works.

For example, your Phase-2 device will still let you copy CDs, but only for use on your own computers and players, not for posting on the Internet. And the new software won’t let you download new music unless it was legitimately posted by the artists or record companies.

According to the RIAA source I spoke to, “legacy” recordings—pre-SDMI CDs and music files and, presumably analog recordings—won’t be affected. You’ll still be able to play them and post them on the Internet as you are now. If you make a compressed file through a Phase-2 device, you’ll be able to play it on your own equipment but not post it to others; if you use pre-SDMI recordings to make files from Phase-2 CDs, you may be able to post them, but users of Phase-2 devices won’t be able to download or play them.

One reason SDMI’s announcements have been unclear is that it is not working toward a single encoding system but toward a recommended list of systems. That was always part of SDMI’s plans, but now it’s in-

Divx Is Dead



Illustration: Jack Gallagher

Digital Video Express, who brought us the Divx pay-per-view DVD system, has thrown in the towel. Sales at Circuit City stores were said to be strong, but support from studios and other retailers was not forthcoming.

As of June 16, Divx is no longer registering new customers; owners of Divx DVD players purchased before that date can obtain a \$100 rebate by calling 888/639-3489. All Divx discs, whether already purchased or still in stores, can be viewed on registered players until June 30, 2001 but can no longer be upgraded for unlimited viewing. Owners of discs that have been upgraded can continue viewing them until that date or can receive a refund of the upgrade fee.

NEWS+ NOTES

• America Online (AOL) has bought two online music companies: Spinner Networks (which broadcasts songs over the Internet in RealAudio format) and Nullsoft (developer of the Winamp MP3 player software and Shoutcast MP3 streaming-audio system). AOL plans to distribute only music authorized by copyright holders, to direct its 17 million subscribers only to legitimate music sources, and to post warnings against downloading pirated music. The same will also apply to CompuServe, ICQ, and Netcenter, which AOL owns. Internet service providers Yahoo and Lycos have taken similar steps, the former buying Broadcast.com and the latter signing a distribution agreement with DMX.

• Polk Audio has announced a recall of the mounting brackets sold with five wall-mountable speaker models. The recall affects M1, M2, AW/M2, RM5300, and RM5400 speakers sold from May 1996 to April 1998. Contact Polk's Consumer Service Dept. at 800/377-7655, ext. 324.

• One roadblock to the widespread use of IEEE-1394 technology for home entertainment is crumbling. Sony has adopted the Digital Transmission Content Protection protocol (DTCP) already backed by Matsushita, Intel, and Toshiba and will build DTCP into its IEEE-1394 interface chips. This may help break the logjam between DTCP and the rival XCA system backed by Zenith and Thomson.

Not until there's industry agreement on a copy-protection standard will we see cable-ready digital TV (DTV) sets and set-top adapter boxes. Without protection, it would be possible to make perfect pirate copies of movies and programs on DTV via 1394 links to digital recorders. Until that problem's solved, many movie and program suppliers will withhold their wares from DTV—and until there's programming to entice viewers, few DTV sets or boxes can be sold.

evitable, as record companies have started linking up with developers of copy-protection and compression technology. Sony Music has selected Microsoft, Universal Music has signed up with InterTrust, and AT&T's a2b compression system will be used by Mitsubishi in Japan and by Bertelsmann and Matsushita in the U.S. In any case, the SDMI group hopes to be able to announce an overall spec, going beyond portable devices, by March 2000.

Any Book, Any Music, Any Time (Almost)

Want the latest hit book or recording? Your favorite store probably carries it. If it's sold out, or not popular enough for the store to stock it, they can get it for you days or weeks later. (Even on-line stores like Amazon.com can't fulfill every order instantly.) Or you might be able to borrow it from a library.



Illustration: John Ueland

Want one that's been out of print a while? That's another story. The library might help, but otherwise you'll have to prowl used book and record dealers and probably ask them to do a search.

For now, that is. Someday, not too far off, the stores where you buy current hits may be able to run off a custom copy for you. A company named Digital On-Demand is working on kiosks that allow record-store customers to download albums for installation in SDMI-compliant portable digital

players or for burning onto CDs, Mini-Discs, or audio DVDs and to print out liner notes and artwork in color—all within 15 minutes. (CD World, a Swiss company, has announced plans for CD kiosks in Europe.) Trials are slated to start in September in Los Angeles and New York branches of Trans World Entertainment and Virgin Megastores. And Borders bookstores hope to have kiosks that can print out softcover copies of books they don't stock because demand is low or the publisher no longer prints them.

Even if these systems work out, it will be years before you can pick up any book or recording you want. The music kiosks, for example, will initially offer only Sony titles: 4,000 of the company's nearly 7,600 active albums (no singles), which will leave many Sony recordings languishing in the vaults. Other record companies expected to sign on will probably restrict their offerings, too. No plans have been announced to produce custom compilation discs (though these are available through such companies as musicmaker.com and customdisc.com). Mini-Disc users, though, will revel in their bounty—4,000 albums is a big advance over the 450 currently available on MD.

No matter how wildly successful in-store digital production proves, it will take a

long, long time to create an infrastructure that can handle even the comparatively small flood of books and recordings already available in digital form. Because it costs money to digitize, store, and transmit books and records, many pre-digital creations may never come to these kiosks. In addition, because there's big money in video, the digital resources that could be used for bringing back inactive books and records might be devoted to hot movie titles instead.



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Lawrence B. Johnson
Stereophile Guide to Home Theater, Vol.3 No.3



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Songs by Cellular

Unless you're strictly a Top 40 fan, your favorite stations play a lot of songs you can't identify, including some you might even want to buy. If you're driving near Philadelphia, you can find out more about the song, and buy the album, even if you're in a tunnel, when the station finally announces what you've heard.

mal CD rate), let alone the 34 megabytes or so it takes to store a 3-minute song of CD quality. ConneXus then monitors its selected stations and compares each song to the stored fingerprints.

The moment I heard of this, I thought how useful it could be to performance-rights organizations such as ASCAP, BMI, and SESAC. All three collect performance royalties in bulk from radio stations and parcel out those royalties to songwriters, composers, and publishers according to the amount of airplay their tunes receive. Fingerprinting, I figured, should drastically cut the cost of checking airplay—and it does, according to SESAC, which several years ago hired the fingerprinting system's developer, Broadcast Data Systems (BDS).

But BDS and SESAC have also moved beyond fingerprinting to use MusiCode, a watermarking system from Aris Technologies. Watermarks are embedded codes that identify a recording's source and carry other information. If the encoding is done right, the codes will be inaudible under all circumstances but can be detected even after the recording has gone through several data-reduction systems (such as Dolby Digital, MP3, or ATRAC) and been converted from digital to analog and back. SESAC obviously believes that Aris does it right: They're giving the encoding software to the songwriters and publishers whose rights they license, so that their future releases will incorporate MusiCode IDs. Some form of watermarking will almost certainly be part of whatever copyright-protection system or systems the SDMI group adopts (see "SDMI Grounds the Rumors" in this section).

Watermarking can have other uses, too. Watermarked commercials can be logged by computers—now advertisers needn't stay up till 3 a.m. to see if a station really ran their spots. And once most recordings are watermarked, your FM radio may be able to compare each song's ID against a database and display its title.

But fingerprinting and other techniques will still be needed for services like BDS and *CD to identify oldies.

NEWS+ NOTES

- Proponents of DVD-Audio and Super Audio CD are still duking it out to see which will be the dominant DVD-based music system, but plenty of music is already available on DVD-Video. Music videos account for nearly 10% of the 2,900 DVDs available, according to a trade group. All major record labels and some minor ones now offer them.

- Home theater has brought us bigger screens and more gear to put on our TV stands, and that increases the risk of injury from toppling TVs. The Consumer Electronics Manufacturers Association (CEMA) has just formed a Home Entertainment Support Safety Committee, composed of TV-set and home-entertainment furniture manufacturers, to reduce that risk. In addition to working with the Consumer Product Safety Commission and Underwriters Laboratories, the Committee is starting a public information program to make consumers—especially those with young children—more aware of potential dangers. ("For example: is your old TV stand safe for your new, bigger, TV?" says CEMA spokesperson Amy Hill.) The Committee also plans to work with equipment and furniture makers to make their products safer.

- Like many of the new "flat panel" speaker transducers, NXT designs can be molded into shapes that aren't flat at all. So the company has given its panel technology a new name, SurfaceSound, to highlight this fact.

- The next time you say a CD smells, you may be right—and the smell will be deliberate. Record companies can now have their products pressed as Sniffadiscs, with scratch 'n' sniff labels. Sonopress, the disc-pressing company that offers this service, plans to offer fruit and floral odors as well as those of leather, gasoline, and new-mown hay. But can discs that smell of sweat (or worse) be far behind?



The *CD Web site (www.starcd.com).

Just pick up your cellular phone, dial *CD (*23), punch in the station's frequency, and you'll hear the name of the song, who recorded it, and what album it comes from. Then you can hear up to 30 seconds of the song again to make sure it's the one you meant, hear a few other snatches from the album if you like, and order the CD. You can also hear samples from other songs the station has played recently. And you can do all this through spoken commands, so you needn't keep looking at the phone and pushing buttons. The service will be available in other cities soon but probably won't be available from landline phones for a long time.

What intrigued me is the way *CD tells what song is playing. ConneXus, the service's parent company, scans new recordings into its computer system before their commercial release. Rather than store the scanned recordings, the company creates a digital fingerprint for each, a compact file only about 1 kilobyte long—as compared to 700 kilobytes apiece for the 30-second, 8-bit, mono samples *CD plays over the phone (which are sampled at half the nor-

DVD audio

Gets the green light



was beginning to think I was waiting for Godot. Ever since DVD-Video hit the street, audiophiles have been waiting with bated breath for DVD-Audio. But after more than three years of powwowing, it finally happened. On February 9, the DVD Forum's Working Group 4 (the infamous WG-4) birthed Version 1.0—the first “official” version of the DVD-Audio standard.

Turns out the wait was worth it. Certainly, what resulted is a lot better for audiophiles than it appeared it might be when the WG-4 first sat down to work. For a while, it seemed that DVD-Audio might end up being little more than the audio tracks of DVD-Video, but with interminable playing time. Going that route would have fulfilled the promise that was originally made (or at least implied) that DVD-Audio discs would be backward compatible with—and therefore playable on—DVD-Video players. (Forget that, troops; they won't be.) But such an approach, had it been followed, would not have fulfilled the promise of delivering “better” sound than the conventional 44.1-kHz/16-bit Compact Disc (other than its being discrete multi-channel surround). While we were sitting on our you-know-whats, quite a few discs of this type were released.

by Edward J. Foster

They can be played on any DVD-Video player, so you can judge for yourself whether they're “good enough” to serve as a near-ultimate-fi music medium. Lots of people think so. But for some activists—led by Meridian's Bob Stuart, marching under the ARA (Acoustic Renaissance for Audio) banner—that kind of sound is definitely *not* good enough to qualify as the audio medium of the future. To their minds, and mine, sampling rate and word length needed to be increased beyond the ordinary CD's 44.1-kHz/16-bit standard to match the full capability of human hearing. Exactly what is necessary to accomplish that end is subject to debate.

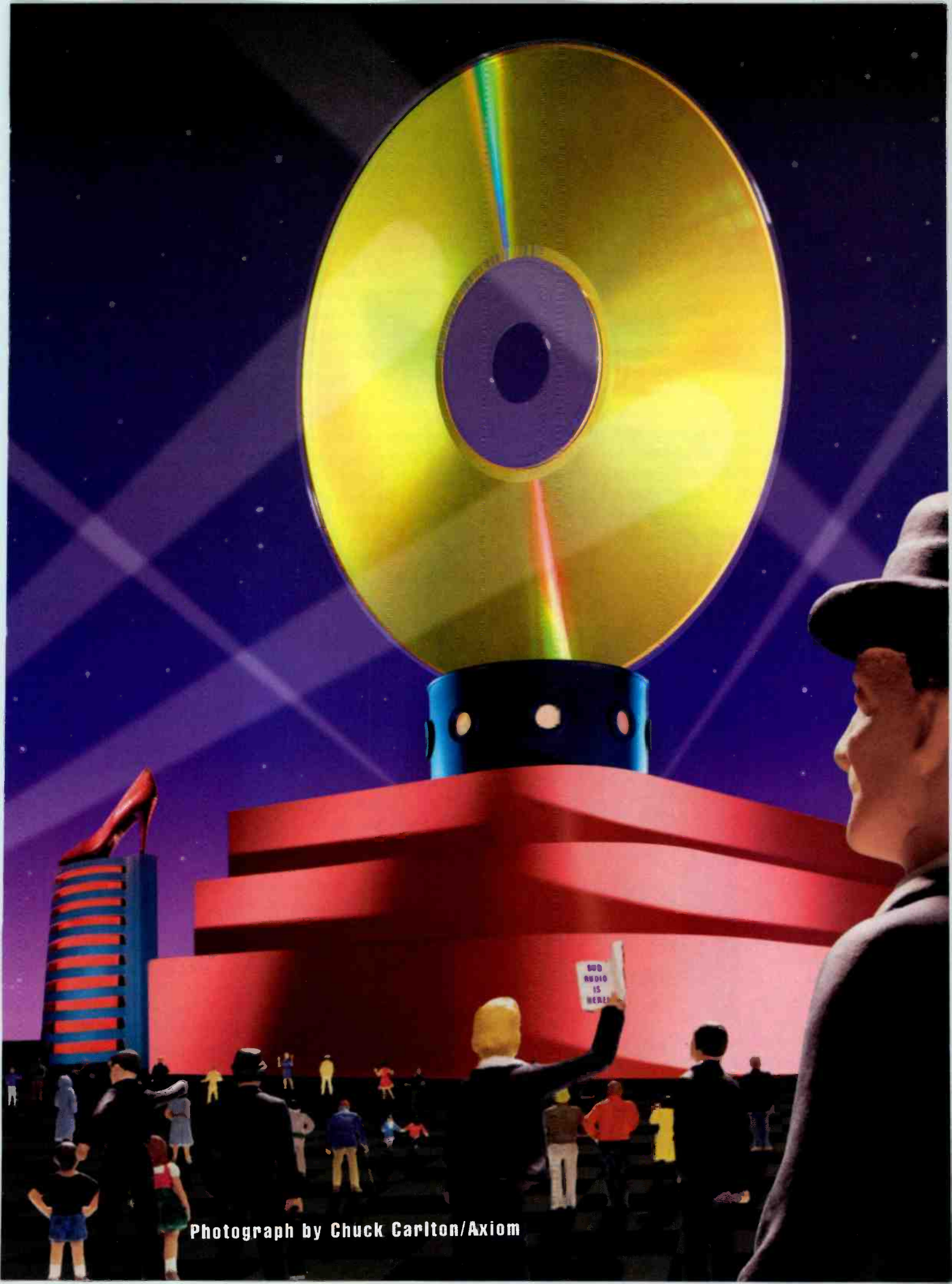
Personally, I'd be satisfied with an honest 20-bit word length (perhaps even 18 or 19 with effective noise shaping), married to a sampling rate of about 55 to 60 kHz in a “delivery” format like a consumer disc. (Professionals need to preserve a few more bits when handing off signals from one

to the next so they can equalize, mix, and otherwise digitally manipulate the goodies and still retain 20 good bits after they've finished their processing.) What we actually have in the DVD-Audio standard is a conglomeration of just about every sampling rate and word length you can imagine, from 44.1-kHz/16-bit to 192-kHz/24-bit.

Is that good or bad? Well, it sure does give everyone a choice, and I imagine it helped cut through the bickering. Getting the 40 members of WG-4 to agree on anything must have been quite an exercise in diplomacy.

For better or worse, the technical arena has become a lot more contentious in the last 16 years. Back in 1983, the CD standard did not need approval from anyone other than Philips and Sony, who invented it. They decided what they wanted to do and did it. The rest of the world could stand up and salute or get left behind. The professional camp differed somewhat, but not by that much! (I can still remember the arguments over using 44.1- or 48-kHz sampling rates at an AES standards meeting in Montreux, Switzerland.) Since then, discussion of technical issues has become more democratic, so now committees decide the issues. And you know committees: They start off designing a horse and end up with a camel.

Since the 40 members of WG-4 apparently couldn't settle on one sampling rate or word length, they concluded by endorsing everything. They adopted six rates and three word lengths. Three of the sampling rates are based on the CD fundamental—44.1, 88.2, and 176.4 kHz—and the other three on the DVD-Video/professional-audio standard: 48, 96, and 192 kHz. The ratios are important because it is easy to downsample from 96 or 192 kHz to 48 kHz, or from 88.1 or 176.4 kHz to 44.1 kHz, by factors of two and four, respectively, without damaging sound quality. It's far more difficult to convert transparently on a non-integer



Photograph by Chuck Carlton/Axiom

basis. That's why 55- or 60-kHz sampling will never happen despite its being eminently sensible. Too many 44.1- and 48-kHz recordings already exist, and no one wants to upset the apple cart now.

The standard also authorizes multiple disc geometries, from single-sided/single-layer discs to double-sided/double-layer ones. Although the geometry and storage capacity—4.7 gigabytes per single-layer side and 8.5 gigabytes for a dual-layer side on a 12-centimeter disc—follow the precedent set by DVD-Video, that doesn't mean DVD-Video players can play DVD-Audio discs. The bit-stream syntax differs, as do the copyright protection methods, maximum audio data transfer rate (DVD-Audio's is higher), and various other factors, so DVD-Video players will burp on DVD-Audio discs; or at least on most parts of most DVD-Audio discs. DVD-Audio discs can also carry video clips that are playable on a DVD-Video deck; thus you might get part of an audio disc to play on what you own now. But the sound will be either Dolby Digital or 48-kHz/16-bit stereo (or matrix-surround) PCM, not the high-bit-rate discrete multichannel PCM of the main audio tracks.

One company, Matsushita (parent to Technics and Panasonic), said last fall that it plans to support three types of DVD players during the launch: the DVD-Video machines we're accustomed to, a DVD-Audio deck that will play DVD-Audio discs but not DVD-Videos, and a universal player that can handle both audio and video discs. Other companies seem likely to follow, but it doesn't take much foresight to conclude that if DVD-Audio is a success the universal players are likely to be the only ones that survive the first shakeout. (At least for the home; audio-only players could still make sense for car and portable applications.)

The final two tidbits that were added to complete the DVD-audio standard were integration of Dolby Digital (AC-3) as an alternative to linear PCM for video soundtracks and adoption of Meridian Lossless Packing (MLP) to compress the data and enable six-channel surround sound at data rates all the way up to 96-kHz/24-bit on all channels. (Version 0.9 did not include data packing and so necessitated lower data rates on at least some channels in six-channel operation, not to mention shorter playing times.) Adopting Dolby Digital for the audio soundtracks of video clips brought the audio standard in line with DVD-Video practice. DTS and MPEG are recognized alternatives to Dolby Digital in both the DVD-Audio and DVD-Video standards, but neither type of player is required to recognize them, and at least initially, neither will be used.

Unlike 5.1-channel systems (Dolby Digital, DTS, and MPEG) that provide five wideband channels and a narrow-band low-frequency effects (LFE) track, DVD-Audio's six channels have identi-

cal bandwidth. If you run the math, you'll find that six 96-kHz/24-bit channels yield a data stream of 13.824 megabits/second (Mb/S) or 1.728 megabytes/second (MB/S). At this rate, you chew up a single-layer/single-sided 4.7-gigabyte disc in 45 minutes and 20 seconds, a far cry from the 74-minute playing time the recording industry insisted on.

Moreover, the problem is not simply a matter of playing time. The transfer rate at this performance level (13.824 Mb/S) exceeds the DVD-Audio system's maximum transfer rate (9.6 Mb/S) by almost 50%, and 9.6 Mb/S already is half again the maximum audio data transfer rate of DVD-Video! Without some sort of data compression, six-channel, 96-kHz/24-bit coding is not in the cards. That's where MLP comes in.

MLP is a lossless data-packing scheme optimized for audio applications. Unlike Dolby Digital, DTS, or the various versions of MPEG, MLP does not rely on perceptual codecs in which data are discarded based on presumptions of inaudibility. MLP looks on data as data and, when not pushed beyond its ability, restores the original bit stream with bit-for-bit accuracy. It is thus analogous to Zipping a PC file or stuffing a Mac file. The output data match the input data precisely; there's just less of it in the compressed file that is stored.

The compression ratio of such a system cannot be guaranteed because it depends on the characteristics of the data. This doesn't matter much with a Zipped computer file, because it need not be compressed to any particular size. If it's a little larger than you'd like, well, tough cookie, but you still can store it. However, there is a hard upper limit on the data transfer rate of a DVD-Audio disc, so it's conceivable that MLP might fail on some passages at the top data rates. But apparently this is very unlikely to occur, which was key to the system's victory over major competition.

Although I've talked so far mainly about six-channel coding, DVD-Audio permits any number of channels up to that. And when you get down to just two channels, the system allows 192-kHz/24-bit coding, enabling proponents to claim "100-kHz" bandwidth.

Frankly, I think the whole business of 192-kHz/24-bit coding is a crock. I don't understand why anyone needs such a high sampling rate and such precision to handle audio signals in the final delivery medium. There is no evidence I am aware of that suggests any human being, of any age, any gender, anywhere in the world, can hear a 96-kHz tone. I'm not sure even bats make it that high.

Furthermore, the dynamic range of human hearing (the range between the threshold of audibility and the threshold of pain) tops out at about 120 dB, and over much of the audio spectrum, it is far less than that. A 20-bit word ought to encompass this dynamic range with reasonable comfort. With some astute noise shaping, you could probably get away with fewer bits than that.

Besides, I've never met an A/D or D/A converter that even approached 24-bit performance, and I doubt that I ever will. It's virtually impossible in the real world. At room temperature, thermal noise precludes it. Here's what I mean: A 192-kHz sampling rate implies a bandwidth of 96 kHz (half the sampling rate), and 24-bit precision implies a noise floor of -145.76 dBFS. Because 0 dBFS has been quasi-standardized at 2 volts rms, -145.76 dBFS comes out to about 0.1 microvolt rms (-140 dBV). That's equivalent to the thermal noise of a 6.37-ohm resistor at room temperature (23° C or 73.4° F). Even if the bandwidth is limited to 20 kHz (in which case,



why do we need 192-kHz or even 96-kHz, sampling?), a 30.6-ohm resistor generates as much noise as is permitted the entire system if we dare to presume 24-bit accuracy. The only way around this is to operate the electronics at cryogenic temperatures. And we'd better include the speaker, because the resistance of its voice coil is often around 6 ohms by itself. *Brrrr!*

In the calculation above, I considered only the resistance in the signal path and I assumed ideal conditions. I ignored all sources of excess noise—i.e., real resistors, transistors, and the like. The real world will be much, much worse than the assumptions for my simple calculations, and I find it hard to believe that anyone can come up with a microphone-through-loudspeaker signal path with an effective source resistance of 30 ohms, much less 6 ohms. If 192-kHz/24-bit encoding isn't overkill, I don't know what is!

Perhaps WG-4 was influenced by professional practice, but if that's so, I think they missed an important point. It's true that the AES/EBU professional standard addresses use of 24-bit words, but that's because professionals need to transfer data that have been mathematically manipulated—i.e., equalized, mixed, etc.—and are likely to undergo further mathematical manipulation. Most mathematical operations increase word length, so recordings originally made with 18- or 20-bit precision may well reach 24 or more bits at intermediate stages. These bits are "real" in the sense that they are the product of mathematical calculations made on the original material and are therefore predictable, i.e., not random noise. To minimize distortion, it's important that these intermediate words not be requantized (reduced in length) unnecessarily until further manipulation is unlikely—i.e., until the delivery product is created. When it comes to the consumer disc, however, 24-bit words are unnecessary and should, in my opinion, be requantized (using dither or noise-shaping) to a realistic length, taking into account the characteristics of human hearing and the thermal noise of analog electronics. Twenty bits should do nicely!

Although DVD-Audio can support identical sound in all six channels, it need not. The producer or engineer may instead opt for greater bandwidth and more resolution in some channels than in others. For instance, to provide longer playing time, or more videos and graphics, he might select 96-kHz/20-bit audio coding for the front channels and 48-kHz/16-bit coding for the surround channels. It's sort of a Chinese menu with a translation dictionary for the player embedded in the bit stream.

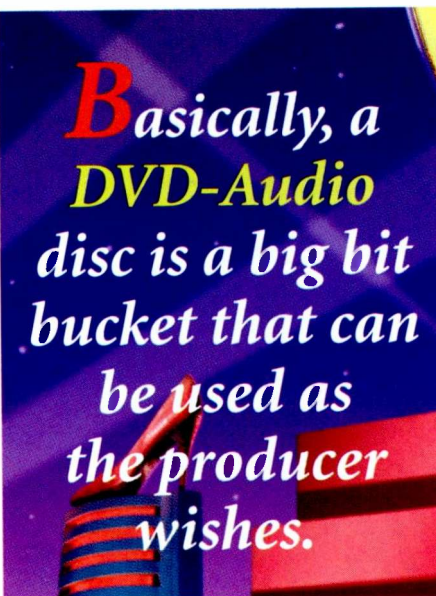
Producers also can embed mixdown instructions in the data. This feature, called "Smart Contents," instructs the player to create a stereo mix of the multichannel recording—one that imitates the stereo program the producer might have created had he or she done so. There are limitations, because the mix must be made from the six tracks available on the disc rather than from the original material, but the results are likely to be far more satisfactory than having some DSP chip decide on its own what constitutes a good mix. Alternatively, the producer can call for an independent stereo mix and dedicate part of the disc real estate to that if he or she wishes. Basically, a DVD-Audio disc is just a big bit bucket that can be used pretty much as the producer wishes. The bits can be used for still pictures, slide shows and video clips, text information such as liner notes and song lyrics, or messages from the artist or producer, as well as for stereo or multichannel music at the aforementioned

sampling rates and word lengths. Text material doesn't require much in the way of data. Still pictures use more, but they're still reasonably modest in their demands. Video clips, however, chew up the bit budget big time, so if a lot of video is included, MLP may come in handy even when the audio is coded at data rates more modest than 96 kHz/24 bits.

DVD-Audio players (as opposed to DVD-Universal players) do not support the video aspects of the audio disc. And even though the video on a DVD-Audio disc is similar to the video on a DVD-Video disc—standardwise, one is a subset of the other—they're not exactly the same. The video on audio discs does not support parental control, multistory, branching, or non-seamless multi-angle playback. I don't see where much is lost by these restrictions,

and I sure like the idea that DVD-Audio discs don't carry regional coding. You can buy DVD-Audio discs anywhere in the world and play them on any DVD-Audio (or universal) player.

In a manner of speaking, DVD-Audio discs can also support computer data. Universal Resource Locators (URLs), a.k.a. Internet home-page addresses, and e-mail addresses can be embed-



ded in the data to permit ready access to relevant Web sites. What's relevant? Well, these might be sites from which you can download information about the artist, the work, or the disc. They could be sites at which you gain access to features of the disc that are otherwise prohibited—for a price, of course. Does this hint at pay-per-play? Use your imagination, and keep your credit card handy!

A final word about copyright protection: At the time this is being written, a basic agreement seems to have been reached, but listening tests are still under way so the final scheme has yet to be decided. What seems certain, though, is that the copyright protection will include stronger encryption than DVD-Video (rumored to be as strong as is permitted by U.S. export controls) and a watermark, optimized for audio transparency (whatever that means), which contains copy-control information. The copy-control data enables the disc manufacturer to limit how many copies can be made of the disc and what quality they can be. At minimum, it is thought that you will be permitted to make at least one digital dub of CD quality or less. That means a stereo mix of the multichannel material using 44.1-kHz sampling and 16-bit words on a CD-R, DAT, or Mini-Disc. But that's the minimum. A generous content owner could code the disc so you could make additional copies or multichannel copies up to and including full DVD-Audio quality, if you have something like a DVD-Audio recorder with the requisite capability. Needless to say, he could also be generous for a price. Does this give you any idea of what those URLs will be used for? **A**





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PAUL TATARA

Acurus DIA 150 Integrated Amp



A glance at Mondial's Acurus DIA 150 immediately suggests the lucid elegance with which this 150-watt/channel stereo integrated amplifier plays music. It's got a gray/black, jet-set look about it, with a bare minimum of knobs and buttons vying for your attention. The control panel is laid out in a graceful little swoop that somehow reminds me of a well-appointed Frenchman crossing his legs and smoking a cigarette. From a purely physical standpoint, if the DIA 150 were a person, it would be Yves Montand—although I'm sure Yves Montand would have been too low-voltage to drive your speakers.

The DIA 150 is Mondial's latest take on the company's "passive integrated amp" concept, which it pioneered with the earlier 100-watt/channel DIA 100. This time around, the power-amp section has been

beefed up, the entire circuit has been refined for cleaner sound, and, in a welcome touch, a solid, nicely crafted remote control is included so you can operate the thing from the other side of the room.

DIA is short for "direct input amplifier." Instead of the active preamplifier circuitry found in most competing integrated amps, the Acurus goes the purist route by using passive volume and balance controls, as well as passive source switching. So the purity of the original signal is maintained right up to the power-amp stage, and you don't have to pay for a lot of extra circuitry that could end up diminishing the sound quality anyway. Mondial claims that through the use of

a high-sensitivity power-amp stage and a separate internal subchassis that shields the passive preamp section it's come close to reaching the "Holy Grail of audio"—a straight wire with gain. In a nutshell, you get more out of less. More or less.

I'm exceedingly pleased with the DIA 150's control layout, as I've never been very good at remembering where the individual function buttons are on audio equipment. (Then again, I'm not very good at remembering much of *anything* that doesn't involve me receiving money or getting kissed full on the lips.) It takes me forever to become intimately acquainted with all those controls; I usually have a major problem getting past the "staring like a flounder"

The DIA 150 is Mondial's latest take on the company's "passive integrated amp" concept.

phase when I want, for instance, to switch from CD to video.

Not so with the DIA 150. Five minutes and even I can figure it out. It has those eight little buttons swooping left to right and two great big gray metal knobs that control the volume and balance. That's it. There are no dials telling you what time it is on planet Zoltar-7, no little lights bouncing around to visually confirm that you're actually hearing music, no burning neck because you've realized that you shelled out

ACURUS

Rated Power: 8 ohms, 150 watts/channel; 4 ohms, 200 watts/channel.

Rated Distortion: 0.09% THD, 20 Hz to 20 kHz, into 8 ohms.

Dimensions: 17 in. W x 5 in. H x 14 in. D (43.2 cm x 12.7 cm x 35.6 cm).

Weight: 35 lbs. (16 kg).

Price: \$1,499.

Company Address: Mondial Designs, 20 Livingstone Ave., Dobbs Ferry, N.Y. 10522; 914/693-8008; www.mondialdesigns.com.

for features that you'll never, ever use.

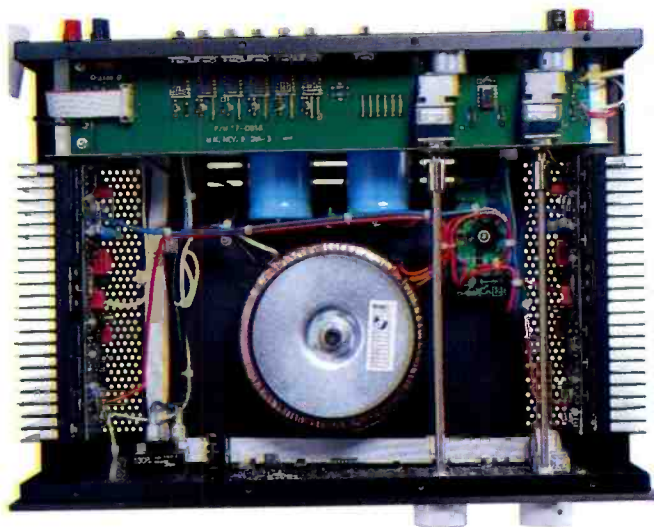
The buttons comprise switches for power and muting plus six for source selection: CD, video, D/A, tuner, auxiliary, and tape monitor. It doesn't get much simpler than that. I also applaud the speaker connectors, which are placed on opposite ends of the back panel so that you don't have to wrestle several wires into a 1-inch space. Your aunt could cope with this baby, though I'd still keep her away from it. It retails at \$1,500, and you know how flighty she can get.

So if you're the kind of person who likes to be seduced by his equipment, the DIA 150 certainly gives you the old amplifier come-hither. But, hey, just for the sake of argument, let's be adults about this. Relationships are more than just looks, otherwise Sophia Loren would never have married Carlo Ponti. No, a healthy attraction is also based on personality, the lusted-after one's ability to communicate his or her inner feelings. Well, the folks at Mondial, those sly dogs, have created a looker with a soul.

I auditioned the Acurus integrated by wedging it between my reference NAD 522 CD player and a pair of NHT SuperTwo full-range floor-standing speakers. Kimber's PBJ audio interconnects and Radio Shack's 16-gauge brown-colored speaker wire tied it all together.

My normal amp is an NAD 310, which is a fine little unit, no doubt about it. It is, however, an altogether different beast from the more cultivated DIA 150. I know the rule is supposed to be that you get what you pay for, but anybody who's attended a movie or bought a car in the past 15 years knows that's an almost amusingly optimistic stance. It's more likely that you'll get whatever the hell they decide to give you, regardless of cost.

Incredibly, however, the DIA 150 delivers on all fronts. The elegance that's so immediately apparent on the outside extends even to the amp's insides. It has hardly any guts, but precision engineering sees to it that that doesn't matter. It's the very definition of inner beauty.



I was so astounded by the sound, I quickly started plowing through my CDs.

I was so astounded by the sound, I quickly started plowing through my CDs as I realized which bits of my music collection I'd like to hear über-juiced by the amp. These, of course, aren't the discs that you'd be reaching for in the same situation, but if you wanna come on over and write this review, I'll gladly take a nap.

Cedar Walton, *Naima*. This is a nifty live performance from 1973, recorded at a Manhattan club called Boomer's. I always say that I like to hear the wood creak in my jazz. Keep the electric instruments away from me, and if Monk is stomping on the ground while he solos, I sure as hell wanna know about it. The DIA 150 lends a sonorous mahogany warmth to Walton's keyboard, with cymbal work that sparkles around the edges.

You could argue that more bass would be nice—and with the lack of tone controls, you better like what you get—but one of the best things about the bass on the DIA 150 is that it lays itself down as a backdrop. You don't feel that it's being punched out at you, and you don't get the somewhat soupy lower-register tone that I find when I'm grooving to the NAD 310. The sound is so

convincingly live on this disc, I almost bought a drink for the blonde over by the bar, and she wasn't even there. And neither was the bar. And I'm engaged.

Bob Dylan, *Blonde on Blonde*. It's no scoop that this is one of the greatest rock 'n' roll albums of all time. The surreal wordplay and don't-try-to-tell-me-they're-bad vocals are part and parcel of Dylan's most brilliant '60s output. I just have trouble listening to it because of what Dylan himself calls its "mercury" sound. I

think what he means is that there's something simultaneously organic and tinny about it. As undeniably visionary as the record is, it often winds up giving me a splitting headache.

The DIA 150 doesn't completely solve this problem, but at least it sounds like Mr. Zimmerman is just *blowing* that damn harmonica directly into your ear, rather than methodically stabbing your timpanic membrane with it. Mostly, though, the sonic palette is much more forgiving than I'm used to it being on this recording. You get to hear it all with the DIA 150—the fog, the amphetamine, *and* the pearls. Just like Bob intended it, although what he intended remains a little piercing on occasion. Still, tones ring out and die away that you don't even know are there when you play the disc on less formidable machinery.

Rufus Wainwright, *Rufus Wainwright*. This is my favorite pop record from 1998, and it's one of that year's most fascinatingly dense productions, to boot. Wainwright combines an almost Broadway-like musicality with a perverse sense of humor that owes a lot to Randy Newman. That means you get a lot of catchy piano, bizarre key changes, bells ding-a-linging, and slowly mounting arrangements that burst into huge orchestrations when you least expect it. Though my NAD pumps it all out with brio, the DIA 150 does a vastly superior job of separating the many layers of sound.

Too many string and rock recordings can end up sounding like a squall of sound, rather than the more inspiring wall that Phil Spector used to build. The DIA 150

TEST RESULTS

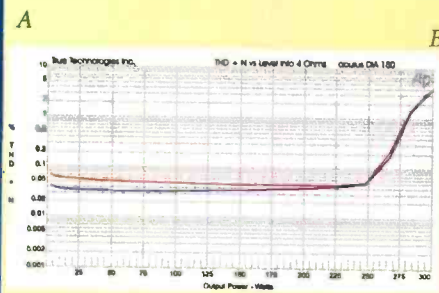
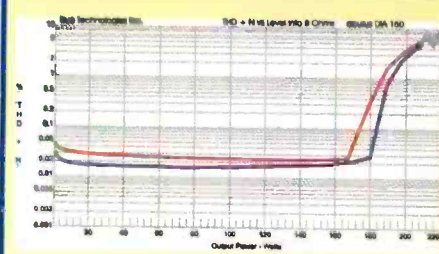


Fig. 1—THD + N vs. level, left channel red and right channel blue, into 8 ohms (A) and 4 ohms (B).

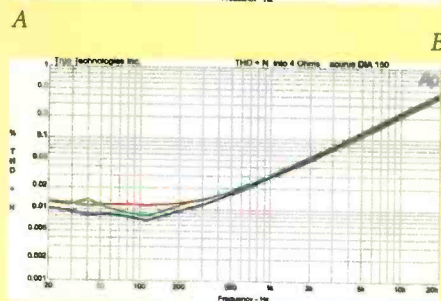
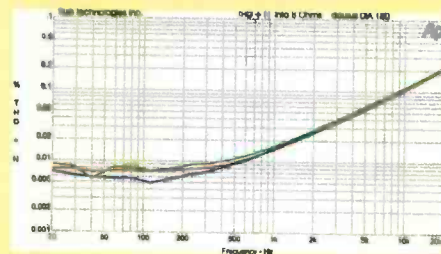


Fig. 2—THD + N vs. frequency at 10 watts (red), 50 watts (blue), and 100 watts (green) into 8 ohms (A) and 4 ohms (B).

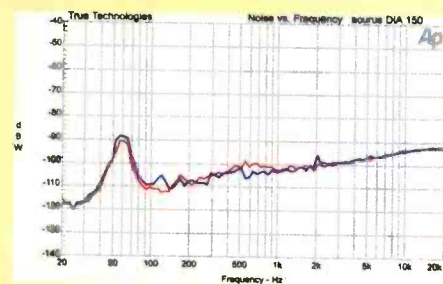


Fig. 3—Noise spectra.

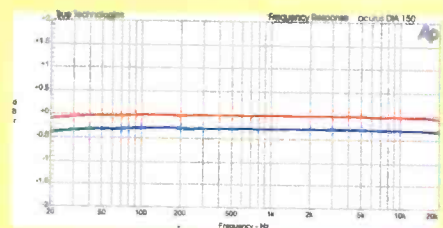


Fig. 4—Frequency response.

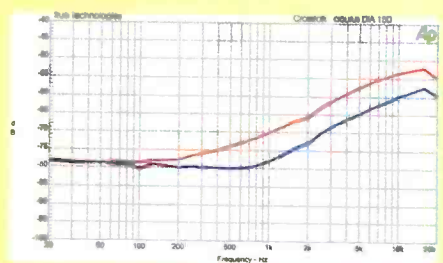


Fig. 5—Crosstalk vs. frequency.

As you can see from Fig. 1, the DIA 150 is exceptionally powerful for an integrated amplifier, clipping at around 170 to 180 watts (22.3 to 22.6 dBW) into 8 ohms at 1 kHz and almost 250 watts (24 dBW) into 4 ohms. Plus you get another decibel or so of dy-

MEASURED DATA

Dynamic Power at 1 kHz: 225 watts (23.5 dBW)/channel into 8 ohms and 290 watts (24.6 dBW)/channel into 4 ohms.

Noise, A-Weighted: -80.3 dBW.

amic headroom. In other words, it behaves like a big stereo power amp with a fairly stiff power supply. And, in fact, one might reasonably regard the DIA 150 as a big, high-gain power amp with multiple inputs, a source selector, and an input level control.

Distortion is very low at frequencies under a few kilohertz and still reasonably so even at the top of the audio range (Fig. 2). And it varies hardly at all with level until the overload point is reached. Noise is also quite low. The only appreciable blip in the noise spectrum (Fig. 3) is a small hum spike at the 60-Hz power-line frequency—probably not enough to be audible under

normal circumstances. Frequency response (Fig. 4) is extremely flat, though there is about a quarter-decibel channel imbalance, and interchannel crosstalk (Fig. 5) is well controlled.

In short, the Acurus DIA 150 is another clean, quiet bruiser of an amplifier from Mondial.—*Michael Riggs*

doesn't allow things like that to get all hissy, provided the producer was at least a little bit on his toes during the recording process. On Wainwright's most sublime track, "Foolish Love," I even detected a previously unheard swirling organ sound that reminded me of The Band's Garth Hudson, and that was when an entire orchestra was cranking behind it at top volume. And the bass, as usual with this amp, was crisp and fully evident without wrestling the other instruments into submission. I never caught that fairground organ before, and it made

me smile. Your level of Band-related exuberance, of course, may vary.

Frank Sinatra, *The Capitol Years*. Everything on this three-disc set springs to swaggering, finger-popping life through the DIA 150. On "One for My Baby," you'd swear that Frankie is breathing Jack Daniels vapors down your neck. And don't even get me started on "I've Got You Under My Skin"; it's so dazzling I actually yelped. The entire collection sounds like fancy crystal, from beginning to end. When crooned through the DIA 150, Sinatra's way with a

vowel is even more of a religious experience than you've come to expect it to be; you're practically wearing every whisper. Jill, my betrothed (and a major Sinatra fanatic), took one listen and said, "It's like sex for your ears." Nuff said—and that pithiness, coupled with her startling cuteness, explains why I'm marrying Jill.

The DIA 150 sounds spectacular, folks, but all is not completely hunky-dory in Acurus world. First of all, there's no headphone jack. I know it's heresy to some audiophiles to even bother with headphones,

and that makes sense when you consider how marvelous music can sound when wafting out of a great set of speakers. I, however, like to put together tapes for my friends, and a quick check with the headphones can make it a lot easier to cue up the next track when the song you've just recorded is over. Besides, if you live in a thin-walled apartment building, sometimes you simply *have* to use headphones. Neighbors in New York City, as you perhaps know, are quite capable of killing without remorse.

Another relatively minor drawback is that the amp is pretty darn heavy. I don't know what kind of metal the chassis is made of, but I wouldn't be surprised if it were salvaged from an old panzer. The aluminum faceplate certainly *looks* beautiful, but you need a decent set of biceps to pick the thing up and stick it in a cabinet by yourself. And it has more than a few surprisingly sharp corners to contend with. By the evidence of my right palm, the DIA 150 can also be used to carve the roast on Sun-

days—I mean, if you're in a bind and feeling especially manly.

But those are rather negligible concerns when you consider the luminous sound; after all, that's the reason you buy an amp. The DIA 150's diction, if you will, is precise, free of slurring or muddled guttural pronouncements. The nuances it can pull out of a piece of music can turn even your most often listened-to discs into adventures of rediscovery. (I had incorrectly assumed that my days of getting all worked up over Van Morrison's "Moon-dance" were finished about 10 years ago.)

The top end doesn't screech its way through an arrangement, even when you're dealing with a perilously pitched big-band trumpeter like Sweets Edison. And the bass, as I've already said, is supportive rather than steamrolling, plus the DIA 150 can deal with a broad range of low-end boom-

ing. Paul McCartney's playing comes across as delightfully buoyant, full of surprising textures, while Charles Mingus's altogether different muscularity is never goosed by the amp into overpowering a recording. The music spreads out and luxuriously surrounds you. You don't feel as if it's being shot out of an expensive cannon.

All in all, this is a gorgeous-sounding amplifier and an extremely nice piece of fancy-shmancy furniture. Your music (and your decorator) will be pleased, I'm sure. Now I'm gonna put that Sinatra back on. **A**



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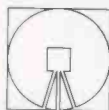
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KEN KESSLER

B&W DM-605 S2 Loudspeaker



By sheer fluke, I'm reviewing the top model in the new B&W 600 Series 2 lineup mere weeks after I finished assessing the least-expensive model in the 800 range for a British magazine. What's confused me is that they sell for roughly the same price—sort of like the model-range overlap in the automotive kingdom between, say, the top-

of-the-line BMW 300-Series model and the stripped, entry-level model in the 500 Series. The dichotomy is best explained with a glance: B&W's more prestigious Nautilus 805 loudspeaker is a small, two-way design for stand- or shelf-mounting, while the butch DM605 S2 is a woofer-laden, semi-active floor-stander. So from the outset, the latter looks like the better value. But

B&W ain't stupid, so they're not mutually exclusive.

The 600 Series 2 flagship model is blessed with the newly developed tweeter and the tapered-tube loading first seen in the original B&W Nautilus speaker and made populist through the recent 800 Series derivatives. B&W developed the tapered-tube layout to absorb unwanted energy radiated from the rear of the tweeter diaphragm; said to be propagated as "a succession of plane waves," this excess energy is absorbed before the back wave reaches the end of the tube. The tube also damps the resonance at the bottom of the tweeter's operating

The DM605 S2 can be used with everything from low-end A/V receivers to high-end powerhouses.

range, which B&W says reduces coloration in the crossover region.

The trickle-down approach is also evident in the new 600 Series' adoption of the Nautilus 800 Series' flat-ring tweeter suspension, in place of a conventional roll surround. This advanced suspension is de-

B & W

Rated Frequency Response: 25 Hz to 20 kHz, ± 3 dB; -6 dB at 23 Hz and 30 kHz.

Rated Sensitivity: 91 dB SPL at 1 meter, 2.83 volts applied.

Rated Impedance: Nominal, 8 ohms; minimum, 3 ohms.

Recommended Amplifier Power: 25 to 200 watts.

Dimensions: 39 $\frac{1}{4}$ in. H x 9 $\frac{3}{8}$ in. W x 17 $\frac{1}{2}$ in. D (99.6 cm x 23.6 cm x 44.6 cm).

Weight: 68 lbs. (31 kg) each.

Finish: Black-ash vinyl.

Price: \$2,200 per pair.

Company Address: 54 Concord St., North Reading, Mass. 01864-2699; 978/664-3820; www.bwspeakers.com.

signed to reduce distortion and lower coloration in the treble region. Other benefits include increased sensitivity for the tweeter, improved power handling, and better off-axis response, in part from elimination of the phase ring used in the tweeters of the earlier models.

The midrange cones in the three-way systems (and the woofer cones in the two-ways) continue to be of woven Kevlar, a material chosen by B&W for “its octopole bell mode break-up characteristic, during which the effect of the four areas of the cone going upwards is canceled by four exactly equal areas going downwards, producing a remarkably uncoloured performance.” But B&W claims two improvements over past 600 Series drivers: stiffer spiders in the suspension for better control at high levels and stiffer, bullet-shaped dust caps to reduce deformation. The result is cleaner, more dynamic bass—an area where all recent B&Ws seem to excel.

In the three-way systems, such as the 605, the woofers have Kevlar-reinforced paper cones, another technology first seen in the Nautilus 800 Series. It is combined with a large-diameter “mushroom construction” dust cap to eliminate the cone cavity effect on the adjacent midrange driver. This dust cap is fixed directly to a specially extended voice coil, thus producing a light but rigid woofer, for delivery of dynamic bass at high output levels. Again, those familiar with recent B&Ws will note that they “rock”—an ability believed alien to British speakers by some Americans. Maybe I should warn you at this point that the current generation of British speaker designers is as far removed from its BBC-dominated ancestors as Matthew Polk or Kevin Voecks is from Edgar Villchur.

While the 800 Series’ superior cabinetry is one reason the diminutive Nautilus 805 costs the same as the beefy DM605 S2, the latter does sport a robust, if prosaic, cabinet with a black-ash vinyl finish. But it is so plain, so anonymous, so tiresome in its lack of detail or sculpting that the more aesthetically driven among you might be tempted to sacrifice the 605’s dynamic sound, deeper bass, and home theater suitability for the 805’s far more stylish presence. Which brings us back to the stripped

500 Series versus the loaded 300 Series Beemer analogy.

B&W has made much noise over its matrix technology for making cabinets more rigid, so it’s no surprise that the 605 has a decidedly stiff enclosure. One neat trick is a second baffle of molded, mica-filled polypropylene to stiffen the wooden front baffle, adding both strength and extra damping. Knowledge of such constructional aspects, though, doesn’t alter the fact that the 605 is merely a box. If you think I’m over-stressing appearance, I do so because the 605 is too big to hide; this speaker is not easy to camouflage, however devious an interior designer you might employ.

On the other hand, the 605 is something of a space-saver; its clever, semi-active design removes the need for subwoofers in all systems except those belonging to the most head-banging of listeners. Keep that in mind, too, if you have to juggle bass aspirations versus space allocation and budget considerations: This speaker goes *wa-a-ay* down with some ease, and you don’t have to spend a bundle on primary amplification to achieve this. One of the reasons the 605 weighs a hefty 68 pounds is the on-board 130-watt amp for direct-driving the speaker’s two 7-inch woofers. The bass output is augmented by B&W’s very successful Flowport technology, which uses a golf-ball-like dimpled surface on its internal and external port flares to smooth the passage of air over them, thus reducing “chuffing” while improving detail.

The 605’s 7-inch midrange and 1-inch metal-dome tweeter are driven conventionally from the main audio system’s amplifier; you can biamp or bi-wire them via multi-way binding posts on the seemingly cluttered, recessed control panel at the back. Being self-powered only in the bass, the 605 must have user-adjustable controls to match it to a wide array of power amplifiers, so the binding posts nestle in among knobs and switches for the fine-tuning. I drove the speakers with an array of amps ranging from 30-watt integrateds to 300-watt monoblocks, tubed and solid-state, and at no point was I unable to find an ideal setting through the EQ and level options.

The DM605 S2’s newly designed crossovers feature air-core inductors, which



One of the reasons the DM605 weighs a hefty 68 pounds is the on-board 130-watt woofer amp.

B&W believes responsible for major improvements in the retrieval of subtle detail and for further reducing distortion and compression. The tweeter filter sections now use plastic film capacitors to preserve signal quality. Once you’ve connected the main amplifier to the speakers, you can invert phase, set the bass equalization in six steps (the flattest having a -3 -dB point at 25 Hz), and alter the woofer output in six steps, from -6 to $+4$ dB.

Also accessible at the back is a switch to activate or bypass an auto-sensing circuit that turns on the woofer amplifier when it detects an incoming signal. If you bypass it, you’ll have to reach around the backs of the speakers to turn on the amps every time you want to listen—so don’t. An LED visible through the grille glows red when the speaker is in standby mode, green when it senses a signal. The other facility found on the back panel is an input to drive the bass section from the subwoofer output of a sur-

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TEST RESULTS

The DM605 S2's Nautilus heritage is most evident in the top end of its frequency response (Fig. 1), which is a close match to what we saw from the Nautilus 802 back in February. Hardly surprising, since they share the same tweeter and backwave-absorption technology. Very smooth. (The jaggedness right around 20 kHz appears to be an artifact of an ultrasonic tweeter resonance and probably doesn't amount to much sonically.) Below 1 kHz, the response gets a bit lumpier, but it's still quite decent. And the low-frequency reach is exceptional—flat to below 25 Hz!

The speaker exhibits wide horizontal dispersion. In fact, the response hardly changes from on-axis to about 20° off-axis, and it remains smooth and reasonably extended to beyond 60° off-axis (Fig. 2). Vertical off-axis plots are almost never as sweet as the horizontal, but these (Fig. 3) are pretty good. A notch appears in the treble almost immediately above- and below-axis, however, perhaps associated with the tweeter/midrange crossover.

The speaker's impedance characteristic (Fig. 5) is somewhat unusual at low frequencies, because of the very high impedance presented by the input to the woofer amplifier. It drops to 3 ohms at 400 Hz, however, and again to about 4 ohms above 10 kHz. Most amplifiers should be okay with this, though some might object; you would not want to run a pair of DM605's in parallel with another set of speakers, though.

Harmonic distortion (Fig. 6) was measured at the input level required to pro-

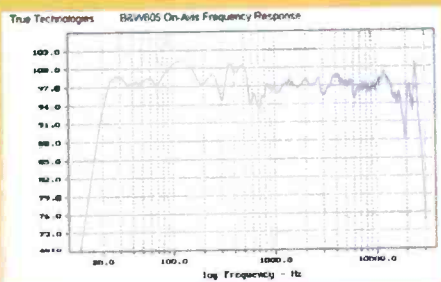


Fig. 1—On-axis frequency response.

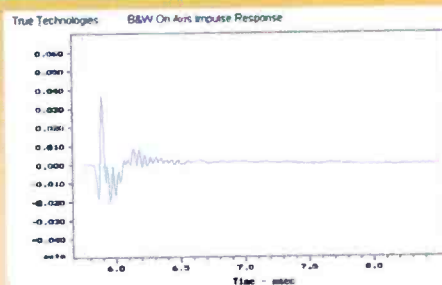


Fig. 4—On-axis impulse response.

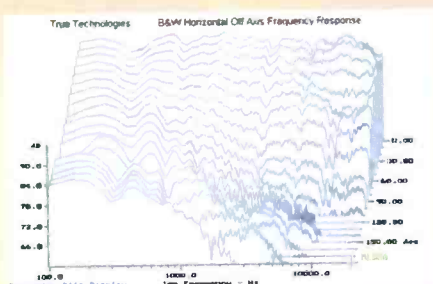


Fig. 2—Horizontal off-axis frequency responses.

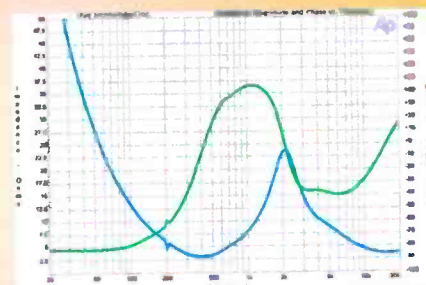


Fig. 5—Impedance vs. frequency, magnitude (blue) and phase (green).

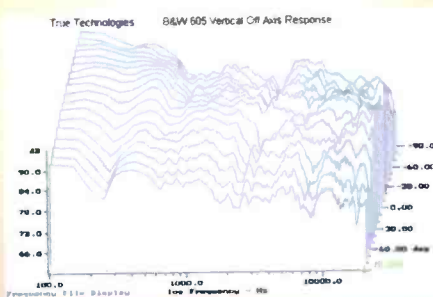


Fig. 3—Vertical off-axis frequency responses.

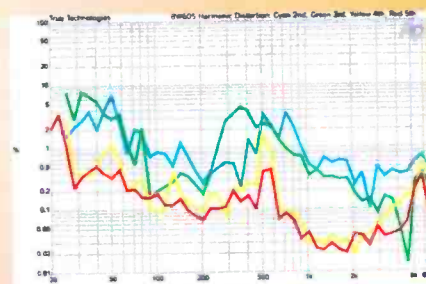


Fig. 6—Harmonic distortion vs. frequency, second (blue), third (green), fourth (yellow), and fifth (red) harmonics shown.

duce 100 dB sound-pressure level (SPL) at midband. It is well controlled even at the bottom end; the DM605 S2 is clearly a clean and robust speaker.—*Michael Riggs*

round-sound receiver or processor. You feed the signal into one speaker and then link it to the input on the other speaker.

As a purist, I stuck with running the speaker in full-range mode. I'm one of those pathetic types who refuses to deny that bass directionality matters, and I prefer not to have the same lower-octave action coming out of my left and right main speakers.

Sensitivity of the conventionally driven midrange/tweeter section is moderately high, and the impedance is reasonable (though with a rather low minimum). Consequently, the DM605 loudspeaker can be used with everything from low-end A/V receivers to high-end powerhouses, but it does seem to like all the juice you can muster. Crossovers are at 230 Hz and 4 kHz.

Although I did use the B&Ws in home theater mode, just to hear how it worked, I felt that their true measure was best revealed in a purist audio setup. Sessions included time with Musical Fidelity's X-RAY CD player driving that company's Nu-Vista preamp and 300-watt Nu-Vista power amp and Linn's exquisite CD-12 driving the Pathos Twin Towers tube hybrid integrated amp. For A/V operation, I used a Pioneer

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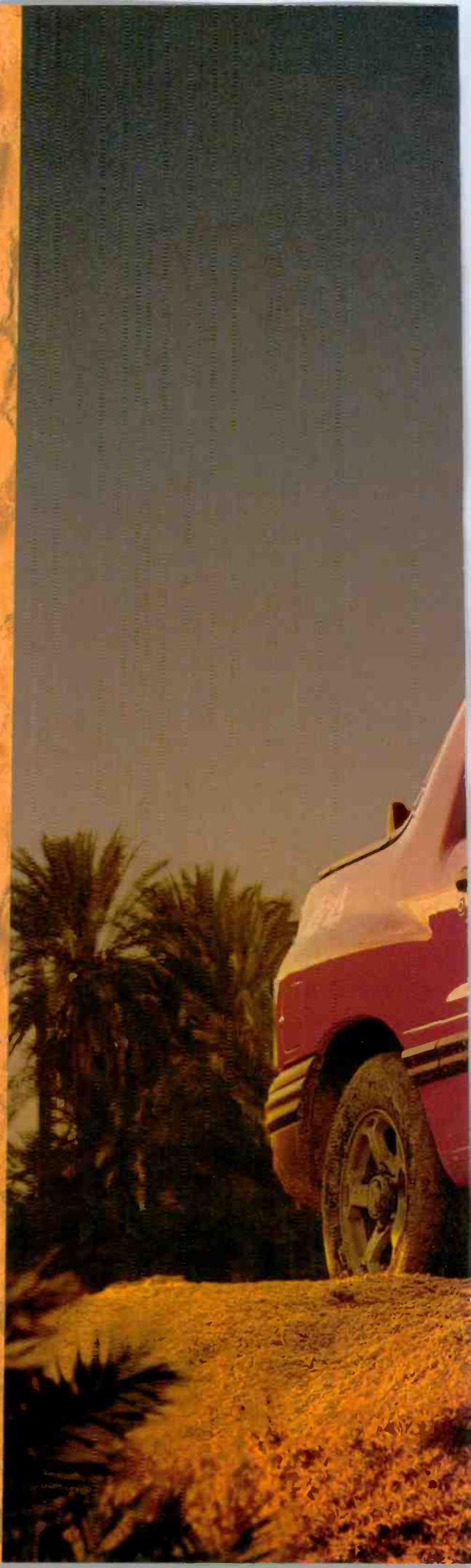
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HOW THE SWEEPSTAKES WORKS: A Chevy Tracker is shown in a specific location somewhere in the world. During the months of May, June, July, August and September 1999, three clues will be given in magazine, newspaper, mailings, TV and the Chevy Tracker website (<http://www.CHEVYTRACKER.COM>) advertisements as to what specific city and country the Tracker is located in. From these three clues, you must guess the specific city and country where the Tracker is located in order to be eligible for the sweepstakes drawing. If you wish to obtain all three clues, you may request such by sending a stamped, self-addressed envelope (VA and VT residents need not affix return postage) to: Where's the Tracker Clues, P.O. Box 4945, Blair, NE 68009-4945 USA. All requests for clues will be mailed back on September 1, 1999, and requests received after that date will not be honored.

HOW TO ENTER: Either access the Where's the Tracker website (<http://www.CHEVYTRACKER.COM>) and follow on-screen instructions to enter your name, address (including zip code), work and home telephone numbers (optional), your e-mail address (optional) and your guess as to the specific city and country where the Tracker is located, or hand-print the same requested information on a 3"x5" card and mail it via first-class mail (limit one entry per outer mailing envelope) to: Where's the Tracker Sweepstakes, P.O. Box 4951, Blair, NE 68009-4951 USA. For eligibility, entries must be submitted either via a completed Internet transmission, or if mailed, postmarked no later than September 30, 1999. Mail-in entries must be received by October 7, 1999.

WINNER SELECTION AND PRIZE: One (1) winning entry will be selected on or about October 15, 1999, under the supervision of D.L. Blair, Inc., an independent judging organization whose decisions are final, in a random drawing from among all correct entries submitted. In the unlikely event no one entrant correctly guesses the specific city and country location of the Tracker, winner will be determined in a random drawing from amongst all entries submitted. Winner will receive a brand-new 1999 four-door Chevy Tracker (approx. prize value: \$19,000 US). No cash equivalent or substitution of prize will be permitted. Winner will be notified by overnight express service and must sign and return an Affidavit of Eligibility and Release of Liability within 15 days of notification, via the return mailer provided. Non-compliance within that time period may result in awarding of the prize to an alternate winner.

ELIGIBILITY: Sweepstakes open only to residents of the United States (except Puerto Rico) and Canada (except Quebec), 18 years of age or older, who possess a valid driver's license. Employees of General Motors, Campbell-Ewald Advertising, D.L. Blair, Inc. and members of their immediate families are not eligible. All applicable laws and regulations apply. Sweepstakes void wherever prohibited by law. Taxes, licensing and registration fees where applicable are the sole responsibility of the winner. Odds of winning are determined by the number of correct and incorrect entries submitted. No responsibility is assumed for incomplete, lost, late, damaged, illegible or misdirected e-mail, for technical hardware or software failures of any kind, lost or unavailable network connections, or failed, incomplete, garbled or delayed computer transmission which may limit user's ability to participate in the sweepstakes, or for non or illegibly postmarked, lost, late, non-delivered or misdirected mail. Prize is guaranteed to be awarded.

By acceptance of prize, winner consents to use of his/her name, photograph and other likeness for purpose of advertising, trade and promotion on behalf of General Motors without further compensation, unless prohibited by law. Rules are subject to any requirements/limitations imposed by the Federal Communications Commission.

For the name of winner (available after November 15, 1999), send a separate, stamped, self-addressed envelope to: Where's the Tracker Winner, P.O. Box 4972, Blair, NE 68009-4972 USA.

Sweepstakes sponsor: Chevrolet Motor Division, General Motors Corporation, 100 Renaissance Center, Renaissance Drive, Detroit, Michigan 48265.



REVIEWS

DV-414 DVD player, Lexicon DC-1 pre-amp/processor, and Acurus amplification.

While nationalistic overtones are odious, especially while just at war in the Balkans with a psycho-jingoist, I've gotta say that the 605 sounds like it was designed first and foremost for an American audience. And that refers not so much to its home theater suitability as to its unashamed dynamics. This is a bold, big-sounding speaker, as far removed from the twee and precious delicacy for which Brit-boxes are known as a Corvette is from a Mini. This speaker is almost a denial of British audio virtues, and for that it will be loved.

Almost from the outset, I was impressed by the speaker's way with scale. In a sense, this reinforces its home theater role, but it's just as valid for massive orchestral works. Having recently rediscovered the, uh, glories of James Horner's *Glory* soundtrack, I've been using it as a genuine example of the inescapable link between pure audio and pure cinema. The B&W conveys the majesty without any sense of constriction, and its bass performance is the key. On an array of discs pos-

**This is a bold,
big-sounding speaker,
far removed from the
precious delicacy of
customary Brit-boxes.**

sessing rich acoustic bass passages, timpani, and—yes—explosions, the 605 rose, or rather sank, to the occasion. No flatulence, no truncated decay, plenty of slam. This speaker is not going to please subwoofer vendors one bit because it really delivers the goods in a room I feel is too large (14 x 22 feet) for small two-way systems.

But bass is only part of the equation, however much the world is being overrun by Beavis and Butthead. The midband and treble exhibit enough of the refinement of the 800 Series speakers to fool you just enough into thinking that you've pulled a

fast one: that you can have finesse with seriously deep bass for such a sane outlay (and still get a couple of 130-watt amps thrown in for free). But again, home theater rears its head and you notice that the mid and treble lean toward the energetic. Vocals are clear and precise, but a bit cool. If this worries you, then by all means drive the upper units with the fattest, warmest-sounding tube amp you can muster.

Still, I was constantly drawn back to the 805. As one who hates denial, I will unashamedly state that I am a midband fanatic, one who'll gladly sacrifice bass for the rest, so part of me finds the smaller speaker irresistible. Clearly, there's no escaping the Nautilus 805's far greater refinement and delicacy, let alone its superior cabinetry. But I did say that B&W ain't stupid and that the 605 and 805 aren't mutually exclusive. What prevents the latter from occurring are such elements as the 605's perceived value, absolute bang-for-the-bucks, and ultimate versatility. In which case, the B&W DM605 S2 emerges as one of the very best buys on the market, especially for those who enjoy both home theater and pure audio.

A





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Toshiba SD-9000 DVD Player



Toshiba—the self-proclaimed prime developer of the DVD format (which I guess makes it first among equals)—recently launched a fourth-generation player, the SD-9000. The first DVD deck admitted to Toshiba's exclusive Cinema Series, it is claimed to redefine "the state-of-the-art in DVD-Video performance, quality and functionality," "to provide unmatched picture and sound quality, flexibility and user convenience," and to offer "the highest level of DVD video playback quality attainable." Sounds good to me. Pass the popcorn—and a check for \$1,100!

Toshiba attributes the improved performance to construction designed "to dramatically reduce mechanically induced vibration and resonances" and to an advanced anti-aliasing filter and 10-bit, 27-MHz video DAC that are claimed to pro-

vide resolution in excess of 500 lines. I can attest that the SD-9000 is heavier than many players, thanks no doubt to its resin-impregnated base, shock-damped cover (there's a plate laminated to the inside of the cover over the transport mechanism), and machined aluminum front panel. I can't attest to the 500 lines—not because I doubt that the SD-9000 can do that, but because I know of no test disc capable of

TOSHIBA

Dimensions: 3¼ in. H x 17 in. W x 12¼ in. D (8.1 cm x 43.2 cm x 31.0 cm).

Weight: 15 lbs. (6.8 kg).

Price: \$1,100.

Company Address: 82 Totowa Rd., Wayne, N.J. 07470; 973/628-8000; www.toshiba.com/tacp

proving the point. Suffice it to say that it shows no sign of quitting at 440 lines, which is about as high as the wedge patterns on test discs go.

The player also features two-level 3D-DNR digital video noise reduction, which is claimed to reduce the incidence of random video noise, particularly in background images. Toshiba's 3D-DNR works in the usual manner, by storing picture frames in a digital buffer and correlating the present frame with the previous one to identify and average out the noise. I've never understood why one needs noise reduction in a digital-video system, but Toshiba is not alone in thinking it's useful. The company's literature says it's highly effective in reducing

Resolution shows no sign of quitting at 440 lines, which is about as high as the test discs go.

blocking noise in Video CD software, but who in this country uses Video CDs? It sure didn't reduce blocking on low-bit-rate DVDs and, if anything, made matters a little worse on high-bit-rate pictures by blurring vertical details, such as the ripples on the surface of moving water.

Like most new upscale DVD players, the SD-9000 has color-difference, a.k.a. component-video, outputs as well as S- and composite-video connections, one of each type. Toshiba calls its color-difference outputs ColorStream and has equipped more than 30 of its 1999 TVs with corresponding inputs. Color-difference (component) connections are the best way to go with digital video, and although Toshiba likes to identify its system with a proprietary name, the SD-9000 outputs are fully compatible with any monitor that provides color-difference inputs.

The SD-9000 passes DTS, Dolby Digital, and MPEG-2 audio bit streams via optical and coax connectors for downstream decoding but also has a full 5.1-channel Dolby Digital decoder built in. Toshiba uses Fujifilm's Vaddis II chip (a Zoran design li-



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censed by Fuji) for this purpose. The player can also provide a two-channel mixdown feed for stereo TVs and for A/V amps and receivers that can manage Dolby Pro Logic but not Dolby Digital decoding. There's also a headphone jack and volume control on the front for private listening. To enhance stereo listening, the player provides two Spatializer N-2-2 modes, one for use with loudspeakers like those in a stereo TV, the other for headphone listening. These provide a virtual surround sound experience that is better than nothing but no substitute for the real thing. All connectors save the optical socket and the S-video jack are plated in dazzling gold.

Although the SD-9000's feature roster is not unique, it includes a few things that some other players might not. For example, the Dolby Digital bass-management options permit you to set the system up with or without a subwoofer and with "Large" or "Small" center and surround speakers. You also can choose not to use center or surround speakers, with signals routed accordingly. And you can adjust the delay for the center and surround channels relative to

The SD-9000's internal 5.1 decoder is more accommodating than those of some other players.

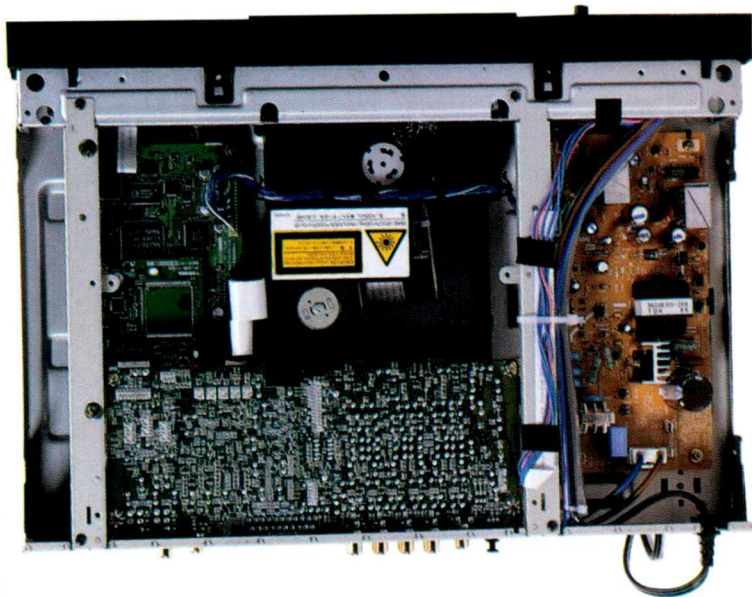
the main fronts. All this is accomplished via on-screen menus that are clear and reasonably intuitive.

There's no option for using "Small" main front speakers, however, or any means to accommodate center and surround speakers of different size. There is no choice of bass-management crossover frequency, either, and the crossover point proved to actually be a bit higher than usual (-3 dB at about 125 Hz), with filter slopes that are rather gradual (6 dB/octave on the high pass and somewhere between 6 and 12 dB/octave on the low pass). Nonetheless, Toshiba's internal Dolby Digital 5.1 circuitry is more accommodating than that of some other players.

On the audio front, the SD-9000 sports 96-kHz/24-bit "multi-port" DACs in "a parallel configuration" (whatever that means). The converters are said to "filter the L/R audio signals three times to achieve ultra-low distortion, improved signal-to-noise ratio and dynamic range greater than 112 dB."

Toshiba's remote is long and rather heavy, but it's relatively easy to grasp. Besides the SD-9000, it handles TVs and cable boxes from an extensive list of manufacturers. But it is not universally programmable. A slider on the side chooses the device to command: DVD, TV, or cable. The most frequently used keys—the transport controls, zoom, angle, subtitle, and so forth (along with the ubiquitous up/down/left/right arrows and "Enter" button for navigating on-screen menus)—are always available and illuminate at the touch of the "Light" button. Although the backlighting is none too bright, it's helpful in a dark room. If the room is relatively well lit, the backlighting isn't visible (which is no problem, since then you can see the buttons anyway). However, I found I really had to aim the remote directly at the SD-9000 to get the deck to respond if the room lights were up. A more powerful remote would be greatly appreciated.

At the base of the remote is a door that slides down to reveal a numeric keypad and some less frequently used controls. These mostly involve the deck's programmer, but a few oddballs, like the "3D DNR" button, are there as well. Between these and the main bank is a jog/shuttle combination for slow and accelerated forward and reverse motion. I found it a pain to use. The SD-9000 seems to take its own sweet time responding to commands, and I was never quite certain whether that was because the deck didn't receive the command, or because its microprocessor was dragging its butt. Whatever the reason, this encouraged me to twist the ring further than I should,



causing the deck to go into a X30 mode rather than X2. Next thing I knew, I'd shot past the point I'd wanted and was cursing up a storm.

Frame-advance and slow motion were admirably smooth in the forward direction but quite jumpy in reverse. The SD-9000 always managed to land on a full "I" frame, but it seemed to jump back further than necessary to find one.

Picture resolution on my projection monitor was as good as the bench tests suggested. Even the tightest wedges of the Snell and Wilcox test patterns were clearly delineated, and the color rendition was subjectively pleasing. I noted some instability in midrange gray scale that escaped me on the bench. It's not something I test for often; perhaps I should! But the problem was too minor to be visible in a normal picture.

To check the 3D-DNR, I used certain tracks of the THX test disc that are encoded at reduced bit rates and produce noticeable blocking, or tiling, on DVD players. There are a number of such tracks at different bit rates, so you can judge where matters improve sufficiently to be "acceptable." I could find no evidence that the 3D-DNR did anything to prevent or obscure blocking in these pictures. Indeed, I could see little difference whether it was on or off other than a softening of vertical detail with it on. What's more, the blocking at any given bit rate seemed to me to be more apparent on the Toshiba SD-9000 than it did on my reference Sony DVP-S7700.

TEST RESULTS

Despite Toshiba's claims for the filters in the SD-9000's audio D/A converters, they proved less effective than those in many other upscale players. There is visible ripple in the frequency response (Fig. 1), and though the ripple is quite minor and overall response is within ± 0.07 dB across the audio band, distortion at 20 kHz (in stereo) hits a whopping 0.249% (as shown in Fig. 2). The culprit is a 24.1-kHz beat

created between the sampling carrier (44.1 kHz) and the signal (20 kHz): This is a consequence of inadequate digital filtering. Fortunately, the beats at lower frequencies are weaker, and converter distortion barely exceeds 0.03% at frequencies below 20 kHz. Nonetheless, I had hoped for better numbers considering the price of this DVD player.

Figure 2 contains two curves, both taken on the left front channel. The blue curve shows data taken at 0 dBFS in stereo; the other was taken at -10 dBFS using a Dolby Digital signal. (The data taken on the other Dolby Digital channels were essentially the same as on the left front, which is why they're not shown.) As you can see, distortion in Dolby Digital is lower at 20 kHz than in PCM, but distortion in the top octave overall is higher with a -10-dBFS Dolby Digital signal than with 0-dBFS PCM information. Frequency response of the five full-range channels in Dolby Digital was essentially the same as that of the left and right channels in stereo (except that the ripples occurred at different frequencies). This is why they are not broken out separately in Fig. 1.

Figure 3 shows total harmonic distortion plus noise (THD + N) versus level in stereo with a 16-bit, 1-kHz signal. Noise and distortion at signal levels below -30 dBFS are excellent (less than -96 dBFS), but the distortion rises quite steeply at higher signal levels. THD + N of -78.6 dBFS at 0 dBFS is nothing to write home about in a top-of-the-line player. Undoubtedly, the increase in distortion at high signal levels also gives rise to the punko quantization noise figure, which is one of the poorest I've measured in the past few years.

Linearity error measured in PCM stereo (Fig. 4) is okay but nothing to get excited about. A good D/A converter shows less than 0.2 dB error at -100 dBFS with a dithered signal (a really good one has virtually none!), whereas this DAC's error exceeds 0.5 dB at that level. The fade-to-noise linearity error plots I took merely confirm the overall results of Fig. 4 and therefore are not being shown. Dynamic range is reasonably good but remains a few decibels shy of the best

MEASURED DATA

Audio

Line Output Level: 2.06 V at 0 dBFS.
Line Output Impedance: 200 ohms.
Frequency Response: PCM, 20 Hz to 20 kHz, +0.06, -0.07 dB; Dolby Digital, full-range channels, 20 Hz to 20 kHz, +0.05, -0.11 dB, worst case; Dolby Digital, LFE channel, below 20 Hz to 120 Hz, +0.08, -0.11 dB.
S/N re 0 dBFS: 116 dB, A-weighted.
Quantization Noise: -83.6 dBFS.
Dynamic Range: 98.4 dB, A-weighted; 96.2 dB, unweighted.
Subwoofer Crossover: High-pass, -3 dB at 122 Hz and -6 dB at 73 Hz, 6 dB/octave; low-pass, -3 dB at 128 Hz and -6 dB at 165 Hz, 9 dB/octave.

Video

Luminance Frequency Response: +0, -1.3 dB to 4.2 MHz; down less than 0.4 dB at 5.5 MHz.
White (Luminance) Level: 109 IRE.
Black-Level Accuracy: 1 IRE high.
Gray-Scale Linearity: Within 1 IRE.
Chrominance Frequency Response: Down less than 10.6 dB at 2.75 MHz.
Chroma Level Accuracy: +0.7 dB.
Chroma Phase Accuracy: Within 1°, depending on color.
Chroma Differential Gain: Within 10%.
Chroma Differential Phase: Within 3°.
Chroma-Luma Time Displacement: 20 nS, worst case.
Overshoot: 0 IRE.
Chroma Burst Level: 40.5 IRE, peak-to-peak (0.1 dB high).
Sync Pulse Level: 44.5 IRE (0.9 dB high).

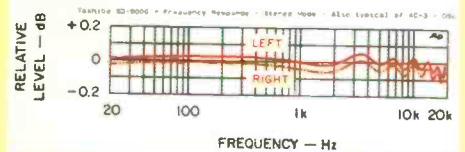


Fig. 1—Frequency response, PCM mode.

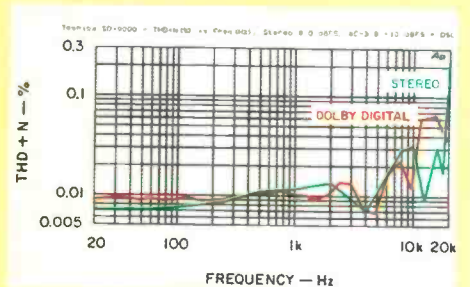


Fig. 2—THD + N vs. frequency.

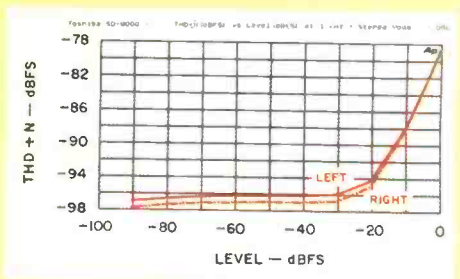


Fig. 3—THD + N vs. level at 1 kHz.

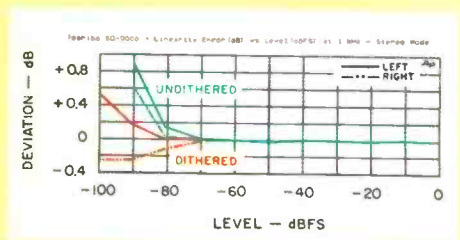


Fig. 4—Linearity error.

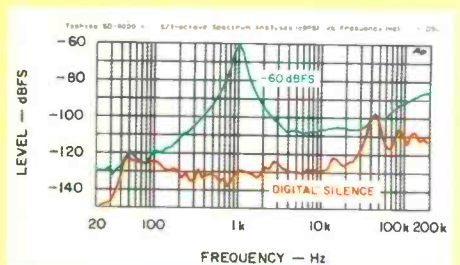


Fig. 5—Noise spectra, PCM mode.

REVIEWS

players and certainly doesn't get near Toshiba's 112-dB figure. In fact, it's theoretically impossible to achieve a 112-dB dynamic range with a 16-bit stimulus, so I expect Toshiba's claim is based upon a 24-bit source. But if the player doesn't do as well as some others with a 16-bit source, how can we expect it to lead the pack with 24?

Figure 5 contains $\frac{1}{3}$ -octave spectral analyses of the 1-kHz, -60-dBFS signal used to measure dynamic range and the residual noise in the output when playing the "digital silence" band of the CD-1 test disc. The output is blessedly free of power-supply hum, but note the spike in the noise curve at the sampling frequency (44.1 kHz) and its harmonics. No wonder beats are produced! From the shape of the noise curve, it's clear that Toshiba's DACs mute on the silent code, which explains the good-looking S/N figures in the table.

The output levels of the five channels are well matched (within 0.04 dB), and separation, both in stereo (86 dB) and in Dolby Digital (72 to 99 dB), is fine. Main output level and impedance are ducky, too, but the headphone amp clips at a rather low level. Nonetheless, it's probably adequate for most consumer headsets. I don't think many readers will be listening to DVDs over headphones anyway.

The Toshiba SD-9000's video performance failed to live up to the hoopla about the 10-bit, 27-MHz video DACs, although the resolution is good. Not that the video performance is bad or that there are obvious problems on the screen: It isn't and there aren't. However, when I find player after player that is dead accurate vis-à-vis luminance, chroma-burst, and sync levels, it's bothersome to find a pricey, top-of-the-line model that's off the mark.

The SD-9000 also exhibits measurable chroma differential gain and chroma-luma time displacement, which other players do not. Luminance channel response, on the other hand, is admirable, as is chroma phase (tint) accuracy, and the deck responds to rapid shifts in luminance level (the "overshoot" measurements) very well.—E.J.F.

I used CDs rather than DVDs to evaluate audio performance. At least I know I'm getting straight 16-bit PCM. The sound was decent but by no means as good as it could (and should!) be. James Levine's piano was a bit strident, Dawn Upshaw's voice rather shrieky, and the image and ambience rather distant in the Sony SBM recording of the "Forgotten Songs" (*Dawn Upshaw Sings Debussy*, James Levine, piano, Sony Classical SK 67190). The sound from the new Bit-stream recording of Mitsuko Uchida playing the Schubert Piano Sonatas D. 958 and D. 959—made by Philips in the Musikverein, Vienna (Philips 456579)—also was disappointing. I've heard this recording in its original format, so I have some idea of what it can do, and this ain't it! The sound through Toshiba's converters is hard, the ambience confusing, and the decay rather unnatural. One final example: the Rodrigo *Concierto de Aranjuez* (EMI Classics 54665) with Christopher Parkening and the Royal Philharmonic Orchestra under Andrew Litton. One would hardly recognize this as Parkening playing a José Ramirez guitar. The guitar sounds dull, characterless, and lifeless; the violins, on the other hand, are shrieky and edgy. And the orchestral transients are tizzy—precisely the opposite of the guitar. Beats me!

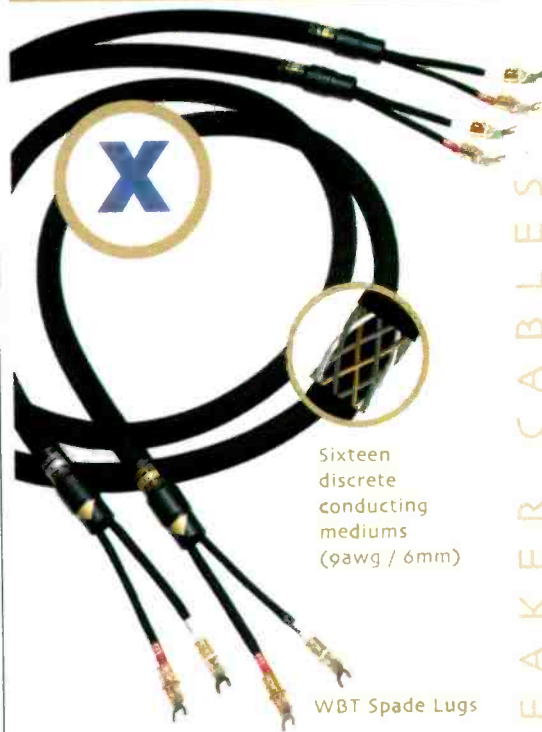
Well, I guess I've rather chewed up on the Toshiba SD-9000. I dare say most people would be very glad to have it. I just think that in this price range, one has a right to expect more. Not my first choice for a top-of-the-line DVD player. **A**



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Although Vandersteen Audio's 2Ce Signatures aren't mammoth, at 70 pounds each they aren't exactly anorexic either. The optional steel bases (\$125) Vandersteen sells for use with the 2Ce Signatures added another 22 pounds each—and that's before they're filled with the requisite sand. Despite their heft, the 2Ce Sigs are relatively simple to set up. Three floor spikes with jam nuts insert into threaded holes on the bottom of each T-shaped stand, and then

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Rated Impedance: Nominal, 7 ohms; minimum, 4 ohms.

Rated Sensitivity: 86 dB SPL at 1 meter, on-axis, 2.83 volts applied.

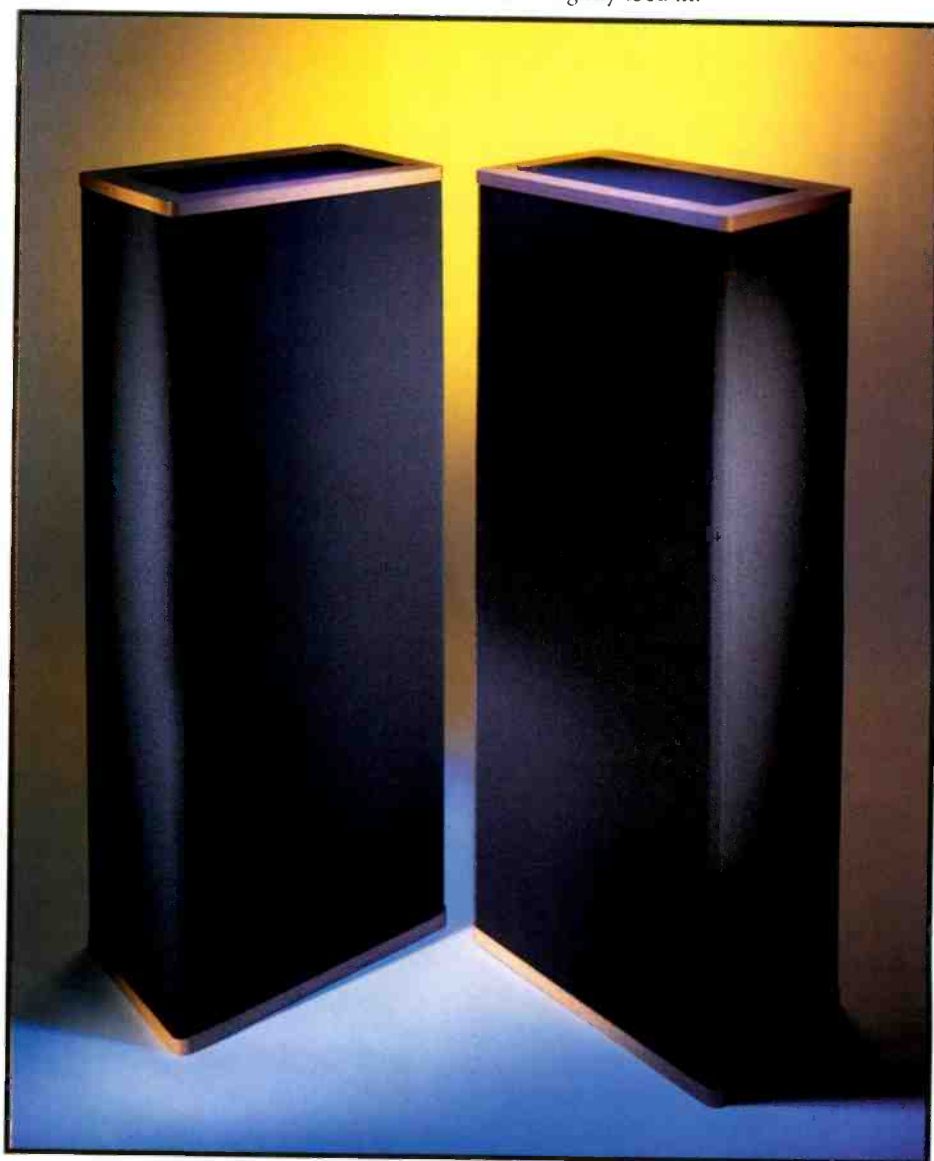
Recommended Amplifier Power: 40 to 160 watts.

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Price: \$1,495 per pair.

Company Address: 116 West 4th St., Hanford, Cal. 93230; 559/582-0324; www.vandersteen.com.



the bottom of each overturned speaker can be secured to the top side of the stand with supplied bolts and washers. Then it's just a matter of flipping the speaker over and adjusting the spikes for the proper speaker angle, or "lean."

The user's manual provides a "Listening Height" chart to aid in adjusting the speaker angle vis-à-vis the distance of your ears from the floor and the distance of your lis-

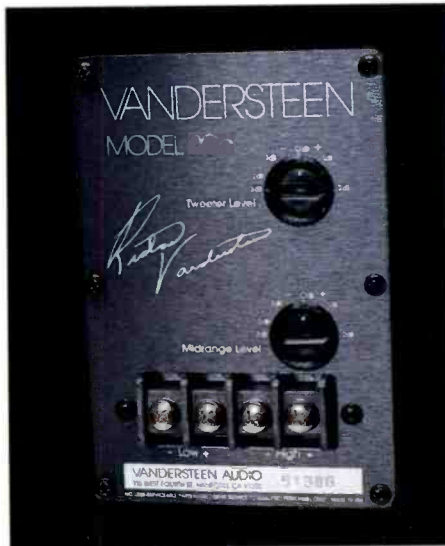
tening position from the speakers. For example, my listening position was centered approximately 11 feet from the speakers, and my ears were at a height of about 39 inches from the floor. Subsequently, I angled each speaker so there was a 1 $\frac{1}{2}$ -inch variance between the back edge of the top and bottom. Also, after listening extensively for a few weeks, I found the Sigs sounded best slightly toed in.

Vandersteen strongly recommends bi-wiring the 2Ce Signatures (either with a single amplifier or via vertical biamplication with two identical amps) and suggests that mono-wiring be used only "as a temporary connection method." The Signatures—unlike the predecessor 2Ce's, which have banana-plug receptacles—feature terminal barrier-strip inputs that accept spade-lug connectors with a maximum

width of 7/16 inch. I powered the pair with a Thule Audio Spirit IA 60 integrated amplifier rated at 60 watts per channel into 8 ohms and 85 watts per channel into 4 ohms. The sole signal source was a Thule Audio Spirit CD 100 CD player. I connected the amplifier to the speakers using primarily Kimber Kable BiFocal-XL cables 8 feet in length, though I did some of my initial listening with Monster Cable Z3R cables. The amplifier and CD player were linked with Kimber Hero interconnects.

The fundamental topology and outward facade of Vandersteen's 2-series speakers hasn't changed much since the basic design was introduced in the mid-1970s. Judged by appearances only, the 2Ce Signatures are identical to the 2Ci's I used for years and still have on hand. In fact, I had to chuckle when I caught my neighbor (who helped me set up the 2Ce Sigs) doing tennis-match type glances between the new models and the 2Ci's in an adjacent room. "They're the same speakers!" he finally protested. "On the outside, perhaps," I replied. The 2Ci's are 3 pounds heavier and 3 inches shorter, though the 2Ce Signatures' squat stands give both pairs the same stature. Other than that, they're virtually identical: the same top and bottom wood-veneer end caps, each with a cloth-covered opening at top, and the same black grille-cloth cloak. They are different on the inside, though, and quite dissimilar in performance, as I found out. But my neighbor was already walking out the door rubbing his back, shaking his head, and muttering something about "crazy stereo people."

Vandersteen's strategy has been to upgrade the interior components of its 2-series speakers (and 1 and 3) while keeping the basic design the same: mounting the drivers in small, individual, staggered enclosures with contoured baffles. (The company claims that saving money on exotic cabinets enables resources to be directed towards improvements in the driver and crossover parts.) Top to bottom, behind each Signature's translucent black mask is a 1-inch, critically damped metal-alloy dome tweeter that plays from 5 to 30 kHz; a 4½-inch midrange with a die-cast basket and curvilinear polycone that takes over at 5 kHz and starts to roll off at 600 Hz; an 8-



The 2Ce Sigs replicated singer Luka Bloom's chesty, resonant vocals in warm and vivid tones.

inch woofer that uses the same type of basket and cone as the midrange driver, has a heavy-duty, 1½-inch, four-layer voice coil with a ventilated aluminum former, and is assigned frequencies from 35 to 600 Hz; and a rear-firing active acoustic coupler with a 10-inch carbon-fiber-reinforced paper cone attached to the same type of voice coil as the woofer. The coupler operates from 28 to 35 Hz. The tweeter and midrange also have ferrofluid voice-coil cooling, and contour controls on the aluminum dress plate below the terminals allow ± 3 -dB midrange and treble adjustments. The first-order (6-dB/octave) crossover is similar to the one used in Vandersteen's Model 5 speaker line and has high-purity silver internal wiring.

Vandersteen assured me that my test samples were broken in before I received them. Nevertheless, I listened to a wide variety of music while getting better acquainted with the 2Ce Signatures over the course of about three weeks before I sat down for more focused listening. The speakers performed admirably for casual listening around the house, whether I was quietly spinning John Coltrane's *Like Sonny* com-

pilation (*Roulette Jazz*) during a weeknight dinner, cranking Wilco's *Summer Teeth* (Reprise) on a Saturday afternoon, reading the Sunday paper to Keola Beamer's *Wooden Boat (Dancing Cat)*, or dancing in the living room on a Friday night to *Zydeco Dynamite, The Clifton Chenier Anthology* (Rhino).

Here's what more critical listening revealed. On "Cold Comfort," the opening track of Luka Bloom's '94 CD *Turf* (Reprise), the Sigs replicated the Irish folk singer's chesty, resonant vocals in warm and vivid tones, though they sounded a bit congested and overemphasized at certain midrange frequencies. (I also happened to see Bloom live at The Roxy, an intimate showcase club in Los Angeles, during the period I did most of my listening.) The taxing lower registers of his voice, however, were smoothly and heartily reproduced, but there was a little exaggeration of sibilances. The soundstage had good width and depth, although the vocal image wavered. The steely high notes of Bloom's acoustic guitar were clear and extended and only a tad harsh. Fiddling with the contour controls while repeatedly listening to this track did little to tame any of the mid- and high-frequency anomalies.

On the brisk instrumental, "The Blues Walk," from *Lyle Lovett and his Large Band* (Curb/MCA), the dynamics were superb. There were heaps of air between the barrage of instruments on this track, and the soundstage was impressively spacious. The impact of the drums and bass guitar was visceral and lifelike. The electric guitar was accurate and so was the piano—except for a little sheen. The horns, however, were more than a little hot and brassy. On the deceptively complex track "I Know You Know," the sound was exquisite. In fact, "I Know" has never been one of my favorite tracks on *Large Band*, but the Vandersteen 2Ce Signatures gave me a new appreciation for its understated charms. The soundstaging was intricately layered; the horn section seemed to wrap around the rest of the instruments. The sax solo was rich and full-bodied, but the image focus was indistinct. The entire track had the intimacy of listening to a jazz combo in a small club. Throughout this disc, the dynamics were

TEST RESULTS

The Vandersteen 2Ce Signature is interesting in that it is a phase-compensated design, which no doubt accounts for the rather low frequency to which essentially constant group delay is maintained (Fig. 1). Above 100 Hz, the only prominent irregularities correlate strongly with peaks and dips in the frequency response (also Fig. 1), suggesting that they are caused by driver resonances. Overall, the on-axis frequency response is reasonably smooth, although there are the aforementioned jogs of about ± 2 dB in the region covered by the midrange driver. The midrange crosses over to the tweeter at 5 kHz, and you can see that the latter's output shelves down a couple of decibels. Bass response is well extended—flat to 50 Hz and -3 dB relative to the midrange at 40 Hz.

Horizontal off-axis response (Fig. 2) holds up well to 20° and then tapers off gradually at high frequencies as the angle

The Vandersteen Signatures delivered blasts of Dana Colley's baritone sax *con huevos.*

increases. As is usual, the vertical off-axis plots (Fig. 3) are more irregular, with some notching apparent in the vicinities of the crossovers, but they are still quite reasonable, especially within $\pm 30^\circ$.

This speaker's impedance curves (Fig. 5), both magnitude (the lower plot) and phase, are astonishingly smooth. The magnitude is between 3 and 10 ohms over the entire audible range and stays close to 6 ohms in the critical decade from 100 Hz to 1 kHz, where so much of the power in music is concentrated. The phase varies almost not at all between 100 Hz and 5 kHz, and its deviation over the whole band is a mere $\pm 35^\circ$. That the impedance goes as low as it does at some frequencies would

discourage paralleling a pair of 2Ce Signatures with another set of speakers, but by themselves they should be a very easy load for any decent amp or receiver.

Distortion—specifically, the second through fifth harmonics—is shown in Fig. 6, measured at the input level required to produce 100 dB SPL output at mid-band. These results are quite good down to 30 Hz or so. The Vandersteen 2Ce Signature speaker should be able to play quite loud without strain on just about any kind of music.—*Michael Riggs*

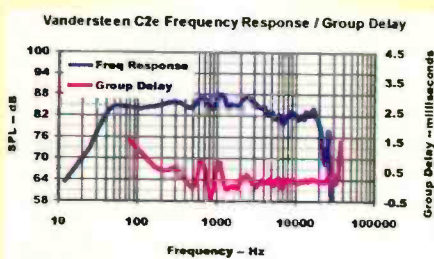


Fig. 1—On-axis frequency response (blue) and group delay (magenta).

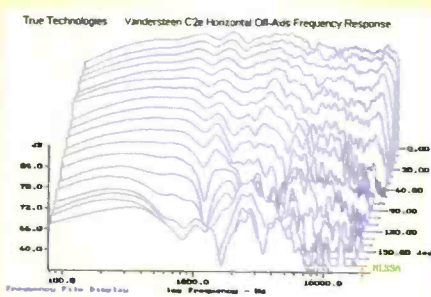


Fig. 2—Horizontal off-axis frequency responses.

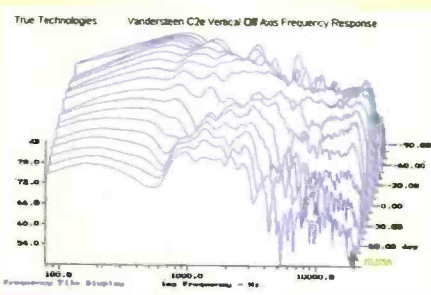


Fig. 3—Vertical off-axis frequency responses.

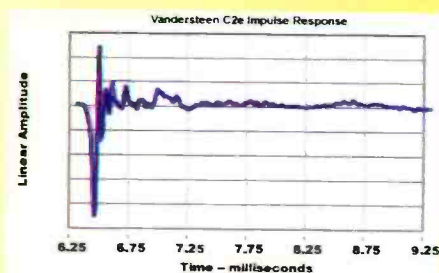
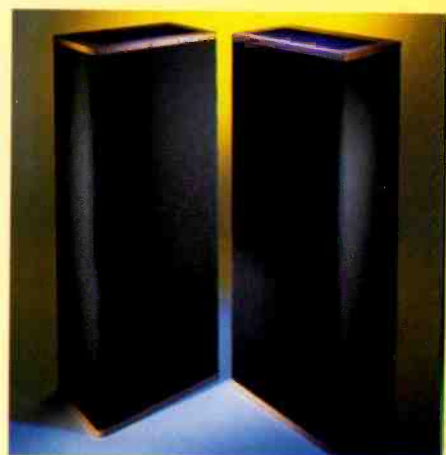


Fig. 4—On-axis impulse response.

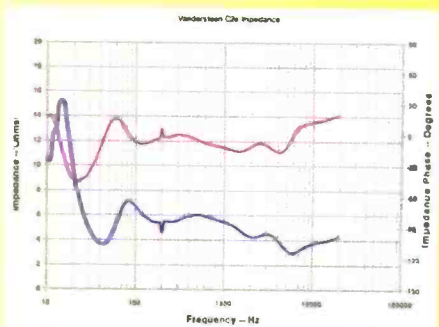


Fig. 5—Impedance vs. frequency, magnitude (blue) and phase (red).

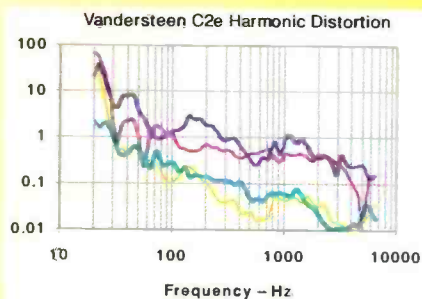


Fig. 6—Harmonic distortion vs. frequency, second (purple), third (magenta), fourth (yellow), and fifth (blue) harmonics shown.

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good at both low and high levels. In fact, the Thule amplifier's highest volume setting is 79, and I pushed it up to 75 on both "I Know" and "The Blues Walk," and neither speakers nor amp showed signs of strain or breakup.

On "Heads Up," the lead-off track on *Bluesiana Triangle* (Windham Hill Jazz), the eponymous-titled 1990 disc by Dr. John, Art Blakey, and David "Fathead" Newman, the sound was remarkably spacious and open. The timbre of Newman's sax was spot-on, and Dr. John's piano was equally convincing. I've heard this disc hundreds of times, but when listening to it through the 2Ce Signatures, I enjoyed it more than I can ever recall. I actually had to keep reminding myself to stop tapping my pen on my notepad and stomping my left foot so I wouldn't interfere with my listening! On track 2, "Life's a One Way Ticket," the ambience of the small studio in which this disc was recorded was palpable. Essiet Okon Essiet's acoustic bass was supple and realistic, and Dr. John could have been playing piano in my living room. However, the good Doctor's bullfrog vocals were too thick, and Blakey's cymbals were overly bright. The high point of all my listening sessions, however, came during *Bluesiana Triangle*'s 10-minute funk-jazz improvisation "Shoo Fly Don't Bother Me." The soundstage was about the best I've ever heard from this recording, and the music was rendered in tangible textures and immaculate detail. During Newman's flute solo, it was easy to hear the breath preceding each note. The climax, however, was Blakey's potent percussion solo at the end of the track, which was reproduced as rigorously as Blakey worked his drum kit. The impact was striking, and drum-skin tone was flawless.

Shortly after cueing up Lucinda Williams's critically acclaimed '98 recording, *Car Wheels on a Gravel Road* (Mercury), I noticed that the Sigs brought out the ragged charisma of her tough and twangy vocals on "Right in Time." Roy Bittan's subtle accordion hovered clearly in the background—not too forward and not too obscured. On "Drunken Angel," the individual timbres of the 12- and six-string electric guitars and six-string acoustic

were well defined, and Steve Earle's harmonica punctuations were pure. On "Lake Charles," Charlie Sexton's doleful Dobro licks were convincing enough for me to consider pulling out the Jack Daniels, and each of Buddy Miller's perfectly placed electric-guitar fills made me thirstier. The only thing that kept me from heading for the liquor cabinet was the goose-bump-inducing moan of Williams's voice on the last verse of every chorus, which was intoxicating enough. The densely mixed rocker "I Lost It" was cleanly reproduced no matter how hard I cranked it. The song's dueling electric guitars were well separated and conspicuous, while the accordion solo stood out defiantly rather

On John Coltrane's "Naima," the 2Ce's soundstage was immense, and the ambience bona fide.

than getting buried in the song's sonic maelstrom. The gallery of guitars in "Joy"—three electrics(!) plus Earle's "resonator" gitz—were equally clear-cut and reproduced with a good balance of beauty and bite.

To test the Sigs' bass muscle, I resorted to Morphine. For years I've used the bruising "Buena," the second track on the Boston trio's *Cure for Pain* CD (Rykodisc), to test bass extension and detail. The low-frequency-saturated lineup of bass guitar, saxophone, and drums never fails to separate the real woofers from the wimps. The Sigs delivered blasts of Dana Colley's baritone sax *con huevos*, but they couldn't quite cope with Mark Sandman's bass-guitar growl, particularly the punishing passage at 1:48.

Next, I sampled several audiophile tracks from a sampler titled *Disque de démonstration Focal automobile numéro un*. On Junior Wells' version of "Sweet Sixteen" from *Everybody's Getting Some* (Telarc), there was good definition and delineation between the furtive electric guitar, thumping bass line, and rifle-shot

drums. Wells' incomparable harp work was grippingly detailed, and his singing was reproduced in gruff splendor. On Thom Rotella's version of Coltrane's "Naima," from *Platinum Melodies* (DMP), the soundstage was immense, the ambience bona fide, and the kick-drum had concussion-like impact. The saxophone tones in Harry James' rendition of "Sweet Georgia Brown" from *Comin' from a Good Place* (Sheffield Lab) were authentic, and the rest of the horns sounded natural and uncolored. And when all the horns kicked in at 2:16, they blended well, without massing. Jeannie Bryson's sultry vocals on "Fever," from *Some Cats Know* (Telarc), were focused dead center, and the track's muted trumpet was precise. The best part, though, was the bass: lush and strong, but not overpowering. "Spanish Harlem," by Rebecca Pidgeon, from *The Raven* (Chesky), also had pinpoint center vocal imaging. The strings had a hint of harshness on the upper end, however, and the sound of the piano was a trace tinny.

For kicks, I hooked up my old pair of Vandersteen 2Ci's that I bought at the beginning of this decade. First, I again listened to Bloom's "Cold Comfort" on the trusty ol' 2Ci's. His voice, however, wasn't as true, plus there was a boxy coloration. The guitar was clear, actually sharper on high notes. The soundstage was okay, and the imaging was fuzzier. Overall, the sound was not as transparent as with the 2Ce Signatures. Lovett's "Blues Walk" wasn't as dynamic and powerful. The bass was tubbier, and the horns blared. On *Bluesiana Triangle*'s "Heads Up," the bass was ill-defined, but the piano still sounded great; on the same album's "Shoo Fly," the flute solo was far less detailed. Finally, on Morphine's "Buena," there was an annoying amount of rumble, and at high levels the speakers chewed up Sandman's bass.

I like livin' large, especially when it comes to speakers. And except for a little mud in the midrange and some hash on the high end, the Vandersteens left a big impression on me, especially because, at roughly \$1,500 per pair, you're not looking at big money. And though it may be trendy these days to downsize, this is a case where size definitely matters. **A**



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“I was losing all my friends!”

Matt Polk, Speaker Specialist

When friends needed an audio system, they would turn to me for advice. I was happy to help; nothing thrills me more than helping someone discover the joy of great sound. I make no apologies: I'm an audiophile. When friends asked my advice, I steered them to the highest performance components they could afford, which was easy when things were just 'stereo.' I would recommend components, give some quick set-up advice, and everybody was happy.

Things got complicated when digital home theater came along.

The phone calls would come just as we were sitting down to dinner. 'Hey Matt, what the %\$#&! is bass management and how do I turn it on?' Or, 'Matt you creep, I need an electronics degree to hook this contraption up!' Creep? Me? *Ouch!*

Obviously things aren't as simple as they used to be.

Don't get me wrong, I love digital surround technology, and nothing beats the excitement of a slick action flick on a great home theater system. But I got tired of making after-dinner house calls to hook up, set up, and explain how to use complicated home theater systems.

Yet I couldn't bring myself to recommend one of those 'home theater-in-a-box' systems. They may be easy to operate, but they fall far short of a 'spine-tingling' home theater performance.

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ANTHONY H. CORDESMAN

Lexicon MC-1 A/V Preamplifier

Lexicon's MC-1 Music and Cinema Processor is an excellent stereo and A/V preamp, a noteworthy digital-to-analog (D/A) converter, and a truly advanced surround processor. Its reproduction of Dolby Digital and DTS soundtracks and recordings is among the best I have yet encountered, and its surround processing is outstandingly, perhaps uniquely, flexible.

As a stereo preamp and D/A converter, the MC-1 is distinctly cleaner and quieter than its predecessor, the Lexicon DC-1 (which can be traded in against the MC-1 or upgraded to incorporate some of the new model's advances). The MC-1 is simply a better preamp, with far better DACs than the DC-1's: new 96-kHz/24-bit delta-sigma converters. It also has separate, digitally controlled analog volume attenuators for each channel.

The analog-to-digital (A/D) converters are, like the DACs, 24-bit delta/sigma designs. Lexicon states that these converters deliver "an astoundingly wide dynamic range." I long ago gave up on separating one manufacturer's technobabble from another's, but I must say that the MC-1 is remarkably quiet. Lexicon claims a dynamic range of 105 dB (versus 90 dB for the MC-1's predecessor). Verifying that is too much of a challenge for my limited test gear, but I

LEXICON

Dimensions: 17 $\frac{1}{2}$ in. W x 3 $\frac{1}{2}$ in. H x 11 $\frac{1}{2}$ in. D (44 cm x 29.2 cm x 9.2 cm).

Weight: 10.8 lbs. (4.9 kg).

Price: \$5,995.

Company Address: 3 Oak Park, Bedford, Mass. 01730; 781/280-0300; www.lexicon.com.

can attest that the MC-1, with its input shorted, was as quiet and clean as any component I have heard. It also had very good resolution of low-level digital signals and very fast, clean dynamics.

When I plugged the MC-1 into a stereo reference system, I got the kind of sound quality I'd expect from a good separate stereo preamp and D/A converter. Lexicon didn't sacrifice any essential aspect of musical sound quality to make room for audio/video features. I do not mean you should rush out and buy an MC-1 instead of a reference-quality stereo preamp. The Lexicon is not quite as clean and transparent as a Krell KD-25 or a Pass Aleph preamp, and I wouldn't use it to replace a reference-quality Krell, Mark Levinson, or Theta D/A converter. The MC-1 did not have quite their transparency,

sweetness, and soundstage detail; its bass was very good, but the Krell's is incomparable. Nevertheless, these differences were surprisingly small when I listened to the MC-1 as a straight stereo preamp without using its processing features.

Considered strictly as a stereo preamp, the MC-1 has some functional advantages over purist models. It has not only tone controls but a "tilt" control to alter the overall high/low frequency balance, a surprisingly natural-sounding loudness contour, and bass-enhancement and subwoofer-management features you don't normally find on pure stereo preamps. These features may seem like heresies to the audiophile who values transparency and sonic detail above all else. They do, however, enable the MC-1 to provide far more timbre and frequency-balance adjustment than most stereo preamps, and I would rather have the right timbre than ultimate transparency. In addition, Lexicon's excellent manuals show exactly what each setting does. (Why, oh why, do the manuals for the few high-end components that have such features almost never show the response curves they produce?)

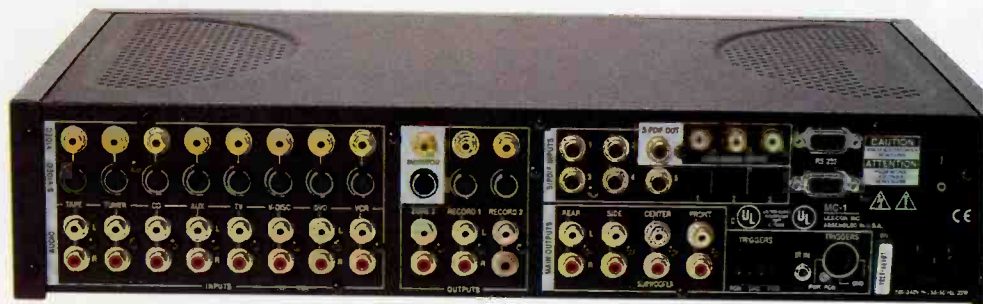
The Lexicon MC-1's adjustments cover not only timbre but imaging—even in

stereo mode. Its "Panorama" control can help cancel interaural crosstalk, giving the soundstage exceptionally clear imaging. This feature was particularly good with stereo recordings having a natural soundstage and with binaural recordings. You can also use the "Panorama" effect's "Low Frequency Width" adjustment to change the feeling of space on some recordings by varying the amount of out-of-phase bass information in the output signal.

The MC-1 has a low-frequency enhancement algorithm designed to give you smoother and more enveloping bass if your system uses full-spectrum speakers (rather than bass-limited satellites) at the front, side, or rear. In addition to the THX-specified 80-Hz crossovers (the MC-1 is THX-Ultra certified), there are 120-Hz and 40-Hz crossovers to allow the use of subwoofers with speakers that have real low-bass capability, small satellites, or a mixture of both.

If you are willing to drift even further from sonic Puritanism into sonic heresy, you can use the MC-1 to derive five- or seven-channel surround from your stereo recordings. I found its "Music Surround" particularly good for acoustic jazz, acoustic rock, and classical music; another, "Music Logic," is especially good for rock, country, jazz, and pop vocals. There are also "Nightclub," "Concert Hall," "Church," and "Cathedral" surround modes, useful for some dull or mediocre recordings. The parameters for all these modes can be adjusted to enhance the way individual recordings sound on your particular system. Among the adjustments available in various surround modes are delay, center level, subwoofer level, "Speech Detection" (which reduces the effect settings when there's a centered vocalist or mono dialog), and hall size. Such surround modes may add little or nothing to the musical realism of the very best stereo recordings, but they will often add realism to the other 95%.

For listening to 96-kHz/24-bit DVDs, you press a shift key on the remote to bypass the digital processing and minimize the rest of the circuitry between you and the sound. In this mode, the MC-1 proved truly outstanding, equaling the sound of many far more expensive preamps and D/A



converters. I found this especially true on the best Chesky and Classic Records 96-kHz/24-bit DVDs, including Chesky's recent 96/24 music videos. I tried Sara K.'s *No Cover* (Chesky CHDVD195) and Chuck Mangione's *The Feeling's Back* (CHDVD194); the former was the most successful crossover from stereo music to audio/video I have encountered to date.

That brings us to video DVDs and home theater. The MC-1 is one of the best-thought-out and most flexible audio/video preamps made. Its ergonomics (among the finest I've seen in an A/V preamp) and its truly informative instruction manuals (which walked me stage by stage through every adjustment and the technology be-

Lexicon didn't sacrifice sound quality to make room for the MC-1's A/V features.

hind it) made the Lexicon easy to set up and a pleasure to use—something I can say of no competing A/V preamp. Its remote is also excellent.

This ease of setup, programming, and use is not purchased at the expense of versatility. The MC-1 provides every feature and facility you're likely to need, with the possible exception of balanced outputs. It has eight inputs for video (composite or S-video), eight stereo input pairs for analog audio, and eight digital inputs (five coaxial and three Toslink optical). A digital output enables direct dubbing from any digital input source to a CD-R, MiniDisc, or DAT recorder.

The MC-1 has a "Zone 2" output for multiroom systems, as well as two record outputs. All three carry the same signal, but level is adjustable only for "Zone 2." You can choose to block any source from feeding these outputs (to prevent feedback in recording), but this will also prevent that source from feeding your remote listening zone.

Five high-speed DSP engines perform all the MC-1's surround decoding, crossover, equalization, and configuration functions. Each of these engines is dedicated to specific surround-format and major audio functions. There are some two dozen processing modes, including Dolby Digital and DTS digital surround decoding and all the usual THX 5.1 enhancements.

The processing modes include a refined version of Lexicon's proprietary Logic 7 algorithm. Logic 7 is a surround process for playback of matrix-surround and stereo two-channel signals and enhancement of discrete 5.1-channel signals. It develops 7.1-channel surround and ambience via stereo pairs of side and rear channels. It is also able to "down-matrix" 5.1-channel signals for recording on two-channel media such as MiniDisc, CD-R, DAT, or Hi-Fi videotape; according to Lexicon, the matrix is compatible with Dolby Pro Logic, but you'll recover more of the original discrete recording's spatiality if you use Logic 7 in playback. The choice of surround modes in MC-1 is fully automatic, and it selects the highest-performing available surround mode from whatever's playing.

The MC-1 is also designed to stay current as digital technology and surround processing change, thanks to a discrete digital bus architecture that makes this preamp's circuits easy to update and upgrade. Its control software is upgradable by chang-

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Plus, you get multi-room/multi-source convenience at its best. Unlike infrared systems requiring sensors throughout the house, the RX-1028 employs RF technology. That means you can run your entire system via the remote control from anywhere, inside or outside. There's no need for installing expensive wall mounted sensors, or limiting system operation to only one or two rooms.

The new JVC RX-1028 provides superior home theater performance and custom install control at a fraction of the cost of separates. Is there any other receiver that can say the same?

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*130 Watts per channel @ 8 ohms with 2 channels driven, 20Hz-20kHz at 0.02% THD

**The RX1028 is one of the few receivers RATED into 4 ohms. 130 Watts per channel @ 4 ohms with 2 channels driven, 20Hz-20kHz at 0.08% THD

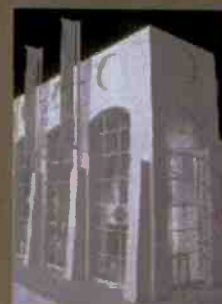
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or for the surfing savvy, visit us online at www.klipsch.com.

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A LEGEND IN SOUND.

TEST RESULTS

ing an EPROM (electrically programmable read-only memory). Additionally, the MC-1 incorporates jacks for up to six digital input channels to provide for digital decoding of future surround formats or for adaptors to accept future signal formats such as IEEE-1394; these inputs feed directly into the MC-1's DACs. Two RS-232 serial ports are on the back: One is "reserved for future control and communication options," and the other is for easy integration with home-automation or A/V-control systems. Other provisions for A/V and multi-zone integration include two 12-volt device-control triggers (for raising and lowering projection screens and curtains, switching amps on and off, and similar tasks) and a mini-jack input for signals from remote infrared sensors.

What about video quality? Well, the MC-1 notably outperformed the DC-1 in this area, and the DC-1 was pretty damn good. The MC-1 incorporates what Lexicon calls a broadcast-quality video switcher that "ensures loss-free routing of images with zero performance penalties." I am always dubious about claims like "loss free" and "zero performance" penalties: They mean that the product has to be perfect. In fact, I did not find the MC-1's video performance quite up to that of the best of its competitors, whether viewed through my home theater's 40-inch monitor or my friends' projection systems. It takes a lot of work, however, to see the differences between the MC-1 and its competitors—even when you use the Imaging Science Foundation's *Video Essentials* test DVD and laserdiscs and scrutinize the image from distances far closer than you'd ever use for viewing. These visual differences are so small that the routing and quality of your video cables will probably have more influence than switching between good A/V preamps. Perfect? Well, no. Excellent? Near reference quality? Yes! Definitely!

The MC-1's sound quality is also excellent—some of the best around for straight 5.1-channel surround decoding with the Lexicon's special processing features switched off. Unlike its DC-1 predecessor, the MC-1 delivered audio and video quality that was competitive with that of the best reference-quality A/V preamps. I

Lexicon has established an enviable reputation for the quality and performance of its digital audio components, and the MC-1 does not disappoint. Frequency responses for the seven main channels are shown in Fig. 1. They are as flat and as nearly identical as one could imagine. The subwoofer output's response (Fig. 2) is equally flat with its low-pass filter defeated; when the filter is engaged, the turnover frequencies are close to spot-on nominal, with a nice, steep 24-dB/octave rolloff above.

Figure 3 is total harmonic distortion plus noise (THD + N) versus frequency, with the measurement filter in the Audio Precision test system set to bandwidths of 22 (red) and 80 (blue) kHz. (The wider bandwidth registers more noise and distortion products in the ultrasonic range, which is why that curve is higher.) Note that these plots are for the worst channel and for a 2-volt analog input, which means both the A/D and D/A converters are in the signal path. These are extraordinarily good results. D/A converter linearity (Fig. 4) is also quite good, noise is very low (-87.9 dB relative to a 0.5-volt output), and channel separation (Fig. 5) is exceptional.

If the Lexicon MC-1 can't put to rest the myth that signal processing is an inherently dirty undertaking, I don't know what can. This is one clean machine.

—Michael Riggs

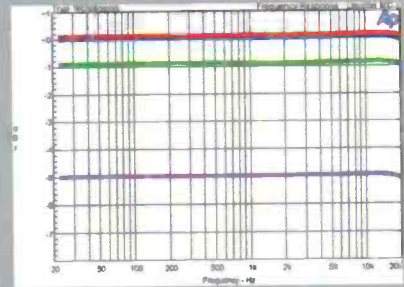


Fig. 1—Frequency response of five main channels (red, front left; blue, front right; cyan, center; magenta, side channels; green, rear channels).

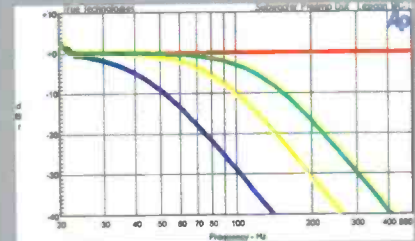


Fig. 2—Subwoofer output response, low-pass filter set 40 Hz (blue), 80 Hz (yellow), 120 Hz (green), and off (red).

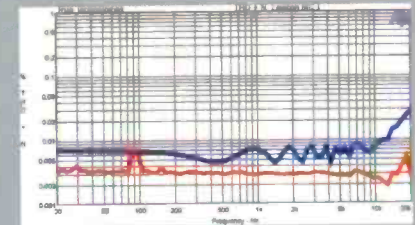


Fig. 3—THD + N vs. frequency, worst channel, with measurement filter set to 80 kHz (blue) and 22 kHz (red).

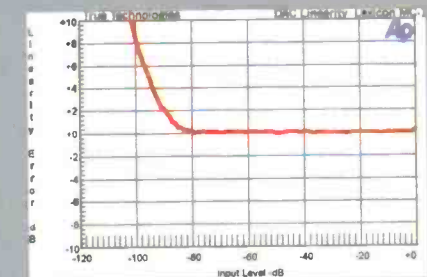


Fig. 4—D/A converter linearity.

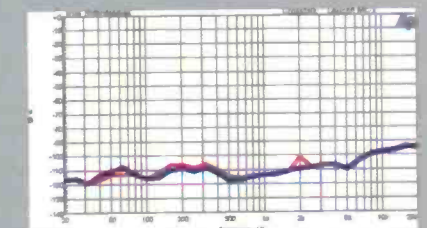
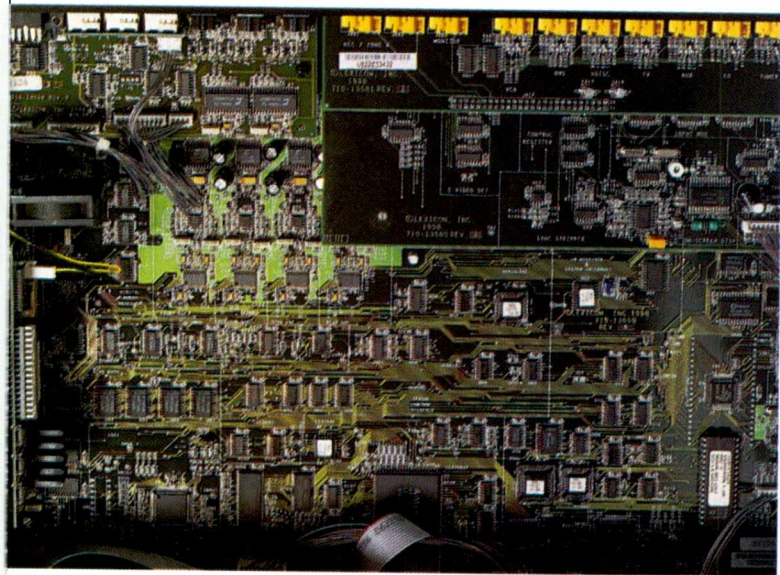


Fig. 5—Crosstalk vs. frequency, left and right front channels.



wouldn't quite say its sound blew away that of the Krell Audio+Video Standard, the Meridian 861, the Proceed AVP, or the Theta Digital Casablanca, all of which I used in comparisons with the MC-1 on a wide range of Dolby Digital and DTS movies and soundtracks. The MC-1 may not quite yield every last bit of the sonic purity that you can get from some of these products. But it is very good, delivering tremendous dynamic life without sacrificing air, sweetness, or detail. In the low bass, your speaker will almost certainly be the factor limiting resolution, energy, and high-level dynamics; I have heard no competing units that seemed more musically realistic or convincing.

I can't assess the MC-1's decoding accuracy on surround soundtracks because every top manufacturer seems to process these tracks differently. All of today's top A/V preamp/processors provide impressive performance on Dolby Digital, DTS, or Dolby Pro Logic, but there is no way I can determine which processor is most "accurate." God only knows how the surround effects and soundstage of most multichannel soundtracks are really intended to sound. Even a single film often seems to have different sound fields for music, dialog, and effects; and on many, the balance changes from scene to scene. Soundtracks vary so much in mix and balance (even my 5.1-channel test discs sound slightly different) that no one processor's approach ever sounds consistently best, particularly when you recall that there are no hard-and-fast

rules for speaker configuration and setup.

Nonetheless, I have never heard an A/V preamp or processor do a better job decoding Dolby Digital, DTS, or Dolby Pro Logic surround than the MC-1 does in its Logic 7 modes. Never did I feel shortchanged in terms of directional information, ambient sound, sound effects, or dramatic involvement. Further, I could

vary the parameters for each surround mode to suit my system, room, and taste.

This flexibility was a godsend with Dolby Digital and DTS. With Dolby Digital, you really do need the timbral correction offered by the MC-1's tone and tilt controls and bass adjustments in order to make up for a certain lack of transparency and a slightly hard upper midrange. With DTS, you may need to consider a touch of compression with some speakers; and any improvement DTS makes over Dolby Digital in transparency and the upper midrange is offset by the total unpredictability of bass levels in the low-frequency effects (LFE) channel.

The MC-1 is equally good in reproducing surround-encoded music. The MC-1 could not save Dolby Digital music from itself (or, rather, from its AC-3 encoding system), but it does give it more help than any other processor I know. There is something slightly irritating about the upper midrange in virtually every Dolby Digital music recording I hear, DVD or laserdisc. This is not a problem when dialog and sound effects disguise it or the music's upper midrange is too soft to bring it out. It is a problem, however, when the music has a natural timbre and extended upper midrange and highs. The MC-1's "5.1 Music" mode (which shares some of Logic 7's effects) is the only mode I can recall encountering that's dedicated to making Dolby Digital music sound better. I suspect it represents the limit of what can be done to salvage the medium. The Dolby people told

me some years ago that Dolby Digital was not intended for serious music listening, and they were right. Let's hope that the Meridian MLP process or some other benign encoding system replaces Dolby Digital as soon as possible.

Dolby Pro Logic music recordings, and the "surround music" recordings from labels like Telarc and Chesky, consistently sound better than recordings using Dolby Digital. (You can also, of course, tailor the MC-1's parameters in these analog surround modes to get the best from specific recordings.)

The MC-1's performance with DTS music recordings was the finest I have heard, using its "DTS 2-Channel" and "DTS Music" settings. The Lexicon made it easy for me to optimize the settings for delay and the LFE-channel settings for each recording. Because DTS seems to have no standards for deciding on the channel balance, delay, and the LFE-channel levels for music, it's almost always necessary to make this effort on a recording-by-recording basis, which is most annoying. It can, however, pay off. Try the DTS version of Giuseppe Verdi's *Aida* (DTS 71021-51022-2-1), which originally was an EMI Classics four-channel recording, or Tchaikovsky's symphonies No. 3 (DTS 71021-51031-2-9) and No. 4 (DTS 71021-51032-2-9). These are some of the most sonically and musically convincing examples I've yet heard of what discrete surround can do for classical music.

One final note: The MC-1 works very well in a conventional 5.1-channel system, but its Logic 7 feature is particularly valuable when you are using both side and rear speakers. Most of today's best processors now have rear- and side-channel outputs, and I have found the cost of an additional amplifier and two more speakers to be well worth it. The sound field becomes much more stable and convincing. The ambience from the sides gives you the feeling of space and an enveloping sound field, while the rear channels anchor the directional information and ensure there is no hole in the middle behind you. I must caution you, however, that with those two extra speakers in your room you may also hear as much from your significant other as you do from them. **A**

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Cambridge SoundWorks' *MovieWorks*® 5.1—great surround sound for the price of good surround sound.

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- Main speakers with smooth, natural tonal balance, pinpoint imaging.
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Daniel Kumin

Krell KAV-300r Receiver

Porsche minivan. . . Hasselblad camcorder. . . Krell receiver.

You can excise the last item from the official *Audio* list of Things We Thought We'd Never See, because I have on my test bench the new KAV-300r from Krell Industries. Let's admit it: The notion of a Krell receiver seems, at first blush, a radical, even absurdist, one. And yet here it is: a 150-watt-per-channel, analog-input/output, remote-controlled AM/FM stereo receiver. But like so many unexpected ideas, once conceived the thing makes perfect sense. Krell's own explanation: "The KAV-300r gives the audiophile an exceptional-sounding, two-channel music system in a convenient package that can stand alone or easily be integrated into a multi-component system."

Krell's design is, in essence, the firm's KAV-300i integrated amp—itsself already

well reputed in high-end circles—enhanced by an AM/FM tuner section. On paper, there is little to distinguish the KAV-300r from innumerable high-power receivers of decades past (the 300r is strictly a stereo, non-A/V affair). But in the flesh, this clearly is a fish of another color altogether from

KRELL

Rated Power: 150 watts/channel into 8 ohms, both channels driven, from 20 Hz to 20 kHz, at 0.06% THD.

Dimensions: 19 in. W x 3¼ in. H x 15½ in. D (48.2 cm x 9.5 cm x 39.4 cm).

Weight: 27 lbs. (12.3 kg).

Price: \$3,450.

Company Address: 45 Connair Rd., Orange, Conn. 06477; 203/799-9954; www.krellonline.com.

the untold millions of solid-state receivers to reach these shores from the East between 1965 and 1985.

Massively constructed and finished with the kind of precision and care you simply don't find on gear in the superstore aisles—but should expect from an "esoteric" maker—the KAV-300r is simple enough to make the owner's manual quite superfluous for basic operations. Pushbuttons deliver all control functions, including source selection, tuner operation, and even volume up/down action; a large, blue display supplies tuner mode information, tuning, and signal-strength data.

Though the KAV-300r is, as mentioned, an audio-only design, it does incorporate one simple and highly useful nod to the A/V age. Any of its line inputs can be set to

"Theater Throughput" mode simply by holding its selector key in for four seconds. Once invoked, this sends the selected input's incoming signal, at unity gain, directly to the 300r's power-amp section, enabling the receiver to function as a two-channel amp for any pair of a multichannel system's speakers, typically the main left/right pair. This means you can integrate the Krell into a high-end home theater system simply by routing the surround-processor's left/right line outs to one of the 300r's inputs. It also

The 300r equaled my usual pre/power-amp combo in sound, yet occupies one-quarter the space.

means Krell can offer a far more attractive product, value-wise, to a far wider range of potential buyers, because the receiver can function as both a purist tuner-amp and as a two-channel power-amp-and-tuner in one-and-the-same system.

Under the heavy-gauge top cover, the KAV-300r exhibits numerous high-end fea-

tures. The chassis pan is folded from 2-milimeter steel sheet, as are the top and rear wraparound panels; the front panel is Krell's trademark milled-billet aluminum fascia finished in gray-flannel anodizing. The hefty-looking toroidal transformer is itself shielded internally, and the interior heatsinks are more carefully finished than some amps' exterior ones. The three p.c. boards are heavy glass-epoxy types, populated by tight-tolerance resistors, upper-crust capacitors, and mostly discrete transistors (a scattering of ICs seem to execute control/switching chores only). Twelve output transistors appear to serve each channel. Said to be proprietary, these are stamped "Krell" above their Motorola logo. A cookie-tin-sized shielding can, identified as "Designed and Manufactured for Krell by Day/Sequerra" (an impeccable RF pedigree for the AM/FM tuner module it contains), occupies the front-right section.

Krell endowed the 300r with four line-level inputs, one with balanced XLR jacks and the other three unbalanced RCAs; there's also a complete tape loop and, of course, the on-board tuner. Output is via five-way binding-post pairs for each channel; like the input jacks, these are prime-grade, solidly panel-mounted items but not otherwise overtly exotic. The power cord is a removable IEC type, and there is a single 12-volt trigger and a jack for Philips-protoc-

tensively for a little more than a week, in a simple setup incorporating just a CD player (a Sony ES model from several years back) and my Platinum Solo speakers. The Solo is a rather small, low-sensitivity two-way that's fully capable of absorbing the Krell's power while producing very good resolution and surprising extension.

There is no question to my ear but that the KAV-300r does in fact sound better playing stereo recordings than even many of the more expensive, high-power multi-channel A/V receivers of today (or, I'd wager, their stereo equivalents of yesterday); of course, for \$3,450, it had better! This was

The Krell KAV-300r had plenty of power in my system, free of any congestion or harshness.

evidenced quickly and definitively by the sort of effortlessly timbre-defined lower two octaves, even on pianissimo passages, and a level of open, airy, but non-forward top-octave reproduction that I simply don't hear on all but a very few receivers—amplifiers too, for that matter. This finesse may be due to exotic amplifier topologies, proprietary output devices, and the heavy, all-metal chassis, or it may simply derive from generous power-supply reserves and lots and lots of safe operating area that keeps the output transistors linearly in their "happy place" more of, or perhaps even all of, the time.

Whatever the cause, the Krell receiver produces the desired result. For example, the 300r was entirely equal in quality to my usual pre/power-amp combo (rated for slightly more power) in re-

producing music of Janáček, whose frequent percussion episodes, over subtly shifting orchestral colors, can make considerable dynamic demands. A recording of

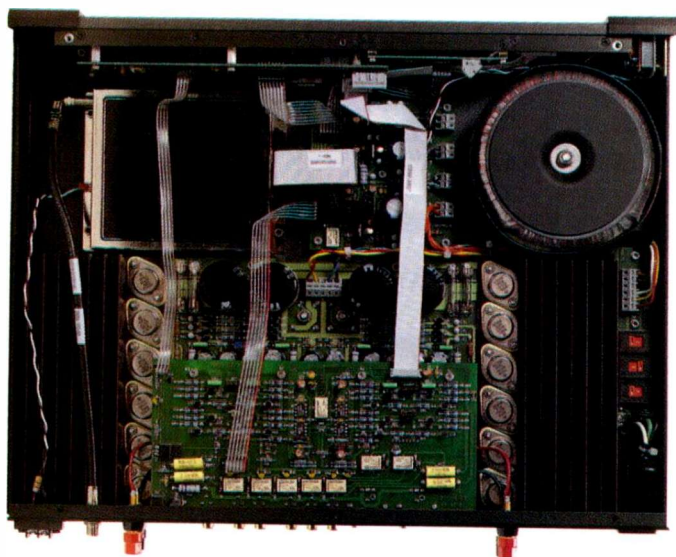
the Lachian Dances (Reference Recordings RR-65CD) sounded superb, with deep, quiet backgrounds from which music like the last "Pilky" movement can build in intensity, in classic polka fashion, with full drama.

The KAV-300r had plenty of power in my system: The opening Fanfares from the Sinfonietta on the same CD featured punchy yet clear brass-choir sound, free of any congestion or harshness, with plenty of reserves for the tympani entrances.

The 300r also supplied the subtly graded dynamic precision I expect from the good stuff. On the *Jim Hall & Pat Metheny* duoguitar CD (Telarc CD-83442), Hall's mellow, highs-starved guitar tone on "Farmer's Trust" produced the discretely tangible air-puffs in advance of each note, just like the real thing. This was even more notable on Metheny's Tommy-esque, acoustic backup for "Summertime," where the close-miked sound carried an excitingly real pressure wave with each accented down-stroke. The Krell was spectacularly quiet, producing not one molecule of audible noise, at any sanely contemplated volume setting from the listening position, even at midnight.

Randy Newman's latest, *Bad Love* (Dreamworks DRMD-50115) hitches ol' Rand's man-with-a-piano Edwardian harmony to the production of the cheese-addicted Tchad Blake and Mitchell Froom—the duo largely responsible for the "wall-of-mud," alt-rock sound of the '90s. (This record is worth the price of admission for just one hearing of Newman's latest paean to America, "The World Isn't Fair.") The collaboration seems bizarre at first, but it is often surprisingly successful musically. "I Want Everyone to Like Me" features the producers' trademark, heavy, 40-Hz bass and ultra-loose bass drum, making for a rich and spleen-tingling bottom to accompany Newman's shopworn voice and cheap-miked piano, together with skating-rink organ and sundry other colors. The 300r had ample reserves to deliver this unholy stew at high levels without evidencing any loss of control of my somewhat difficult-load Solos on the powerful bass/drum-downbeats, while still maintaining delicate definition on the noodling Dobro.

The KAV-300r tuner proved itself an adequate FM performer, but in several regards



of RC-5 hardwired remote commands, all of which encourage integration into more elaborate systems.

I auditioned the Krell receiver fairly in-

You're looking at a truly remarkable speaker system, the M&K 750 THX Select. It was designed for people who want to be surrounded by great sound. People who love to be surrounded by great sound.



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M&K's designers have great eyes and even better ears; so it stands to reason the 750 THX Select is a masterpiece of form-follows-function thinking. Need proof? Well, for one, look closely and you'll notice the LCR's tweeters are pointing away from the listener. This is not a case of bad manners but, instead, a remarkable technical advancement called the High-Frequency Prism System. While most conventional speakers aim the sound like the beam of a flashlight to only one room



location, the High-Frequency Prism System delivers stunning sound clarity to a very wide listening area. The result: sit wherever you want and let the great sound of the M&K 750 THX Select System find you with pinpoint accuracy.

The 750 THX Select has also captured the fancy of the world's most discerning critics. Sound & Vision Magazine commented: "The 750 THX Select kicked butt, especially with 5.1 channel music..."

"Absolutely stunning home cinema performance...

the most cinematic speaker package for the price".

If that's not enough, the 750 THX Select also won the Editors Choice Award from Popular Mechanics Magazine.

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TEST RESULTS

The Krell KAV-300r held a couple of test-bench surprises that, upon reflection, really weren't all that surprising. Most results were excellent to a fault. Among these, I number the 300r's almost perfectly flat response, tight channel-to-channel tracking (both seen in Fig. 1), and fine channel separation—the last is not graphically obvious but was close to 70 dB (or better) at any frequency. Total harmonic distortion plus noise (THD + N) versus frequency, however, was a bit higher than that from most "conventional" solid-state amps: Figure 2 shows results for 8-ohm loads at 1 watt and at 150 watts output. (For 4-ohm loads, the THD + N, while not strictly identical, was insufficiently different to warrant another graph or further comment.) The distortion figures at 1 watt output, at around 0.3%, are just about as specified. My guess is that this "high" level of distortion—still far below audibility—arises from a higher-biased mode of operation that would keep the Krell in a more Class A-like state to well above the 1-watt output level. The curves for 150 watts output, at nominally 0.1%, presumably show the amp's operation in fully Class-AB mode.

As I noted by ear, the 300r was superbly quiet. My signal-to-noise result, at around 84 dBW, A-weighted, is truly excellent. Factor in the Krell's headroom and you get a dynamic potential approaching 110 dB: You'd need a really quiet room (and armor-plated ears), or unusually low-sensitivity speakers, to experience a real-world dynamic-range deficit.

The Krell delivered its rated watts easily, even given my unsupported AC

supply, which sagged to 115 volts AC (about 6%) under the 300r's maximum load. Note that Krell rates the receiver's 4-ohm output power for one channel driven, which seems perfectly consistent with the 240-watt, both-channels-driven 4-ohm power I saw. Figure 3 tells the tale for watts versus distortion for 8- and 4-ohm loads. Interestingly, the 300r produced slightly more power and clipped just a bit more gradually at high frequencies than at low or middle ones,



The Krell KAV-300r receiver's amplifying abilities are faultless.

which is the opposite of the usual case. Performance at frequencies below 1 kHz was essentially identical to that shown in Fig. 3. The Krell delivered a useful 2.3 dB of dynamic headroom into 8 ohms, and slightly more at 4 ohms as compared to the 300r's actual, measured, 240-watt, two-channel 4-ohm abilities.

Figure 4 shows a one-third-octave spectrum analysis of noise from shorted inputs, re 1 watt into 8 ohms (the peak at 32 kHz is digital hash from the test computer and should be discounted). The 120-Hz hum component is the only notable feature; this is more than 90 dB down in both channels.

The only remaining item of note is damping factor. The 300r's was greater than 20 (at an output impedance of about 0.25 ohms) at low frequencies, slightly higher (about 32) at mid-frequencies, and fell to around 20 again at 20 kHz. This is quite low by modern solid-state standards, for which I have no immediate ex-

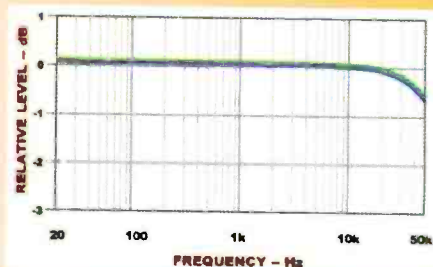


Fig. 1—Frequency response.

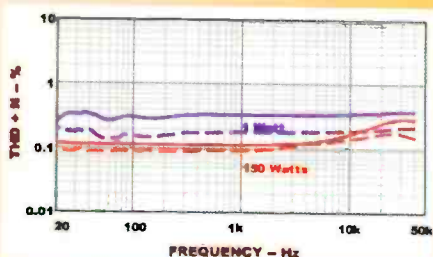


Fig. 2—THD + N vs. frequency at 1 watt and 150 watts into 8 ohms.

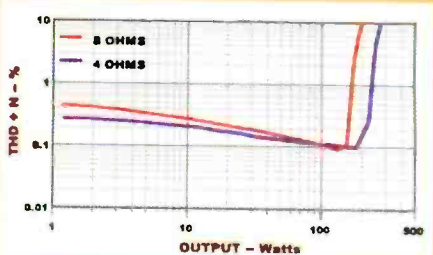


Fig. 3—THD + N vs. output at 1 kHz.

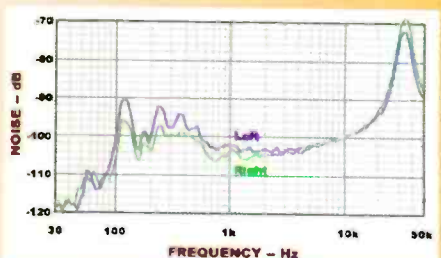


Fig. 4—Noise spectra.

planation. Perhaps Krell's proprietary output devices impose a higher than typical output impedance. Nevertheless, a 300r-based system should easily maintain real-world frequency response well within 0.5 dB so long as reasonable care is taken to keep speaker-cable resistance low and runs short; in any event, I heard no evidence at all of loss of control or floppy bass.—D.K.

MEASURED DATA

Dynamic Power at 1 kHz: 256 watts (24.1 dBW)/channel into 8 ohms and 442 watts (26.5 dBW)/channel into 4 ohms, both channels driven.

Noise, A-Weighted: -84 dBW.

I found it more than a little disappointing, especially given the Day/Sequerra imprint on the can. Using the supplied indoor dipole, reception ability was in fact barely better—if at all—than that of today's run-of-the-mill mass-market receivers. That is to say, quite good on strong or local signals but fair to poor on weaker, more distant ones. My local NPR station was strong, quiet, and clean, but the cluster of 100-kilowatt Boston stations about 55 miles distant (I am within about 40 vertical feet of a clear line-of-sight to the west-of-Boston tower farm) were, without exception, borderline or worse; most were unlistenable by any musical standard. My everyday, attic-mounted, medium-gain FM antenna did much better, of course, but then it provides a similar upgrade to most mass-market receivers. The 300r's AM section was, in my view, a disgrace: Whether using the supplied AM loop or another I keep on hand, the receiver could deliver only one or two speech-intelligible signals, both from strong, local stations. And both required

some antenna-orienting. (This level of AM performance held roughly true over four trials on four different days.) At this level, why bother including an AM section at all? Even if the chips employed in the tuner "have it anyway," the customer might be better served simply by disabling it.

The good news is that, given strong RF signals and decent broadcast quality, FM sound quality was first-rate—with the Day/Sequerra name I expected no less. On my NPR station—one of only a couple of acceptably received, decent-sounding FM sources available—transparency was sufficient to distinguish between better-sounding and lesser-grade CDs and to enjoy plenty of musical dynamics and nuance. Sadly—but far from unusually, these days—it was also plenty good enough to highlight just how squished and lifeless nearly all commercial FM sounds, be it pop, rock, classic, alternative, or country.

I expect that most of those who might buy the KAV-300r will regard its tuner abilities as a mere fillip, a convenience for back-

ground music, news, and weather, or an occasional ball game. For these chores, given the strong signals that saturate urban/suburban America, the 300r tuner should work fine. Instead, the audiophile's focus is far more likely to center on the Krell's amplifying abilities, which are faultless.

You can argue—quite rationally, in my view—that \$3,450 is an awful lot of dough for a stereo amplifier, however capable, regardless of power ratings. On the other hand, the Krell KAV-300r's combination of superbly musical power with an internal radio, basic preamp functions, and its A/V integrating "Theater Throughput," rebalances the ledger in important ways. And let's not overlook the 300r's compact form: The Krell occupies approximately one-quarter the cubic volume of my current amp and preamp but sounds virtually indistinguishable. You might also want to factor in the value of the Krell name, which is an assurance of serious sonic performance in much the same way that the Hasselblad or Porsche marques serve for cameras and cars. **A**

S E R I E S

MERCURY

This is not a Quiet Revolution

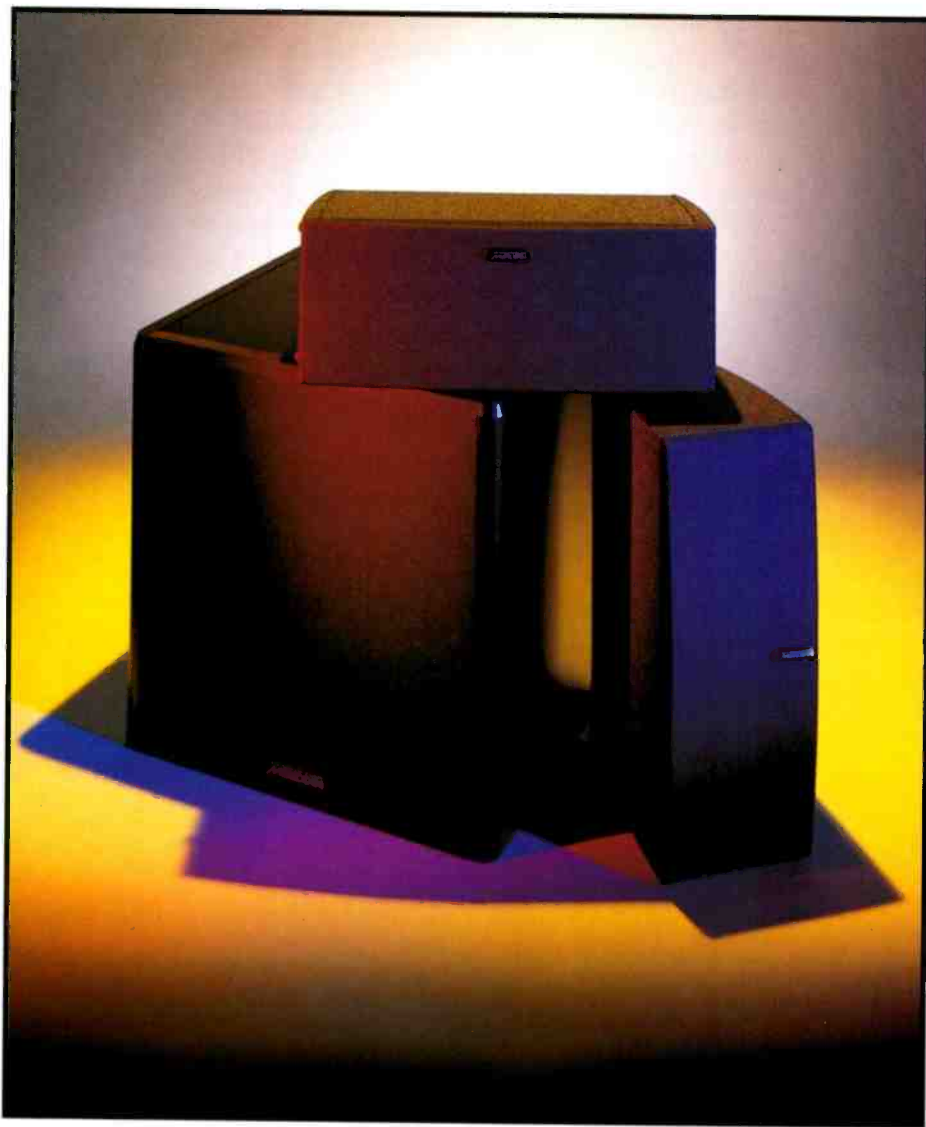
This is a heart thumping, ear crunching, blood racing, spine tingling, hair raising, ground shaking kind of revolution!

The excitement of a true home theater experience at an affordable pricepoint is not easy to come by. Tannoy has transcended the norm by providing a truly realistic sound sensation in an attractive, contemporary cabinet design. How do we accomplish this? Unlike many of today's inferior highly resonant plastic enclosures, large Mercury enclosures are constructed from medium-density fiberboard for its inert, low-coloration characteristics. Tannoy employs only the highest quality bass and treble units; in fact, all of the internal components for the Mercury Series were chosen for their performance parameters first. The crossover is knit with precision components, delivering balanced and seamless audio quality. This is the sort of performance one expects from a senior loudspeaker manufacturer with more than 70 years experience as the worldwide leader in professional studio, post, film and broadcast monitoring worldwide.

The Mercury Series provides rich, powerful bass, dynamic, clear and accurate sound quality, ensuring Mercury provides not merely hype, but good, old-fashioned value. Mercury is at home in any application, providing the dynamic delivery of home theater presentations as well as punchy and accurate stereo playback. It's a demanding world out there, so choose the line of loudspeakers that are as versatile as your requirements are demanding.

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COREY GREENBERG

Meridian M33 Speaker and M1500 Subwoofer

You know what it's like to lust after a piece of gear once you've had a taste? It doesn't happen to me so much with hi-fi gear, but guitar amps? Oh man. I've got a stable of fine, foxy Fenders that give it to me night after night no matter how hard I beat them (can you tell I just finished watching "Dolemite" on DVD?). But ever since I got a chance to plug my Strat into

another guitar player's pristine late-'60s Marshall "plexi" 100-watt stack, a day has not gone by that I haven't lusted after that sound, that feel, that ridiculous ballsiness that no other amp comes close to. No wonder Hendrix used to diddle his git-fiddle 16 hours a day—once you get to play a vintage Marshall, you've caught the lust. And it never goes away.

One of the very few times I've felt that

way about audio gear was when I first heard the magical, awe-inspiring Meridian Digital Theatre. At a cool \$65,000 (which doesn't include a TV or any source components!), Meridian's top-o'-the-line surround sound audio system isn't for the faint of heart. You got to be *steely* to take this kind of gear home with you. But once I heard this all-digital, all-active, DSP-out-the-yin-yang setup throwing great thunderclaps and lightning bolts into familiar music I

The first thing I noticed about the M33s was their startlingly clear and detailed midrange.

thought sounded pretty sparky on my own rig at home, I knew I'd been to the top of the mountain. I also knew that I'd better get my nut off while I had the chance, because it was going to be a cold day in Hell before I got my hands on that system again.

For those of you who've experienced the Digital Theatre and shared my pain, let the writhing come to an end! Meridian has introduced a much more affordable version of its flagship audio system, called the Meridian Compact Theatre. Priced at just

MERIDIAN

Rated Frequency Response: M33 speaker, 55 Hz to 20 kHz, ± 1.5 dB; M1500 subwoofer, 30 to 400 Hz, ± 1.5 dB, in-room with crossover bypassed.

Dimensions: M33 speaker, 6 in. W x 15 in. D x 9 in. D (15.3 cm x 38.1 cm x 22.9 cm); M1500 subwoofer, 16 $\frac{3}{8}$ in. W x 16 $\frac{3}{8}$ in. H x 16 $\frac{3}{8}$ in. D (41.6 cm x 41.6 cm x 41.6 cm).

Weight: M33 speaker, 21 lbs. (9.5 kg); M1500 subwoofer, 77 lbs. (35 kg).

Price: M33 speaker, \$2,495 per pair; M1500 subwoofer, \$1,595.

Company Address: 3800 Camp Creek Pkwy., Bldg. 2400, Suite 122, Atlanta, Ga. 30331; 404/344-7111; www.meridian-audio.com.

under \$12,500 for five satellite speakers, a powered sub, and the new Model 561 digital surround preamp, the Compact Theatre was designed to squeeze most of the performance and capabilities of the larger Digital Theatre into a smaller, more manageable system meant for medium-sized living rooms (and take-home pay). Because there's so much tech to talk about, I'll be reviewing the speaker half of the system this issue and the Model 561 preamp the next time around.

The \$2,495 per pair Meridian M33 is a two-way, three-driver, internally bi-amplified satellite speaker. Note that I didn't say "digital active," like Meridian's more expensive speakers—just plain active. Instead of accepting an S/PDIF digital signal like its big brothers do, the M33 feeds on the analog audio outputs of your preamp or surround processor. And while Meridian's digital active speakers implement their crossovers (as well as phase and frequency response correction) in the digital domain with DSP, the M33's fourth-order Linkwitz-Reilly crossover is a line-level analog circuit.

Look at that photo, will you? That's a *man's* speaker, I'll tell you whut! Pop the grilles, and the M33's black, cast-aluminum cabinet, with its deeply sculpted front panel, shouts "male" in a way that few high-end speakers do (note that I said "male," not "geek loser moron male"). It's like the M33's barking, "Goddamn it, enough with

Despite the M33's slim cabinet, Meridian shoehorns in 85-watt woofer and 55-watt tweeter amps.

the Enya already, put on *Metal Machine Music* and *turn me up*, twig boy!" Okay, so maybe it's a bit *too* male for some tastes, but I wholeheartedly dug the astro-man look of these speakers with the grilles off, and to be honest, they sounded better that way, too. The 1-inch soft-dome tweeter has its own non-removable mesh screen over the diaphragm, so it's protected either way you go.

The M33's dual 5/4-inch carbon-fiber woofers operate in a sealed box, crossing over at 2.3 kHz to the tweeter, nestled betwixt them. This woof-tweet-woof driver layout—and careful voicing—enables the M33 to work just as well toppled over as a horizontal center-channel speaker as it does standing up as a main or surround speaker. In fact, the M33C center speaker is just an M33 on its side, with a heavy metal shelf-stand that anchors the cabinet to its support surface and aims the drivers toward the couch.

Despite the M33's slim cabinet, Meridian somehow manages to shoehorn an 85-watt woofer amp and a 55-watt tweeter amp in there as well, and without a port or heat sink fins on the back to keep the amps cool. What do the British know that we don't, other than that "shag" doesn't mean carpet? I'm guessing the M33's heavy, cast-aluminum enclosure—all 21 pounds of it—is able to dissipate enough heat from the amps to keep them from red-lining. I do know that even after extended periods of ZZ Top's "Tres Hombres," the M33s never even got so much as medium hot.

The M33's back panel sports both unbalanced RCA and balanced XLR inputs, along with an IEC-style AC receptacle, which is a good thing because I'm guessing you'll need longer AC cables to power these speakers than the 6-footer freebies Meridian throws in the box. Radio Shack's finest three-prong 12-footers did a fine job subbing, and I'll also note that I had to defeat all of the grounds with a gaggle of li'l gray cheater plugs to rid my rig of hum (depending on how your system's grounded, you may get by just fine without them).

The companion M1500 subwoofer carries a 100-watt amp to go with its 10-inch, reflex-loaded woofer. Two stereo pairs of unbalanced RCA inputs are provided—one with positive polarity, the other inverted. Cosmetically, the M1500 subwoofer is more in the traditional Meridian bag than the M33—with its "soda-lined" black plate-glass top and black ash veneer, this sub follows the classic Meridian black wood 'n'-glass style much more so than the cast-iron badass puss on the M33. Foot spikes are included, if you've got beat-to-hell wood floors like mine.

The M33 takes balanced or unbalanced line-level analog inputs.



Mounting the tweeter between the two woofers enables the M33 to be used horizontally or vertically.



The M1500's defeatable line-level crossover has 80- and 120-Hz settings, both with 12-dB/octave low-pass slopes. Like the M33, the M1500 has no auto-power circuit that turns the thing on when you hit it with an audio signal and then puts the amp back into standby after a few minutes of silence. But Meridian's Andy Regan told me that the amplifiers built into the M33 and M1500 were designed to draw very little current from the wall AC when not in operation, so it's recommended that the speakers be left on all the time.

Regan hand-delivered the Meridian Compact Theatre to my loft, setting up the system as he regaled me with tales of ribaldry from when he roadied for Bowie back in the '70s. The M33 speakers and M1500 subwoofer replaced my usual NHT 3.3 full-range speakers (both front and surround pairs) and matching NHT Center-One center-channel speaker. Meridian's Model 561 digital surround preamp sat in for my refer-

ence Theta Casablanca, but I went back to the Theta for additional listening, as well as trying Theta's new Casanova digital pre-amp (full review on the way). Theta's Data III digital transport served up CDs, while a Toshiba SD-3107 played DVD movies and music. I mounted the front and rear M33s on 24-inch sand-filled steel Merrill stands—the UK's Target Audio also makes a stand especially designed for the M33 called the Model K60 Meridian, if you want an all-Brit setup.

As the Meridian is an all-active system, the company supplies the M33 with longish lengths of what it unfortunately labels "Meridian Active Loudspeaker Cable," which isn't speaker cable in any sense of the word, but rather just mid-line van den Hul unbalanced RCA interconnect. The Meridian/van den Hul stuff sounded okay, but I got better results with cables I made up of Canare's great-sounding, low-capacitance, 15-cents/foot L-2B2AT two-conductor audio hookup cable (with one conductor wired for signal, the other for ground, and the outer foil shield grounded at one end only), in 15-foot runs for the three front channels and 50-foot runs for the surrounds.

It took a fair amount of time for the Meridian speakers to settle into their best sound. The system sounded pretty dull at first turn-on, but after several hours of

Meridian designed the M1500 for maximum tightness and clarity without any added mid-bass bloat.

cranked pink noise in all five speakers plus the sub, things got much, much better. Meridian is right to recommend the M33s and M1500 be left powered "on" all the time; even though they're designed to draw very little current when in standby, the line-level crossover and amplifier input circuits are kept perpetually warmed up, and this definitely has a positive effect on the sound. Experimenting with turning the M33s off overnight and then listening to them cold

the next day revealed them to sound much the same way as they did right out of the box, while keeping them turned on all the time ensured that great sound was always just a press of the CD play button away.

The first thing I noticed about the M33s was their startlingly clear and detailed midrange. Well-recorded vocals, like Lou Reed's on his tribute to that most delicious of all Fox's U-Bet-based beverages, "Egg Cream" (*Set the Twilight Reeling*), sounded spookily open and natural, with the same kind of

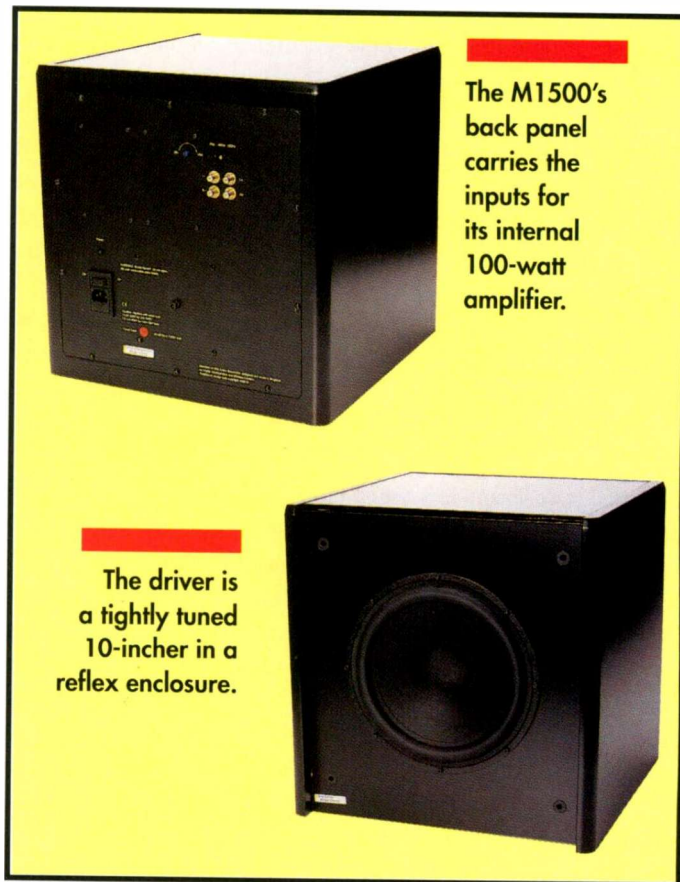
coloration-free coherence I hear from Paradigm's \$1,600 per pair Active/20. While I found I could get reasonably satisfying levels out of the Meridian rig, the self-amplified M33s couldn't quite hit the same peaks without distortion as my usual NHT 3.3 speakers driven by a 100-watt Bryston 9B-ST. In fairness, the M33 and M1500 were designed for more normal-sized living rooms than my large, open loft space. The "compact" in Meridian Compact Theatre is truth in labeling. But given how loud they were able to play without distortion in my loft, the M33s should be able to drive the average small-to-medium-sized living room to near-deafening levels.

The comparison with the Paradigm Actives is an apt one. While the Meridians cost almost a grand more per pair than their Canadian counterparts, they have a warmer, softer treble. Call it "a superbly refined treble presentation" or simply "they got less highs"—either way, the M33s sound a bit more down-tilted in the high end than the Paradigms.

Where the Paradigms' metal-dome tweeters present every last etch of high-end detail, the M33s' soft-domes tend toward a

less incisive, more forgiving treble balance. This was a boon to most DVD movie soundtracks—*Kingpin* may be the greatest comb-over movie of all time, but its soundtrack benefited from the kinder, gentler treble of the Meridians. And that's pretty much how my listening sessions went. I'd listen to a slew of CDs and enjoy the hell out of every minute, but it was when I settled down to a good DVD at the end of the day that the Meridian system really came into its own. The M33s' forgiving treble balance, coupled with their stunning midrange transparency, delivered that rarest of home theater rarities—high-resolution sound that decoded every last spatial detail and dialog nuance, but without bumbing me out over how mediocre most of my favorite movies sound.

As for the M1500 subwoofer, Meridian goes on in its lit about how most subs are voiced with too much mid-bass, which sounds good and meaty on action flicks but too muddy for music. So the company designed the M1500 for maximum tightness and clarity without any added bloat further up the bass range. This is a trend I've seen over the last few years in British sub-



The M1500's back panel carries the inputs for its internal 100-watt amplifier.

The driver is a tightly tuned 10-incher in a reflex enclosure.

one bell, one whistle,



and a button to turn them off.

It's not about a pile of features you'll never use. It's about delivering the best sound for the dollar. The NAD 317 integrated amplifier is built simple to provide - foremost - a faithful and musical performance. And, as with all NAD products, it maintains a reputation for true value, performance and simplicity.

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pure, and simple.



TEST RESULTS

M easurements of the M33's on-axis frequency response (Fig. 1) reveal two prominent traits: very smooth response from the upper bass to lower midrange (70 Hz to 1.7 kHz) followed by a significant 5-dB shelving of upper-midrange and high-frequency output from 1.8 out to 20 kHz. This correlates rather well with reviewer Greenberg's perceptions of "down-tilted" and "kinder, gentler treble."

For the record, True Technologies' measurements show the M33 adhering to Meridian's tight, ± 1.5 -dB response spec only between 70 and 800 Hz; on the other hand, the +4-dB irregularities visible at 3 and 4.5 kHz, and the -3-dB dips at 4 and 6 kHz, apparently had no audible consequences. At frequencies below 70 Hz, the M33's bass output begins to roll off quickly—no problem, because the Meridian M1500 subwoofer's output (Fig. 4) is already strong at that frequency.

The M33's horizontal off-axis plot (Fig. 2) shows good lateral dispersion to 30° off-axis at frequencies up to 10 kHz; at higher

The M33s should be able to drive an average-sized living room to near deafening levels.

frequencies and greater angles, response rolls off in predictable fashion. The M33's vertical off-axis plot (Fig. 3) reveals good dispersion to about 40°; moreover, some averaging out of the upper-midrange irregularities is apparent, which likely accounts for their audibly benign nature in listening tests.

Anechoic measurements of the M1500 subwoofer's frequency response (Fig. 4) indicate very smooth, linear extension down to 45 Hz and out to 200 Hz when the low-pass filter is set to "Flat." At lower frequencies, response falls off fairly swiftly,

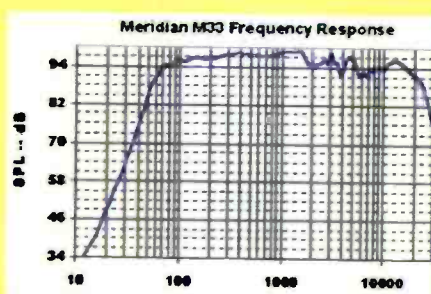


Fig. 1—On-axis frequency response, M33 speaker.

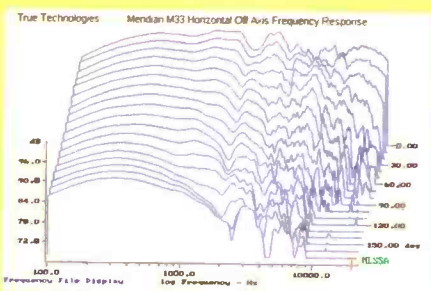


Fig. 2—Horizontal off-axis frequency responses, M33 speaker.

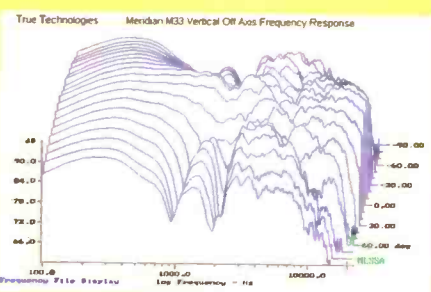


Fig. 3—Vertical off-axis frequency responses, M33 speaker.



Fig. 4—Frequency response, M1500 subwoofer, low-pass filter set flat (blue), at 120 Hz (green), and at 80 Hz (red).

but with bass-enhancing in-room boundary effects in play, the M1500 should deliver useful output to about 35 Hz.

No shrinking violet, the M1500 cranks out maximum sound-pressure levels (Fig.

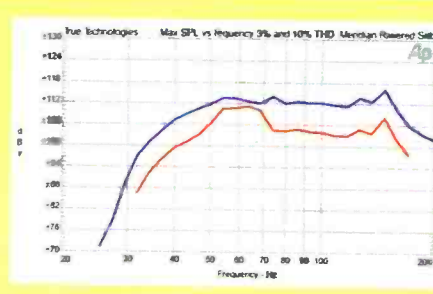


Fig. 5—Maximum output vs. frequency for 3% THD (red) and 10% THD (blue), M1500 subwoofer.

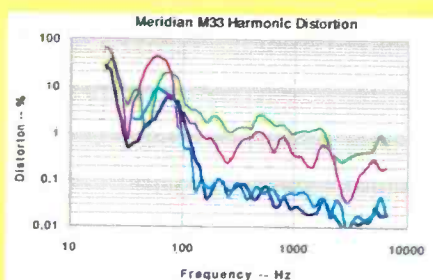


Fig. 6—Harmonic distortion vs. frequency, M33 speaker, second (green), third (magenta), fourth (purple), and fifth (blue) harmonics shown.

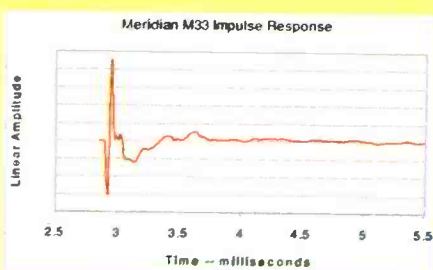


Fig. 7—M33 on-axis impulse response.

5) of 106 dB SPL at 40 Hz and 112 dB at 50 Hz (and above), yet keeps total harmonic distortion (THD) to 10% or less. By the way, when the M33 was driven to 100 dB SPL at midband frequencies, the plots of THD (Fig. 6) show the fourth and fifth harmonic components at less than 0.1% to 150 Hz; second and third harmonic distortion hovers around 2% and 1%, respectively, to 150 Hz, then climbs rapidly, reaching 20% at 80 Hz. No sweat, really, because a high-pass filter would normally roll off these frequencies as the subwoofer assumes its supporting role at the bottom end.—Alan Lofft

woofers—an amp with a deceptively moderate power rating driving just a 10-inch woofer in an overdamped woofer alignment that may not rattle every last rafter during your favorite of the fourteen Lethal Weapon movies (I vote for LWVII, the one with Dame Judi Densch and Nipsy Russell as Mel Gibson's laugh-a-minute in-laws who nonetheless share a dark secret that threatens to—aw hell, I won't spoil it for those who haven't seen it), but play some music and you'll be able to tell whether the bass player strung his instrument with Rotosounds or GHS strings.

Now, I'll be honest—I didn't expect a single M1500 to really do all that much in my large, open loft. Meridian had also expressed some concern, questioning whether it would be better to send me another M1500 to augment the one the company had shipped. But in the end, the M1500 really showed itself to be one of the most musical and involving subwoofers I've ever heard.

Involving? A *subwoofer*? Absolutely. In fact, it reminded me quite a bit of that other excellent British sub, REL's Storm—a woofer you *know* is too small to rock the house, driven by an amp you *know* is too small to do any serious damage, but then you hear the thing and you can't believe all the bass detail you never heard before on other subs. Listening to the new Booker T. and the MGs three-CD Rhino box set, I could clearly hear the differences in the character of Duck Dunn's bass as he switched from flatwound strings on the band's earliest tracks to brighter, growling roundwounds on the landmark "Hip Hug Her." (Actually, everyone had upgraded his rig by the time they cut this instrumental: Steve Cropper moved up from a dinky Fender Harvard amp with a single 10-inch speaker to a 50-watt Super Reverb with four of them, while Booker T. traded in his reedy little Hammond Spinet for a *real* organ, Hammond's mighty B-3). The M1500 is definitely a music-lover's subwoofer. If you're looking for maximum impact, there are any number of American and Canadian-made subs that will rock your world and impress your neighbors all day long. But call a musician over, especially a bassist, and it's the Meridian that'll bring an instant

smile to his face.

Meridian's got another winner with the new Compact Theatre. Unique among high-end audio's forays into home theater, the Meridian system offers a small, elegant profile, outstanding musicality, and total ease in operation and livability. Few speakers at any price tame movie soundtracks as well as the Meridians do without sounding overly dull on well-recorded music CDs, but the Compact Theatre strikes just the

right balance for long-term enjoyment of both. The M33 satellite and M1500 subwoofer are squarely in the Meridian tradition of impeccable sound and beautiful design, and they come much, much closer to the sound of the company's flagship \$65K Digital Theatre than I ever expected them to.

In November I'll delve into Meridian's companion Model 561 digital surround preamp—stay tuned. **A**



100% value

A supremely elegant, neat and complete, CD music system combining power, performance and style.

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LINN
the only sound®

WILLIE GLUCKSTERN

Marantz PM-17 Integrated Amplifier



I'm in wine. Up to my neck. I consult about it with restaurants and wine shops, I teach it to consumers, import it, sell it, talk about it on the radio, and write about it. I taste and spit a quantity of wine each year that could float the QE2, and I've even been known to drink a glass now and then.

So how did I manage to wheedle my way in here? The folks at *Audio*, an otherwise rational publication that's obviously lost touch with reality, actually contacted me! Perhaps they envisioned a kindred approach to tasting and listening—just a couple of senses, sitting around, presenting themselves for comment.

My take on a given wine, as with sound, is a highly personal observation; with the topic being so complicated, subjective, and

downright intimidating, I find it a real plus to be able to sum up a wine in as brief, pithy, and, I hope, humorous a way as possible. That's essentially what I do with wine. Here's how:

Last Friday night at Sam Wo's, with soft-shell crabs sautéed with ginger and scallions, I was offered a certain wildly overpriced, award-winning, chi-chi Chardonnay from California. Like most of the world's Chardonnays, from Monterey to Meursault, this one screamed at the top of its lungs, "I am oak! Smell me, taste me, believe I am fruit and not a dead tree! My alcohol is high, my acids are muted, my label millennial—my marketing will enslave your soul!"

The beast coated my gums, tongue, and teeth with a sweet, oaky, saccharine-like

residue, a filmy coating that squatted obscenely between me and my crab. No flavor, no nuance, no fun.

When I taste a wine, my opinion is formed by comparing that wine with countless others I have experienced over the decades. Aromatic and mouthfeel memory cues have become like second nature, so ingrained as to seem utterly organic. The barest whiff of a superior wine, be it \$5 or \$50, registers like an electric jolt—yes! I know instantly when I've found the real thing. I've learned to trust implicitly in that first small sniff.

Yet I must add that my tasting task has probably been made easier by my insane

**In audio,
as in wine,
price is no guarantor
of quality
(or lack thereof).**

perfectionism and the related fact that terrific wines are (at every price) as scarce as hens' teeth. This makes them rare, but obvious to spot. They fairly leap from the glass, grab you by the lapels, and demand your undivided attention.

Make no mistake. A wine may be good, even exciting, even though its modest price logically argues against it. Certain little wines may display greatness in the fact that

MARANTZ

Rated Output: Continuous power, 60 watts/channel into 8 ohms, 100 watts/channel into 4 ohms, 20 Hz to 20 kHz at 0.01% THD; EIA dynamic power, 75 watts/channel into 8 ohms, 125 watts/channel into 4 ohms.

Dimensions: 18 in. W x 4 $\frac{3}{8}$ in. H x 17 $\frac{1}{2}$ in. D (45.8 cm x 11 cm x 44.4 cm).

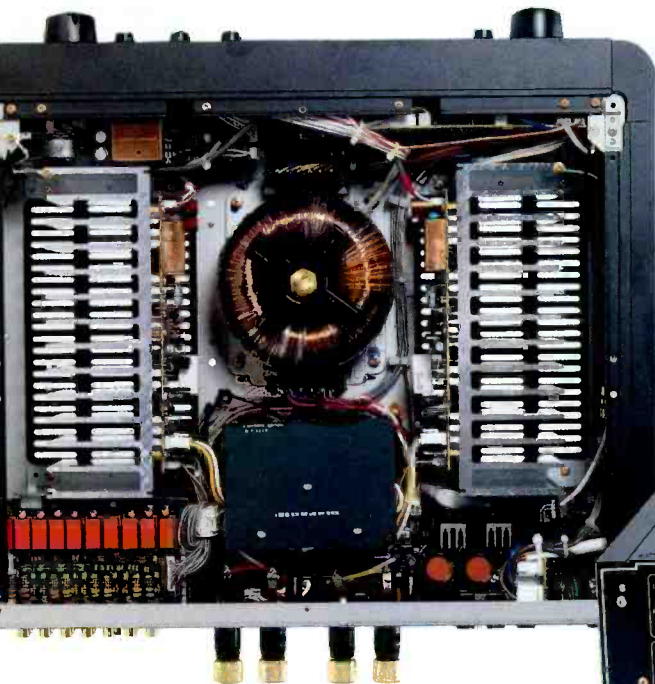
Weight: 33 lbs. (15 kg).

Price: \$1,200.

Company Address: 440 Medinah Rd., Roselle, Ill. 60172; 630/307-3100; www.marantzamerica.com.

their “component” parts (acid, sugar, and extract), though modestly proportioned, fit together seamlessly. *Balance* is what I am really after.

I’ve found these truths about wine to be self-evident for audio equipment as well.



at frequencies where its coefficient of reflection is less than 1%! (Is an anechoic chamber where they put audio writers when they write really bad words, like “crap” and “big tits?” Do they really crank up the volume inside if the writers blow a deadline?)

The audio glossary is fascinating, though, and as Mr. Spock would say, “logical—flawlessly logical,” but it’s oh-so-foreign to an *ausländer* like me. So as for the technical aspects of audio gear, I’ll do my best (with the kindness of editor’s charity, I hope), but do not expect a gang of specs in this space, be-

Marantz PM-17 Integrated Amplifier, a penny under two grand, which claims “unmatched performance...no compromise...ultimate signal purity...and precision-wound toroidal transformers [did someone order a chiropractor?] that have been meticulously selected for optimum sonic purity [again with the purity]...a thrilling listening experience, with [are you ready? please add reverb] *outstanding transparency* [italics mine].”

Anyway, I had high hopes for the new Marantz PM-17, what with the sexy verbiage on the Marantz web page, the swell three-year parts-and-labor warranty, and the fact that I nearly herniated myself extracting its girthful mass from the box. (Weight = quality, right?)

Hooking it up was simple enough. My



For instance, just as my heart begins to pound when I’m digging that first scent of a well-made wine, my ears perk up at well-made sound.

Another such truth is that in audio, as in wine, price is not an automatic guarantor of quality. When its components are perfectly matched, even an inexpensive compact stereo system that lacks deep bass or finely detailed timbre may be lauded, like that great little wine, for its “balance.” This concept of audio balance, be it contained in a single, beautifully constructed speaker cabinet or in the marrying up of a complex component array, is what defines quality.

At this point I may as well declare myself a rank techno novice and get it over with. For me, like most naïve consumers, specification numbers and tales of dithered linearity zoom by pretty fast. “Transparency” seems like an awfully nice term, though, as in:

“The new Adenoid Triple-Sixes displayed elegant, detailed transparency across the entire space-time continuum, even when placed on a damp bathroom floor.”

Can you imagine? I was even ignorant that an anechoic chamber is anechoic only

The Marantz PM-17 suffered no distortion or discombobulation.

cause you won’t get ’em. What you will get is my take, plain and simple, on how the music sounds.

I do grok the music. Man. Nothing I experience personally, including wine, plays a more central part in my life. From Bix to Brubeck, Beethoven to Berg, there’s always some thrilling, undiscovered phrase waiting for me, some fascinating, lovely recapitulation; that unstoppable, swinging moment when a crack, working band clicks and lifts off so surely, they leave their shoes and socks on the stand.

So here’s my first unit for review, leaning up against the UPS guy. It’s the new

reference speakers were a pair of NHT Super Twos—sleek, dependable, black. An NAD 512 CD player, Kimber cables, and good, brown lamp cord from Radio Shack completed the setup.

To put the PM-17 through its paces, I chose the sizzling soundtrack from *The Cotton Club*, the 1984 Francis Ford Coppola film (starring Richard Gere with the most fey mustache in screen history). On the CD (Geffen M5G 24062), Lew Soloff’s searing trumpet solos tear through gems like “Creole Love Call,” “Minnie the Moocher,” and especially the turbo-driven “Daybreak Express” medley that ends the album. The PM-17 suffered no distortion or discombobulation



TEST RESULTS

True Technologies did all of its tests on the Marantz PM-17 in the amplifier's "Source Direct" mode, which should give the best results. Figure 1 plots total harmonic distortion plus noise (THD + N) versus level at 1 kHz, which reveals that the amp clips at a little over 75 watts (18.8 dBW) per channel into 8 ohms and almost 120 watts (20.8 dBW) into 4 ohms. The large power jump between 8 and 4 ohms and the modest 1 dB or so of dynamic headroom suggest a relatively stiff power supply.

Distortion is very low across the entire frequency band and over a wide range of

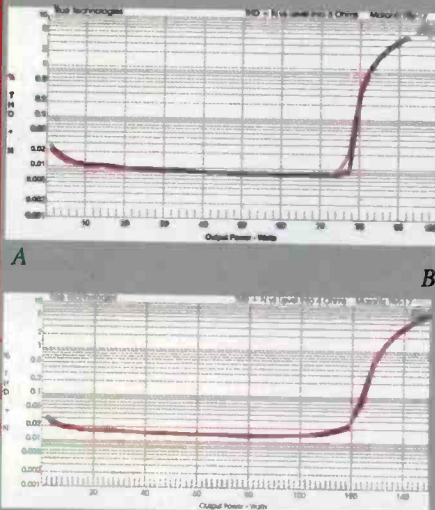


Fig. 1—THD + N vs. level, left channel red and right channel blue, into 8 ohms (A) and 4 ohms (B).

of any kind at moderate, high, or higher volume settings. But where was the brightness? The ringing clarity of Soloff's horn? The rock 'em, sock 'em Ellingtonian clarinet and alto sax solos by conductor/arranger Bob Wilber also sounded restrained to me.

All seemed eerily damped down. I sensed a certain flatness to the sound, as if a dull scrim were draped between me and the band. At first I thought I'd accidentally engaged some filter switch on the front panel,

MEASURED DATA

Dynamic Power at 1 kHz: 95 watts (19.8 dBW)/channel into 8 ohms and 155 watts (21.9 dBW)/channel into 4 ohms.

Noise, A-Weighted: -91 dBW.

output levels (Fig. 2). The highest reading below overload is a mere 0.036%, just slightly short of full power into 4 ohms at 20 kHz. Into 8 ohms, THD + N scarcely rises above 0.01% and is typically closer to half that. Noise is likewise low. The 60-Hz hum com-

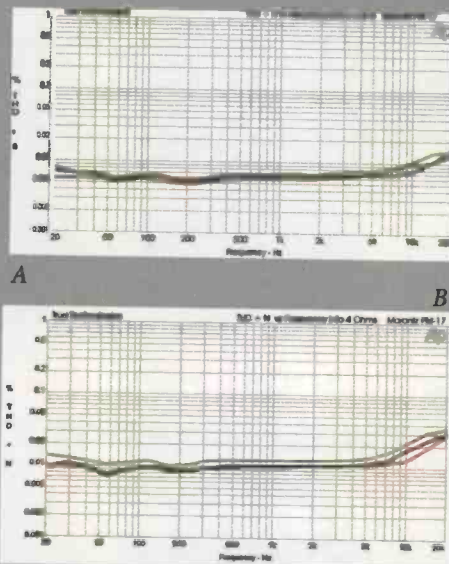


Fig. 2—THD + N vs. frequency at 10 watts (red), 30 watts (blue), and 60 watts (green) into 8 ohms (A) and at 10 watts (red), 50 watts (blue), and 100 watts (green) into 4 ohms (B).

but, of course, I found none. I kicked off the tone defeat, maxed the treble, and still—dullsville. No amount of tonal fidgeting seemed able to pierce the haze.

As a failsafe, I left the amp running for 72 hours (while I listened to my fine old kitchen 8-track player). My hope was that the PM-17 would begin to "settle down," that something deep in its steely innards would finally gel.

No such luck. My second test was Debussy's Sonata in G Minor for Violin and

ponent is about 10 dB greater in the right channel than the left but is still pretty well controlled. Frequency response is essentially dead flat, channel balance is within about ± 0.2 dB, and channel separation is excellent even at very high frequencies.

Marantz clearly designed the PM-17 to a high performance standard. Nicely done.—Michael Riggs

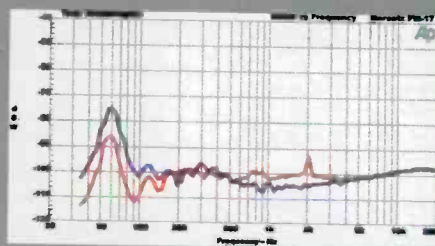


Fig. 3—Noise spectra.

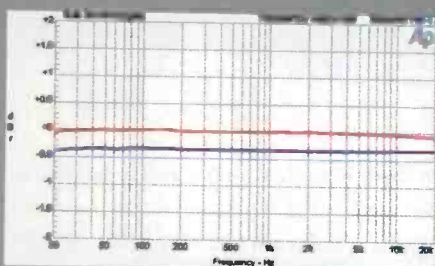


Fig. 4—Frequency response.

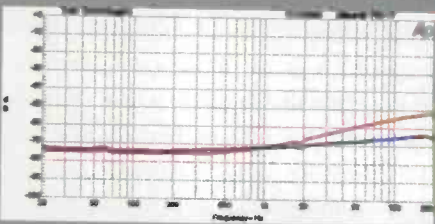


Fig. 5—Crosstalk vs. frequency.

Piano, played by Josef Szigeti and Bela Bartok at the Library of Congress in 1940 (Vanguard 8008). This legendary example of perfect communion between two performers is driven by a palpable sense of immediacy in the recording. The excitement lies in hearing Bartok himself so closely connected to Szigeti and his fascinating violin technique. In animating Debussy's surreal, fairy-like, weird *ponticello* effects, especially in the fantastical second movement, Szigeti and Bartok communicate a sense of

audible intimacy that results in a thrilling listening experience. Incredibly, though, Bela and Josef this time seemed more like new neighbors hollering at one another over the backyard fence.

I then spun my CD of *John Coltrane & Johnny Hartmann* (MCAD5661), their 1963 classic, perhaps the quintessential after-dinner makeout music. But Coltrane and Hartmann's definitive rendition of Billy Strayhorn's "Lush Life" took on the same muffled cast as Soloff's trumpet and Szigeti's violin. What could it be? Was it me? Oh God! Was it... the heartbreak of... *excessive earwax*?!? No. I became convinced there was something endemic (perhaps a poltergeist) in the circuitry of the PM-17 that cast a grey shroud over all music ever recorded—ever.

Perhaps this was part of some cruel joke worked by the other writers at *Audio*. I noticed the way they looked down their noses

**I sensed a flatness
to the sound, as if
a scrim were
between me and
the band.**

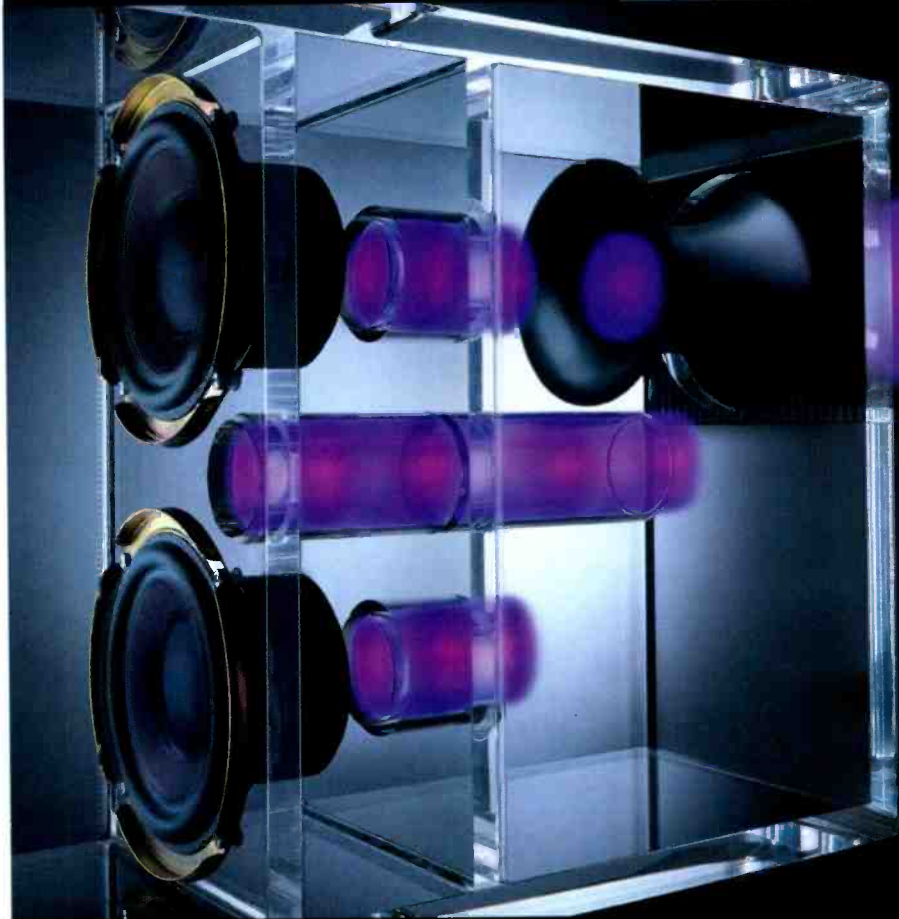
at me at that first staff meeting; their venal, jealous glances towards my end of the boardroom table. Wait a minute! I bet they sabotaged my new Marantz PM-17, those self-righteous, pathetic, stereo-geek losers! Ah, but the shtrawberries! I had them on the shtrawberries! They tried to make a fool of me, but I showed them. Anyway, I tried not to think about it and pushed on with my scientific, extremely blind test.

Trembling, I ripped my Kimber cables from the suspect Marantz PM-17 and plunged them vigorously into the hot, waiting terminals of my beloved NAD 317 to see if I had indeed gone mad.

Mad? Mad am I? Nay, I say! My NHT Super Two's quivered oh-so-gently, sprung to life, and surrendered themselves up to the crystalline sound of 'Trane's manly instrument. I lit two smokes and sighed. Ahhh, the sound of quality hi-fi.

In short, I cannot wholeheartedly recommend the Marantz PM-17. **A**

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JAMES K. WILLCOX

Mackie HR824 Powered Near-Field Monitor

Given the current ubiquity of its mixers in home and commercial studios, it's hard to believe that Mackie Designs is just a decade old. Greg Mackie, however, is much older. He has to be—he earned the enmity of my neighbors in the '70s when my brother and I used an early, outboard P.A. mixer made by his first company, Tapco, to bring our David Bowie-inspired musical vision to the public. Unfortunately, the public responded by asking our parents if we could perhaps take up a quieter hobby, like demolition or torturing cats.

While I didn't grow up to be Mick Ronson, Mackie did evolve, well, into an older Greg Mackie, leaving Tapco to start another business in the late 1970s and eventually launching his present eponymous company in 1989. Since its inception, Mackie Designs

has earned a well-deserved reputation for offering high-quality studio gear at surprisingly affordable prices. Perhaps the truest measure of the company's success is that there is now an "I Hate Mackie" Web site; apparently, some perceived anomalies in the company's new eight-bus digital mixer has

MACKIE

Rated Frequency Response: 39 Hz to 20 kHz, ± 1.5 dB.

Dimensions: 15 $\frac{1}{4}$ in. H x 10 in. W x 10 $\frac{1}{4}$ in. D (40 cm x 25.4 cm x 26.7 cm).

Weight: 33 lbs. (15 kg) each.

Price: \$1,498 per pair.

Company Address: 16220 Wood-Red Rd. NE, Woodinville, Wash. 98072; 800/898-3211; www.mackie.com.

some early adopters in a tither. As I've had no personal experience with the product, I can't comment. Mr. Mackie, however, may find solace in Swift's words that when a true genius appears, "you may know him by this sign, that the dunces are all in confederacy against him."

Although the company—and quite possibly a few inebriated musicians—cut its teeth on analog mixing boards, during the past few years Mackie has made successful forays into other product categories such as digital consoles and power amplifiers—even an interface for digital audio workstations. Although you couldn't call the company's flirtations with new product sectors promiscuous, it has over the years regularly birthed enough new products

for Planned Parenthood to revoke its membership card.

The HR824, a biamplified near-field monitor, is the company's first venture into the studio-monitor arena. According to published reports, Mackie spent considerable time and money developing the HR824, buying some wickedly expensive gear for testing transducers and scrapping

**The Mackies are
bright, open speakers
with great detail
and a wide off-axis
listening area.**

an earlier design and components before settling on the model I spent a few weeks getting to know. The monitors, which arrived in separate cartons, weigh a little more than 30 pounds each and are 15 $\frac{1}{4}$ inches tall, 10 inches wide, and 10 $\frac{1}{4}$ inches deep. Like many of their ilk, the Mackies come in that Ford Motor Company rain-bow palette of colors—black!

Even at first blush, it's obvious that the HR824s have been built to withstand han-

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5 Channel Amplifiers	Anthem MCA 5	Adcom GFA-7500	B&K AV5000 II	Parasound HCA 1205A
Balanced Inputs (Standard)	Yes	No	No	No
Rated Power w/ch-8 ohms	200	150	125	140
Rated Power w/ch-4 ohms	350	225	185	200
S/N Ratio	122 dB	>115 dB	90 dB*	>100 dB
Power Supply Size (μF)	100,000	120,000	60,000	100,000
VA Rating (Max.)	1800	1440	1220	1500
# of Power Transformers	2	1	1	1
# of Output Devices/ch	8	6	4	6
Trigger On (5-24V signal)	Yes	Yes	Yes	Yes
Auto On (music signal)	Yes	No	No	No
Warranty ≥ 5 Years	Yes	No	Yes	Yes
Weight - Net (lbs)	58	56	<43	48
Dollars/Watt	\$6.99	\$9.99	\$10.38	\$11.78
Amplification Type	Solid State	Solid State	Solid State	Solid State
M.S.R.P. (US\$)	\$1,399	\$1,499	\$1,298	\$1,650

The information contained in this chart has been sourced from manufacturer brochures, web pages, reviews and physical examinations. It is accurate to the best of our knowledge, as of June 1, 1999. Sonic Frontiers International 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. This illustration is for comparison purposes only. *1 Watt specification available only.



**Heard on the Mackies,
the guitar's low
notes growled with
the authority of
a junkyard dog.**

dling by fumbled-fingered minions for whom the expression "Oops!" has more than a passing acquaintance. (The Tapcos were comparably built. Our band's lead guitarist, trying to demonstrate how to get a really great rush once, inadvertently smashed his head so hard against the mixer that its case cracked. The Tapco worked for years afterward; we can't say the same for the guitarist.) The rigid, solidly constructed cabinets are made out of ¾-inch-thick medium-density fiberboard (a high-resin wood laminate) faced with a 1-inch-thick front panel beveled to diminish edge diffraction. The speaker also has internal "H" bracing for added stiffness, and the interior cavity contains high-density foam-fill acoustic damping material. The company says this reduces internal reflections by absorbing midrange frequencies that might escape through the woofer's cone.

Each speaker is powered by a pair of high-current, low-negative-feedback Mackie FR (Fast Recovery) Series amplifiers: a 100-watt amp for the highs and a 150-watt low-frequency amp, which is coupled to the woofer via a servo loop. (The amps are said to be capable of peak outputs of 210 and 350 watts, respectively.) Along with other electrical components, the amps are mounted on a

partially recessed metal chassis that is nearly the size of the whole back panel.

Powered monitors offer two immediately obvious benefits to users: convenience and amplifier consistency. But Mackie says there are several more advantages to building the power amps into the speaker's cabinet. One is improved damping of back-EMF—the electromotive force that travels back to the amplifier as a result of cone motion. If controlled properly, back-EMF can be used to help damp the cone's motion to reduce overshoot. But, Mackie says, you need a high-current amp that can take as good as it gives—such as, say, a Mackie FR Series amp! Locating the amp within the cabinet also provides all the real or imagined resistance and capacitance benefits of short cable runs. Mackie also uses active electronic crossovers, which it says yield more accurate dividing slopes, minimize phase shifts and distortion, and enable better control over saturation and overheating.

Most of the monitor's controls are located on the back. As a result, the HR824's face is country-girl fresh, largely unadorned save for a small on/off switch and clipping/overload and signal-present LEDs. The tweeter is noticeably surrounded by a submerged, gently curving waveguide (essentially a shallow horn), which is designed to improve vertical and horizontal dispersion—meaning better imaging and a wider sweet spot—as well as to yield a smoother midrange transition at the crossover point between woofer and tweeter. Eschewing the fabric tweeters used by many of its competitors, Mackie instead has opted for rigid, 1-inch, aluminum-alloy dome transducers, which the company claims produce smoother treble response (flat up to 22 kHz).

Perhaps the Mackie HR824's most distinctive feature is its rear-mounted passive radiator, rather than the more common port or slots, to improve low-frequency response. Constructed of an aluminum-honeycomb composite material, the passive 6 x 12-inch driver handles the back waves coming from the speaker's 8¼-inch woofer, which has a mineral-filled cone, an extra-long-throw voice coil, and a massive magnet structure.

As I mentioned, most of the HR824's controls are located on the back of the metal

chassis, as are several graphs and function diagrams that explain in a straightforward manner what the switches actually do. A small rotary control for input gain can be set with a Phillips screwdriver, and a three-position on/off switch adds an extra "Auto-On" setting, which operates like a standby mode to automatically power up the monitor when it senses an input signal. Located on the back as well are a rolloff switch—which simulates playback on small, bass-shy bookshelf speakers by attenuating frequencies below 80 Hz—and a high-frequency trim control (essential for use in particularly live or dead rooms) that cuts or boosts frequencies above 10 kHz by 2 dB.

Some additional sonic tailoring comes courtesy of a three-way "Acoustic Space" switch with three settings: quarter, half, or whole. These correspond with likely speaker placements: in the open, against a wall, or in a corner. Essentially, the settings lower bass output by 3 and 6 dB for the two latter situations, respectively, to avoid excessive bass reinforcement.

Audio inputs—balanced XLR and balanced/unbalanced ¼-inch phone (TRS) jacks—and the power-cord jack are also located in the back, although they're tucked underneath the rear of the chassis, facing downward, which enables the monitors to be pushed back flush against a wall. However, it also made connecting them in the tight confines of my home studio a bit more difficult. (Note to Mackie: This could be a possible endorsement from the phrenologists' association.)

Finally, Mackie says each set of HR824s is hand-calibrated before shipment to ensure you receive a matched pair with flat response (± 1.5 dB) from 39 Hz to 22 kHz. The company even includes a signed certificate, with a graphed printout of frequency response, guaranteeing not only flat response but that you'll be smarter and more attractive to the opposite sex. Really.

For this evaluation, I added the HR824s to my relatively modest home-recording setup, which is built around two Tascam Portastudios: a MiniDisc-based, four-track 564 Digital Portastudio and an older 488 Mk. II eight-track cassette. The recordings were mixed down to a Sharp MiniDisc player and an old Nakamichi Dragon cassette

TEST RESULTS

Although measurements of a speaker's on-axis frequency response don't always paint the entire picture, when carefully gathered, the response data can graphically reveal deviations (peaks, dips, humps, and troughs) that inevitably show up as instrumental and vocal colorations in listening tests. In the case of the Mackie HR824, however, True Technologies' measurements (Fig. 1) show unusually linear response essentially free of significant anomalies from 50 Hz to 20 kHz—no mean feat. In fact, through the critical upper bass/lower midrange (80 to 900 Hz) and crucial mid-frequencies (1 to 4 kHz), the response adheres to the very tight ± 1.5 -dB specification claimed by Mackie. Exceptional! Indeed, if such performance accorded with price (it doesn't; smooth, linear response can be found at both ends of the price scale), the Mackies should be priced much higher. Were I to truly nitpick, the "laid-back" mids heard by reviewer Willcox could be explained by the slightly depressed (by about 1.5 to 2 dB) response from 1 kHz to 15 kHz relative to the increased output apparent between 250 and 900 Hz.

The waterfall plot (Fig. 2) shows the Mackies' smooth, linear performance at lateral angles as great as 30° off-axis, which undoubtedly contributed to the HR824's excellent stereo imaging and wide off-axis listening area, commented on by the reviewer. At angles greater than 30° off-axis, the response above 8 kHz begins to droop

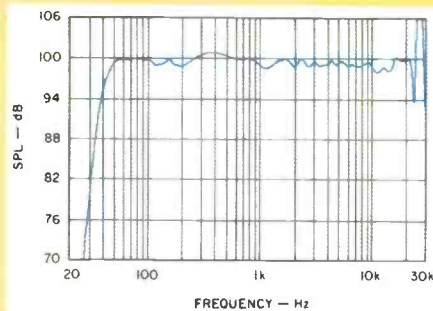


Fig. 1—On-axis frequency response.

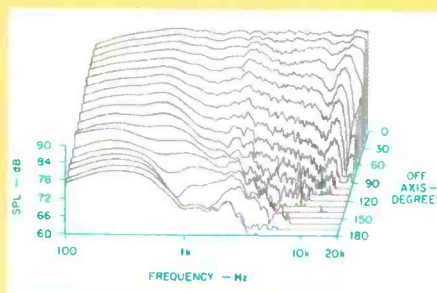


Fig. 2—Horizontal off-axis frequency responses.

a bit; still, in the musically weighty 1-to-8-kHz region, the HR824 maintains its smooth response to beyond 50° off-axis.

With the Mackie driven to a level that produced acoustic output at midband of 100 dB sound-pressure level (SPL)—a level, incidentally, that is rather loud and quite a rigorous test of a speaker—the measurements of harmonic distortion (Fig. 3) reveal third and fifth harmonic components to be very low (mostly less than 0.1%) from 150 Hz to 5 kHz. The second and fourth harmonic distortion is also well

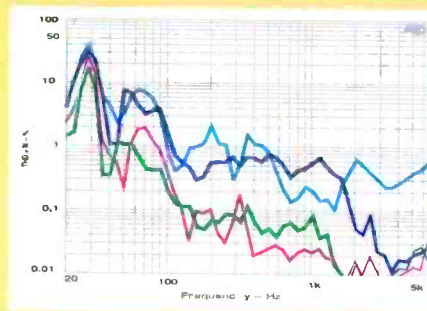


Fig. 3—Harmonic distortion vs. frequency, second (blue), third (magenta), fourth (purple), and fifth (green) harmonics shown.

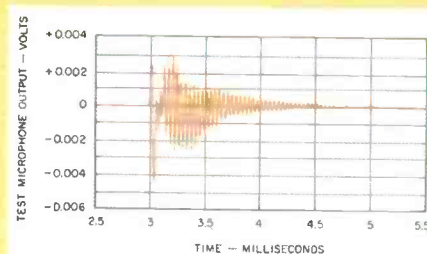


Fig. 4—On-axis impulse response.

controlled, remaining below 1% except for minor peaks of 2% at 200 and 360 Hz. Below 100 Hz, distortion rises (the woofer is working harder), with second and fourth components reaching peaks of 8% at 65 Hz and 50 Hz, respectively. (The distortion dip between 40 and 50 Hz indicates the tuning frequency of the HR824's enclosure and the speaker's effective low-frequency limit.) Overall, impressive performance for a compact speaker and confirmation of the Mackie's low-distortion, high-level monitoring capability.—Alan Lofft

deck, the latter for playing back on a boombox. Connections were made using gold-plated RCA Monster cables and gold-plated RCA-to-1/4-inch adapters from Radio Shack. For reference, I used my ancient 10-inch Tannoy Golds powered by a B&K ST-140 (102 watts per channel) power amp. I was also able, courtesy of a friend (who now gets to use my Audio Technica AT4050 microphone for a month), to borrow a pair of Genelec 1030A monitors, which have become a popular choice among home and project studio owners.

Thanks to the graphs etched on the back of the monitors, the HR824s were easy to set up and install in my system. Because my studio is set away from the wall, I adjusted the Acoustic Space control to "Open" and rotated the gain control to about 85%. I left the rest of the switches alone. (Okay, I played with them until they snapped off. Just kidding.) I began my auditioning of the Mackies by using them to mix a current instrumental project of mine that includes acoustic guitar, Weissenborn acoustic lap guitar, a Taylor Baby high-strung guitar in

Nashville tuning (the bottom strings replaced by the lighter strings from a 12-string set, tuned an octave higher), a 1940s Gretsch lap steel, a bass, and drums.

My first impression of the Mackies was that they presented a very forward bass and treble response, with the mids seeming to lay back a little. Perhaps most noticeable was the surprisingly robust bass performance coming from the relatively small woofers, but not the flabby, muddled bass you often hear from small speakers trying to talk bigger than they can act. Nope, the

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Mackies' bottom end seemed aerobicized, with a tight, well-defined bass that clearly articulated the individual fretted bass notes and kick-drum beats. The lowest notes recorded with the electric lap slide, strung with very heavy strings tuned down to a "C" and played through an overdriven old black-face Fender tube amp, growled and snarled with the authority of a junkyard mongrel.

The high end at first seemed to me a little aggressive and overly bright, though relatively smooth and very detailed. I've grown to be a big fan of metal-dome tweeters, and the HR824's didn't disappoint. The high notes on the Weissenborn, for example (strung with bright, phosphor-bronze strings), sounded absolutely sparkling but remained smooth into even the highest registers, although finger noises were also more evident. The high-strung guitar, which was used to double some parts and add another layer of texture to rhythm guitar parts, also sounded a little bright, causing me to back off slightly on the mixer's EQ. But again, detail and clarity were very good, and effects, such as reverb tail and echo, were reproduced smoothly and accurately.

The metal-dome tweeter's smooth, fast response was very much evident while I was mixing a Steve Cropperish Fender Telecaster rhythm track—which consists of short, staccato bursts of double-stops and high-string triads—on my white-boy faux-soul effort. The domes also revealed the tinny, unnatural flavor of the drum machine's snare and cymbal samples, which truly suck. I hope to substitute real drums in the final mix.

As I mentioned, compared to the forward bass and treble, the Mackie's mids seemed a bit shy, although relatively clean and tightly focused. Stereo imaging was wide and well defined, and because of the high-frequency dispersion resulting from the waveguides, the Mackies present a relatively wide off-axis listening area, which works well when several people want to hear a playback.

Switching to some complex vocal arrangements recorded by my brother re-

vealed much the same thing: strong, clear, well-defined lows that captured the bottom-end lushness of his voice, clear midrange, and accurate, natural highs just a shade brighter than I would have liked. The



The Mackies' bottom end seemed aerobicized, with tight, well-defined bass.

tightly focused imaging became even more apparent on the multitracked a cappella vocal tracks, where I was able to distinguish the subtle tonal differences of the various voices.

Playing the same selections through the other speakers proved interesting. Sonically, I found the Mackies to be quite similar to the more expensive Genelecs, which also use a submerged waveguide and metal-dome tweeter. Both seemed a little bright, but with great imaging and beautifully detailed highs. The biggest difference was in the bass, where the Mackies blew the Genelecs away! To be fair, the Genelecs use a smaller, 6½-inch woofer, but the difference seemed bigger than cone size. The result was that without the deeper low end, the Genelecs seemed even brighter than the Mackies on most material. I got truer mixes with the Mackies and missed their superb low-end response.

Comparing the HR824s to the Tannoys was a more difficult endeavor. Living with monitors is a lot like living with a significant

other. After a certain amount of time, two things happen: One is, you learn to live with—and forgive—their faults; the second is that small quirks can wind up driving you bonkers. I've lived with the Tannoys for more than a decade, and I've found them to be very neutral, revealing speakers, with smooth frequency response and a superb midrange. That probably colored my perception of the Mackies, which even after several weeks of listening seemed a bit more colored than the Tannoys. But I did find that the forwardness of the bass and treble in the Mackies did not seem so pronounced as it did when I first began to listen. During mixdowns, I realized I had already learned to

compensate for the Tannoy's shortcomings and did so automatically. With the Mackies, I found myself regularly backing off on the treble and bass in the mix, only to kick it back up a little after hearing it played back on my stereo and boombox.

So, am I ready to trade in my Tannoys? The answer is no, even though they were more expensive 15 years ago when you add in the cost of a decent power amplifier. I think they are a more natural-sounding speaker, with great imaging and midrange performance that totally suits my ears. And given the type of music I record—a lot of midrangy acoustic guitar and voice—that's important. But probably more than that, I'm just really used to them. And that's not a knock against the Mackies. They do several things very well—some even way better than they have a right to at their price. They're bright, open speakers with great detail and a wide off-axis listening area. And to be honest, some of my friends preferred them—and even the Genelecs—to the Tannoys.

But if I were just starting to build my studio and were looking for a sub-\$2,000 powered monitor, the Mackies would be on my short list of contenders. The only thing I've heard that might take them to the mat was a pair of KRK V8 monitors I listened to briefly at a music store. In the short demo, they sounded very neutral, with an accurate soundstage and a very sweet, detailed midrange; hmmm, sort of like my Tannoys? **A**

KEN KESSLER

Rotel RSX-965 A/V Receiver



Rotel's RSX-965 A/V receiver competes in the home theater end of audio—still a relatively new genre and therefore especially sensitive to price. The nonenthusiast shopping for an A/V receiver is not yet ready to automatically factor in the cost of three added channels of amplification, a surround-sound processor, and video inputs and switching. What was once a two-channel, \$500 purchase is now thrice as complex and twice as costly.

Keep this in mind as you marvel at how Rotel juggles the two sides of its own oft-conflicting image. On the one hand, it's an Asian manufacturer large enough that it must compete with the likes of Sony or Yamaha; on the other, global perception of Rotel is that it's a specialist-cum-audiophile company that must also compete with Denon, Lux, Marantz, and other audiophile-

friendly Far Eastern brands as well as mid-price U.S. and European makes such as Acurus, B&K, NAD, Arcam, and others. You can see where this might give Rotel a split personality.

Let's compound it even further. America is not awash with consumers spending

\$100k-plus on their own private cinemas; the real spread of home theater is *wa-a-a-y* down-market. You know the drill: 27-inch TVs with built-in surround sound and a quintet of nasty little speakers not worth having in one's car. This makes the Rotel RSX-965 receiver, at \$1,199, seem costly to the very (novice) customers who should be adding it to their lists.

But we know otherwise: A buck shy of \$1,200 is not a lot to pay for an AM/FM tuner, a preamp/control section with Dolby Digital and DTS, and five channels of amplification delivering a real 70 watts apiece. You want remote control? Rotel threw in a universal remote, pre-loaded with codes for even the competition: Pioneer DVD players, Panasonic TVs, Sony VCRs, and hundreds of other products from Mission, Arcam, Denon, Magnavox, Yamaha, Sears—the list is as long as you'd find with a One-For-All. Quite rightly, though, the only amplifiers this remote operates come from Rotel.

Big deal, you might be thinking, there are loads of Dolby Digital and DTS A/V receivers with 5 x 70 watts. But that would be forgetting something: Although its price tag and receiver topology put this all-in-one unit firmly in the camp of the casual buyer, Rotel has spiced it up with some serious audiophile and videophile touches that show careful, judicious compromise. Best of all, it actually *sounds* like something you'd want to own.

Take, for example, the video inputs. The RSX-965 has five of them; I can name more than one \$4,000-plus, stand-alone A/V processor that doesn't. Better still, each and every one of them has composite and S-video jacks. Another nicety is the inclusion of a DB-25 input to accommodate an outboard multichannel processor, thus future-proofing the Rotel against any forthcoming technologies its on-board D/A converters or surround decoders might not be able to handle. (There's also a DB-25 output, should you wish to use an outboard multichannel amp.) With four digital inputs (two optical, two coax), a preamp output for adding external amplifiers, and record/playback from two tape decks, its facilities should cause you to rethink the argument that receivers automatically limit your choices.

ROTEL

Rated Power: 75 watts per channel into 8 ohms, all five channels driven, 20 Hz to 20 kHz at 0.09% THD + N.

Dimensions: 17¼ in. W x 6¼ in. H x 15½ in. D (45 cm x 15.8 cm x 40 cm).

Weight: 33 lbs. (15 kg).

Price: \$1,199.

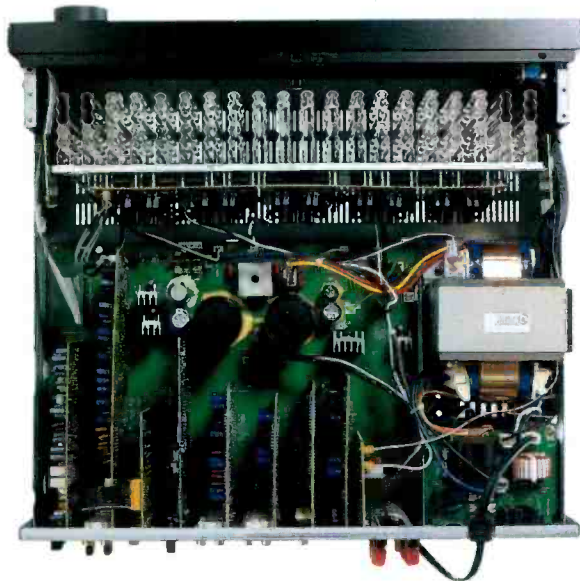
Company Address: 54 Concord St., North Reading, Mass. 01864; 978/664-3820; www.rotel.com.

Then we bump into the other half of Rotel's split personality. Although clearly aimed at burgeoning A/V enthusiasts, the RSX-965 lacks component-video inputs, because of cost considerations and because Rotel feels that component video is still rare and that customers who have \$30,000+ projectors with such inputs wouldn't pipe their video through a receiver anyway. It also lacks an RF input for accessing Dolby Digital from laserdiscs, another case of Rotel's product managers weighing image against reality: A videophile with an extensive laserdisc library is probably way beyond the A/V receiver stage.

When you get to the analog side of things, you hit more delicious confusion. Here we have a receiver very much of the late 1990s, as digital/home theater-y as it gets, and yet Rotel saw fit to include a phono stage. The RSX-965 accepts moving-magnet and high-output moving-coil cartridges, worked just fine with a Thorens TD-160 and an Audio-Technica MC cartridge, and should do justice to all manner of phono setups in the \$300-to-\$1,000 bracket. But, you ask, doesn't a phono section suggest a user of a certain age or type? It seems that Rotel is fully prepared to embrace the MTV generation without *dissing* that generation's forebears or the audiophiles-on-a-budget who helped to establish the brand's enviable credibility in the 1980s.

The RSX-965's wattage is more than adequate for driving serious, power-hungry speakers. But how many receiver buyers invest in speakers like that? I suspect that most RSX-965s will wind up driving high-efficiency, midpriced speakers. So I assessed the Rotel both with budget speakers and with the kind of speakers not usually sold with receivers, picking source components (an entry-level Pioneer DV-414 DVD player and its more illustrious sibling, the DVL-919 LD/DVD combi player) to match each scenario. My speaker choices included those delicious but inexpensive Optimus PRO LX5s and Tannoy's R1s, as well as Sonus Faber Concertinos and a quintet of Apogee Ribbon Monitors and LCRs, with and without Ruark's hot new Log-Rhythm sub-

woofer. Cables throughout were Kimber, but I eschewed costly accessories. In these tests, I tried to think like a dealer, creating systems for the arbitrary price points that are so important in price-sensitive markets like home theater. So the RSX could serve as the heart of a starter package, with a low-end DVD player for a source and five cheapish speakers, for just under \$2,000—but its natural environment would be a system costing closer to \$4,000 (with, say, a



The Rotel's facilities should make you stop thinking receivers limit your choices.

\$500-to-\$700 DVD player and \$2,000+ for five speakers).

Connecting the associated hardware was a breeze, but setting up the receiver wasn't: Rotel clearly chose to distance itself from no-brainer A/V by making the RSX-965's settings wholly customizable. Again, that strange dichotomy: A receiver, by its very nature, is aimed at those who'd rather not tweak, tune, fiddle, or potchke around, yet the RSX-965 positively encourages it. As with most home theater gear above the level of surround sound TVs, the Rotel demands a thorough study of its owner's manual. I found out that there are nonad-

justable defaults for certain surround modes (e.g., you can't set it for a phantom center channel in DTS mode) and that you can enter a tuner frequency directly off the numeric key pad, assign names to the sources, and perform a host of other secondary operations. Learning all this required expending a small amount of patience on reading the manual. (Try that yourself; it may save your dealer's sanity.)

All the controls on the remote are duplicated on the Rotel's front panel, which (typically for this kind of beast) is filled right out to its edges. (Also typically for A/V receivers, the RSX-965 is massive, and you'll need a shelf able to support its 33 pounds.) The factory-default settings covered my installation perfectly, but I did have to use the on-screen menus when I changed from "Large" to "Small" speakers, when I removed the subwoofer, and when I tried the system without a center-channel speaker to assess the Rotel's phantom-center performance. (That phantom channel, by the way, was better than it had any right to be. So, if you are on a tight budget and will not be needing DTS for a while, use the Rotel with just four speakers and save the cost of a center speaker until your funds allow.)

I encountered few surprises with the tuner section, its direct access and 30 presets making it an ideal device for those who can suffer radio. Once I'd checked the FM sound with a few live broadcasts and decided that it was as good as I'd ever need, I concentrated on two-channel music CDs and video via DVD.

Nothing, not even orders from on high, will force me to listen to bogus DSP modes. Alas, even a mildly purist firm like Rotel was forced to follow the customary path of including synthetic ambience modes for customers who demand it, so the company opted for a Crystal 4926 processor to endow this receiver with "enhancements." Listen up, guys: Whether you're playing a CD recorded in Carnegie Hall or enjoying a taxi careering across Times Square, *the correct ambience is in the recording*. And if you're listening to a disc recorded entirely in a studio, rest assured that the artist and the pro-

TEST RESULTS

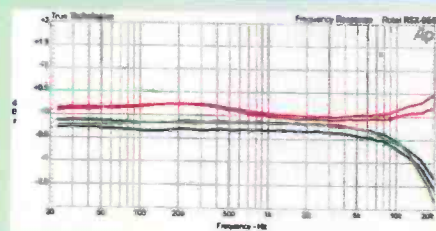


Fig. 1—Frequency response of five main channels (red, left and right front; green, center; blue, left and right surround).

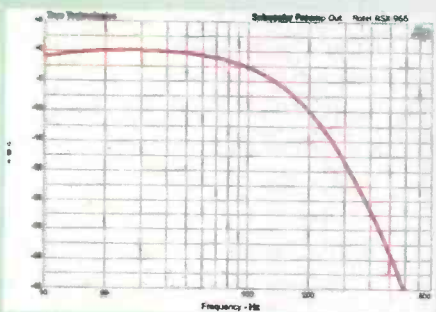
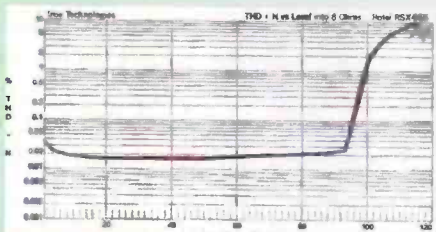
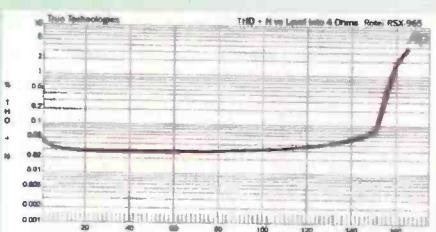


Fig. 2—Subwoofer output response.



A



B

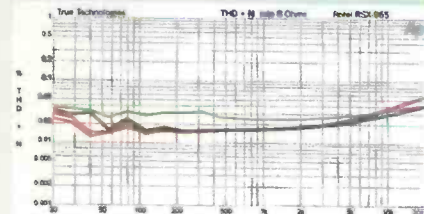
Fig. 3—THD + N vs. level, left (red) and right (blue) front channels, into 8 ohms (A) and 4 ohms (B).

True Technologies' tests of the RSX-965 demonstrate consistently fine performance. Frequency response of the five main channels (Fig. 1) is mostly quite flat. The front left and right channels (red) are within ± 0.3 dB, although the approximately 0.3-dB depression of the three octaves in the low and mid-treble relative to the lower-midrange and bass might make the Rotel's sound a touch mellower

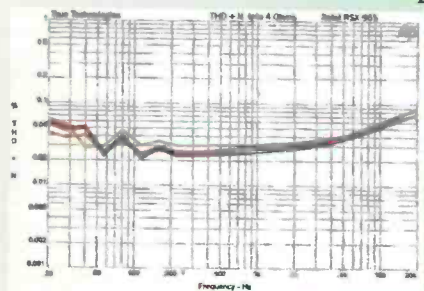
than that of an amp or receiver with perfectly flat response. From the shape of those curves, and their difference from the surround- and center-channel responses (blue and green, respectively), I'd guess that the deviation is caused by the tone-control circuit, which applies only to the front left and right.

The center- and surround-channel responses are extremely flat up to about 3 kHz, rolling off gently from there to a little more than -1 dB at 20 kHz. The rolloff looks sharper than it really is because of the graph's expanded vertical scale and, since it is restricted almost entirely to the top two octaves, will probably be inaudible on most material (especially in the surrounds). In the center channel, it might actually be somewhat beneficial with typically aggressive movie soundtracks. The low-pass characteristic of the subwoofer crossover (Fig. 2) should work quite well in most systems; its steep, 24-dB/octave filter slope is particularly noteworthy in a receiver.

The RSX-965 easily met its 8-ohm power rating, and as can be seen from Fig. 3A, total harmonic distortion plus noise (THD + N) is very low from under a milliwatt right up to clipping. Same is true for 4-ohm loads (Fig. 3B), the only appreciable difference being that the overload point moves up about 2 dB (55 watts). Many separate power amps don't do as



A



B

Fig. 4—THD + N vs. frequency at 10 watts (red), 50 watts (blue), and 89 watts (green) into 8 ohms (A) and at 10 watts (red), 50 watts (blue), and 105 watts (green) into 4 ohms (B).

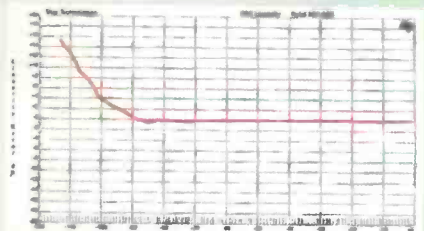


Fig. 5—D/A converter linearity.

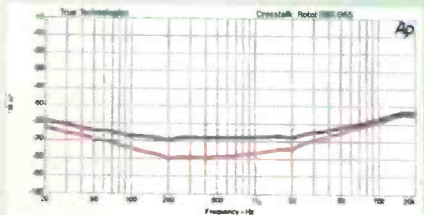


Fig. 6—Crosstalk vs. frequency, stereo mode.

well. And as Fig. 4 shows, distortion is low across the full audio band, not just at 1 kHz. All in all, you couldn't ask for better behavior from an amplifier.

D/A converter linearity (Fig. 5) is good, though not exceptional in any way. There is, in fact, no measurement one could quibble much about. A nice, clean, conservatively rated A/V receiver in the modern Rotel tradition.—Michael Riggs

MEASURED DATA

Output at Clipping, 1 kHz into 8 Ohms: 79 watts (19 dBW)/channel, all channels driven; 119 watts (20.8 dBW), one channel driven.

Dynamic Power at 1 kHz, Stereo Mode: 117 watts (20.7 dBW)/channel into 8 ohms and 184 watts (22.6 dBW)/channel into 4 ohms.

Noise, A-Weighted, Dolby Digital Mode: -68.7 dBW.

Subwoofer Output Response: 10 to 65 Hz, $+1$, -0 dB, -3 dB at 110 Hz, 24-dB/octave slope above 200 Hz.

ducer would have added any effects if they wanted them. (End of rant.)

Still, there was much to assess. Despite the inclusion of all that A/V-related circuitry, Rotel somehow managed to make the receiver sound—when used in two-channel mode—like one of the company’s “modern classic” integrated amps. I’m currently on a rural blues binge, everything from Charley Patton to Eric Bibb, crackly mono on 78s to cutting-edge audiophilia, so I was concerned primarily with how the Rotel handled voice. (Note for my tombstone: It should read, “He Lived for the Midrange.”)

Few would argue that there’s much variance between one smoky vocal and another, or that there’s a whole lot to work with when listening to a session recorded 63 years ago in a Texas hotel room. But the ability to retain small details, to keep alive those nuances, is precisely what enables you to hear the difference between Robert Johnson and Tommy Johnson. Rotel adhered to the high-end gospel by opting for warmth and naturalness—quite a trick when a lust for detail can often strip a sound of the harmonics that add humanity.

Mobile Fidelity’s gilded transfer of Sonny Terry and Brownie McGhee’s classic *Sonny & Brownie* (UDCD 01-00641) allowed me to thrill to Terry’s whoops, to the sound of every reed in his Hohner, underscored by McGhee’s near-Darth Vader intonation. Better still was the rolling piano—can we agree that this is probably the toughest instrument to reproduce?—on “You Bring Out the Boogie in Me.” I was tapping to it even when the speakers I’d hooked up were just the tiny PRO LX5s, minus the help of a subwoofer.

Then, as Hyde to the two-channel Jekyll, I spun my current DVD raves, each possessing some magic moment that provides instant insights. Fave flames and explosions? No question: *Vampires*, that underrated John Carpenter masterpiece. In Dolby Digital mode, the Rotel exhibited no breakup down below and excelled in reproducing the sonic trails of debris flying across the room in one spoof-horror scene.

Bass-buster? Cruddy film, but *Godzilla* matches *Jurassic Park* for footfalls, and the latter is yet to reach DVD. This was especially handy for assessing the transition



from main speakers to sub; once I figured out the Ruark subwoofer’s settings, it was smooth and seamless. Stinker though it is, *Godzilla* (in the scene where the good guys shoot their own submarine) features an explosion that’s my runner-up to those in *Vampires*.

Although I have but five DTS DVDs, one is *Dante’s Peak*, ideal for challenging the lower registers and stretching an amp’s dynamic constraints. While 70 watts x 5 might not seem a lot, it more than satisfied me in a 14- x 22-foot room, the film’s major volcanic eruption giving the Ruark a workout. Impressive, too, was the seamless DTS decoding, the RSX-965 never suffering a single glitch.

The transition was faultless, impressing through subtlety rather than sheer force.

But, as luck and Rotel would have it, the two most revealing DVDs were *not* 5.1 offerings per se. Although remastered as a 5.1 disc, the new edition of *Fiddler on the Roof* is so subtle in its use of surround that I ran the Rotel’s on-board test tones twice to make sure all was well. I A/B’d the DVD with the soundtrack CD, and the former stomped it. Topol’s voice, Stern’s fiddling, the cackles of the numerous hens—it’s as if they were *in the room*. Topol’s sigh of an “oy” in “If I Were a Rich Man” crossed way down into the sub without a hiccup; at the other end, the violin soared while never screeching.

But for me, the Rotel experience was clinched by—of all things—a DVD in Dolby Surround, not 5.1. Then again, *Big Night* is the greatest film ever made, so its two channels are better than any one else’s 5.1. At least, it is if you love Italians, Italian food, Louis Prima’s voice, ’50s style, Minnie Driver, Stanley Tucci, and—best for last—Isabella Rossellini. Sure, that’s my recipe for heaven, but the Rotel did something that convinced me of its greatness. In the scene where a small record player is spinning a Prima 78 of “Buona Sera,” the sound moves from the limited bandwidth and stage-right placement of a 78-rpm record player to the full sound of the original master tape as the camera moves back to take in the whole room and that tape becomes the soundtrack. The transition was faultless, dazzling in a way that impresses through subtlety rather than by sheer force. And that, for me, says it all.

What’s more, the RSX-965 managed all this for far less than I had expected in a home theater market that deems \$2,000+ as the minimum you must spend for a decent-sounding A/V receiver. Rotel has cooked up a receiver far more worthy than its price suggests; its one or two minor omissions, such as its lack of component video, worry me not a lot. If anything about the sound reveals the RSX-965’s “receiverness,” it has to be a slight lack of punch, related more to power than dynamic capability. But then, this Rotel isn’t aimed at headbangers: It’s designed for those who want to marry the A with the V. Feed it some visuals, and it’s good enough for all but those blessed with a room measured in acres. Switch off the TV, and it’s one hell of a purist audio amplifier.

If this is split personality, then call me “satisfied.” Both of me. **A**

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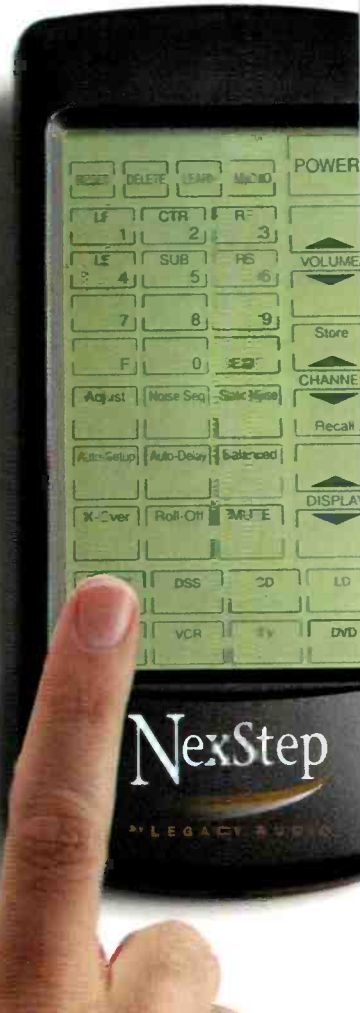
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EDWARD J. FOSTER

ANTHEM MCA 5

5-Channel Power Amp



This said that in King Arthur's time (or was it Sir Ivanhoe's?), the lord of the castle laced his wife and daughters in chastity belts lest the ladies be lanced while the boys were out jousting. Trusting souls! Methought that had gone out of style, but I'm reminded of the legend by Sonic Frontiers' Anthem MCA 5 power amp. Who? What? Huh? Well, read on.

There was a time in the early days of transistor power-amp design when engineers laced their output stages with the electronic equivalent of a chastity belt to limit drive current and protect the output devices from destruction when they were faced with a wayward speaker load. Output transistors were pretty delicate in those days, so it was "lace 'em up, or watch 'em

blow." I know, because I watched a lot of them blow!

Premature triggering of these protection circuits raised havoc with the sound when the amp was asked to drive a speaker that was considered "wayward," and Japanese amplifiers, in particular, were criticized for their raucous "transistor sound." Happily, those days have passed for the most part—probably because today's output transistors are a darned site more rugged and cheap enough that you can parallel up a bunch and increase the safe operating area (SOA)—so today's protection circuits rarely come into action. The Anthem MCA 5 seems to be an exception to this rule.

Sonic Frontiers made its name as a top-notch Canadian tube-amp company, and even when it deigned to solidify its designs,

they were, more often than not, hybrids that combined tubes with transistors. The Anthem MCA 5, like its smaller siblings, the MCA 2 and MCA 3, is solid-state all the way. It is a five-channel design, with each amplifier channel on its own circuit card. Both balanced XLR and unbalanced RCA inputs are provided. Outputs are five-way binding posts. There's also a relay-trigger jack for remote on/off. All three amps are available in silver or black finish.

According to a Sonic Frontiers spokesman, the input circuit of these amps starts off with an RF filter to remove any radio-frequency energy picked up on the cables. That's an excellent idea in my book, as long as you don't throw away too much audio along with the RF—i.e., so long as the cutoff frequency of the filter is high enough. The input stage is configured as a differential transconductance amplifier using high-beta, low-noise transistors. It is biased by a constant-current source and uses an active load that keeps it operating in Class A. That's a pretty standard arrangement these days, because it provides excellent rejection of power-supply hum and common-mode noise on the input wiring.

A buffer between the input stage and the subsequent voltage amplifier prevents the latter from loading the former, which would reduce its gain. The output is the usual complementary-symmetry emit-

ANTHEM

Rated Power: 8 ohms, 200 watts/channel; 4 ohms, 350 watts/channel.

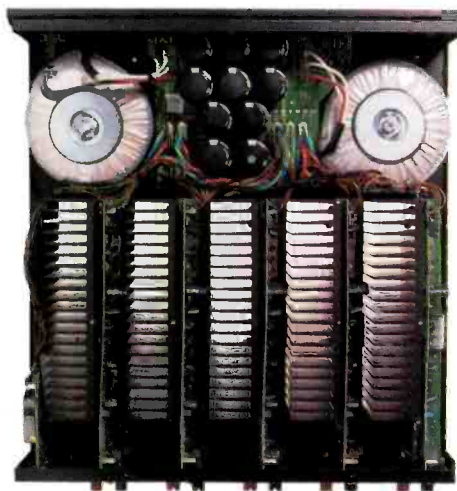
Rated Distortion: Less than 0.1% THD, 20 Hz to 20 kHz.

Dimensions: 17½ in. W x 5½ in. H x 17 in. D (48 cm x 13.5 cm x 44 cm).

Weight: 56 lbs. (25.5 kg).

Price: \$1,399.

Company Address: Sonic Frontiers, 2790 Brighton Rd., Oakville, Ont. L6H 5T4, Canada; 905/829-3838; www.sonicfrontiers.com.



The Anthem MCA 5, like its smaller siblings, the MCA 2 and 3, is solid-state all the way.

ter follower, which in this case uses eight bipolar transistors per channel, each claiming a gain-bandwidth product of 30 MHz and flat beta-versus-current characteristics for low distortion. Sonic Frontiers says the output-bias circuit tracks the temperature of the output devices, the driver stage, and the PC board to ensure that the output bias doesn't vary. It is not clear to me what the circuit-board temperature has to do with this, but tracking the temperature of the output and driver transistors (by monitoring the heat-sink temperature) is standard procedure and certainly the right thing to do.

So far, so good. But the Sonic Frontiers spokesman goes on to inform me that: "Each amplifier channel incorporates a sophisticated protection circuit that not only protects the amp in case of shorts but ensures that the output transistors are always operating within their safe operating area no matter what the load or heat-sink temperature. In addition, a DC sense circuit opens the output relay in the event of a significant amount of DC appearing at the output to protect the loudspeaker. In addition, the output relays are closed at power-up only after the rails have stabilized, and

TEST RESULTS

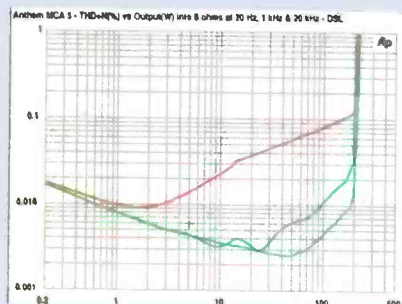
Although I usually don't make continuous power measurements into 2-ohm loads (unless the amplifier carries a 2-ohm rating), I do make dynamic-power measurements into that impedance. Dynamic-power tests don't heat the amplifier as much as continuous-power tests do, but they are a way of getting a handle on driver- and output-stage peak-current capability. In the ideal world in which there are no limits on peak current handling, dynamic power doubles going from 8 to 4 ohms and doubles again going to 2. In the real world, that doesn't happen, but dynamic power into 2 ohms still should be substantially greater than into 4 or 8.

The MCA 5's dynamic power output not only doesn't double going from 4 to 2 ohms, it actually goes the other way: 140 watts (21.4 dBW) into 2 ohms, 400 watts (26.0 dBW) into 4, and 240 watts (23.4 dBW) into 8! The most likely explanation is that the SOA protection circuit is really

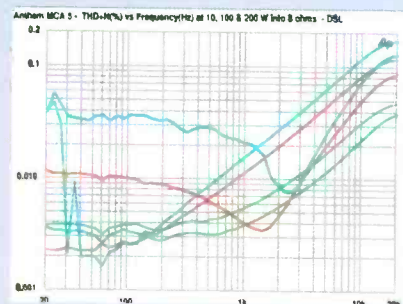
clamping down, and this amp just doesn't want to know about 2-ohm loads.

Actually, the MCA 5 didn't meet spec into 4 ohms either. Well, maybe I should not say "either," because it isn't spec'd into 2 and there seems to be some confusion about what the specs really are. The glossy literature says that the power output (at 1 kHz and 1% THD) is 150 watts into 8 ohms and 225 watts into 4. The MCA 5 does that easily. But the manual, and a letter accompanying the sample, state that the flyer was preliminary and that the real specification is 200 watts into 8 ohms and 350 into 4, 20 Hz to 20 kHz, with less than 0.1% THD. That it doesn't do.

True, it manages to pump out more than 350 watts per channel into 4 ohms in the upper bass and midband, but forget about it at 20 kHz. The total harmonic distortion plus noise (THD + N) versus output curves of Fig. 1 tell the story. At 20 kHz, the amp manages barely more than



A



B

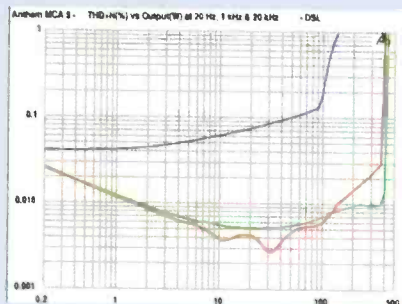


Fig. 1—THD + N vs. level into 8 ohms (A) at 20 Hz (green), 1 kHz (blue), and 20 kHz (red) and into 4 ohms (B) at 20 Hz (red), 1 kHz (green), and 20 kHz (purple).

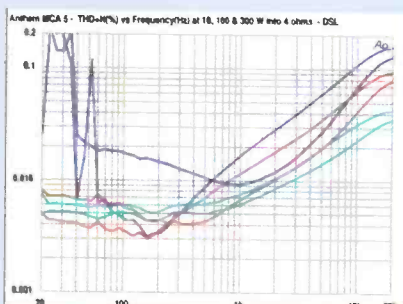


Fig. 2—THD + N vs. frequency at 10 watts (green), 100 watts (red), and 200 watts (blue) into 8 ohms (A) and at 10 watts (blue), 100 watts (red), and 300 watts (purple) into 4 ohms (B).

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Stereophile Guide to Home Theater,
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TEST RESULTS

100 watts into 4 ohms before distortion skyrockets. I expect that's the result of the good ole chastity belt cinching down! With 8-ohm loads, 20-kHz distortion rises gradually as the power level increases, but it doesn't take off (i.e., the amp doesn't clip) until the MCA 5 is pumping out more than 200 watts. Nonetheless, if we're going to be a stickler about it, distortion exceeds the 0.1% specification at 20 kHz. With 200 watts into 8 ohms, it clocks in at 0.167%! You can see this in Fig. 2A.

The data in Fig. 1 were taken on the left front channel; those of Fig. 2 (THD + N versus frequency) were taken on the left and right front channels. The 8-ohm curves (Fig. 2A) were taken at 10 watts, 100 watts, and rated power (200 watts), but since the MCA 5 simply couldn't manage 350 watts into 4 ohms over much of the frequency range, I took the high-power curve of Fig. 2B at 300 watts.

A few other points: Sonic Frontiers uses two 550-VA toroidal power transformers in the MCA 5, one powering the left front

channel and the other the right. By displaying the data taken on these two channels, I've given the amp as much leeway as I could. I am, though, rather dismayed that although the two channels tested very similarly in most regards—frequency response, noise, and so forth—the distortion characteristics were surprisingly dissimilar, which raises questions of quality control.

The MCA 5 offers balanced and unbalanced inputs, with the unbalanced taking priority over the balanced if connections are made to both. Except for channel separation (which, as you can see in Fig. 3, was far better using the balanced connections than the unbalanced ones), there was so little difference in performance between them that I've listed only the data for the unbalanced inputs.

The Anthem MCA 5 does have some stellar attributes. It's quiet (A-weighted noise of -100 dBW is quite good for a 200-watt amplifier), and the noise is "white" over most of the spectrum (see Fig. 4). There's a little bit of power-supply ripple at 120 and 240 Hz—more on the left channel than on the right—but each component is well below -110 dBW and is inaudible. Bass response goes on forever (the amp is dead flat at 10 Hz), but there's more treble rolloff (-0.3 dB at 20 kHz) than I'd expect in a top-quality power amp (Fig. 5). The rolloff is probably due to the RF input filter. The filter seems to be a single-pole affair with (in my opinion) a needlessly low cutoff point.

The MCA 5 has a nice high damping factor and an unusually uniform output-impedance curve, which I really like to see. The other data—gain, sensitivity, input impedance—are par for the course, but the channel separation, although adequate, is nothing to write home about.—E.J.F.

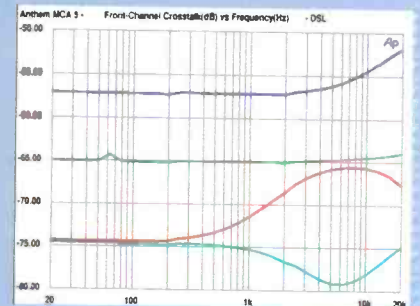


Fig. 3—Crosstalk versus frequency, front left and right channels, for balanced input left to right (red) and right to left (blue) and unbalanced input left to right (purple) and right to left (green).

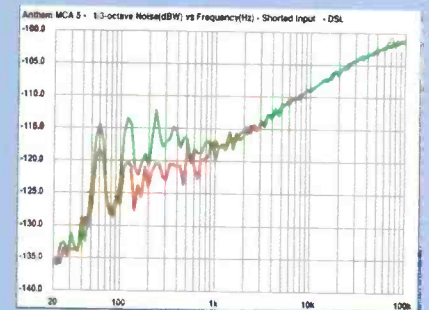


Fig. 4—Noise spectra, left (green) and right (red) front channels.

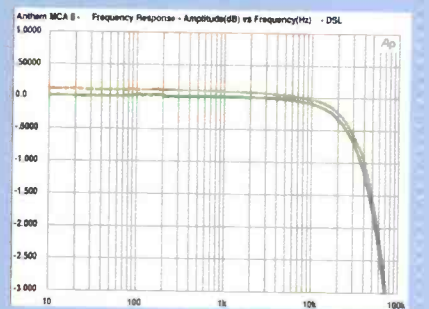


Fig. 5—Frequency response, left (green) and right (red) front channels.

MEASURED DATA

Output at Clipping (1% THD at 1 kHz):

8-ohm loads, 220 watts (23.4 dBW)/channel; 4-ohm loads, 420 watts (26.2 dBW)/channel.

Dynamic Power:

8-ohm loads, 240 watts (23.8 dBW)/channel; 4-ohm loads, 400 watts (26 dBW)/channel; 2-ohm loads, 140 watts (21.4 dBW)/channel.

Damping Factor re 8-Ohm Loads:

240 at 50 Hz.

Output Impedance:

28 milliohms at 1 kHz, 21 milliohms at 5 kHz, 26 milliohms at 10 kHz, and 90 milliohms at 20 kHz.

Sensitivity for 0-dBW (1-Watt) Output:

98.8 mV.

Noise:

-100 dBW, A-weighted.

Input Impedance:

19.9 kilohms.

Channel Separation:

Greater than 54.4 dB, 100 Hz to 10 kHz.

Channel Balance:

± 0.05 dB.

the relays are opened before the rails collapse on shutdown. This will prevent any transient from appearing across the speakers. Finally, should a heat-sink exceed 90° C. (one independent heat sink per channel), the corresponding amplifier channel is shut down as well for a few minutes until the heat sink cools.”

Now, the DC sense, power-on delay, and thermal protection are par for the course. The problem with the Anthem MCA 5 is that either the SOA monitoring circuit is far less sophisticated than Sonic Frontiers thinks it is or the output devices have such a limited safe operating area that papa just doesn't trust his girls at all! On the bench,

The MCA 5's protection circuit clamps far quicker than those of most competitive amplifiers.

the MCA 5 clamped far sooner than competitive amplifiers would have; this can be heard, especially when it is driving a low-impedance speaker.

Most power amps sound decent, and this one did too—at least with relatively easy-to-drive speakers such as the Paradigms I used. Based on the lab tests, however, I would be quite concerned about trying to drive low-impedance speakers with the MCA 5. Electrostatics (even conventional speakers with exotic crossover networks) could give it fits.

Unfortunately, I didn't have the opportunity to prove the point with difficult-to-drive speakers while the MCA 5 was in house. But that's the point of lab testing, isn't it? The best I could do on the listening front was to pad down the Paradigm loudspeakers with lab resistors and give it a go. When I did, the sound did start to wear on the ears pretty rapidly.

The Anthem MCA 5 sells for a rather attractive price, but with all the wonderful multichannel power amplifiers on the market these days, I think you can do better elsewhere—even if you have to pop a few more bucks for the key to the chastity belt. **A**

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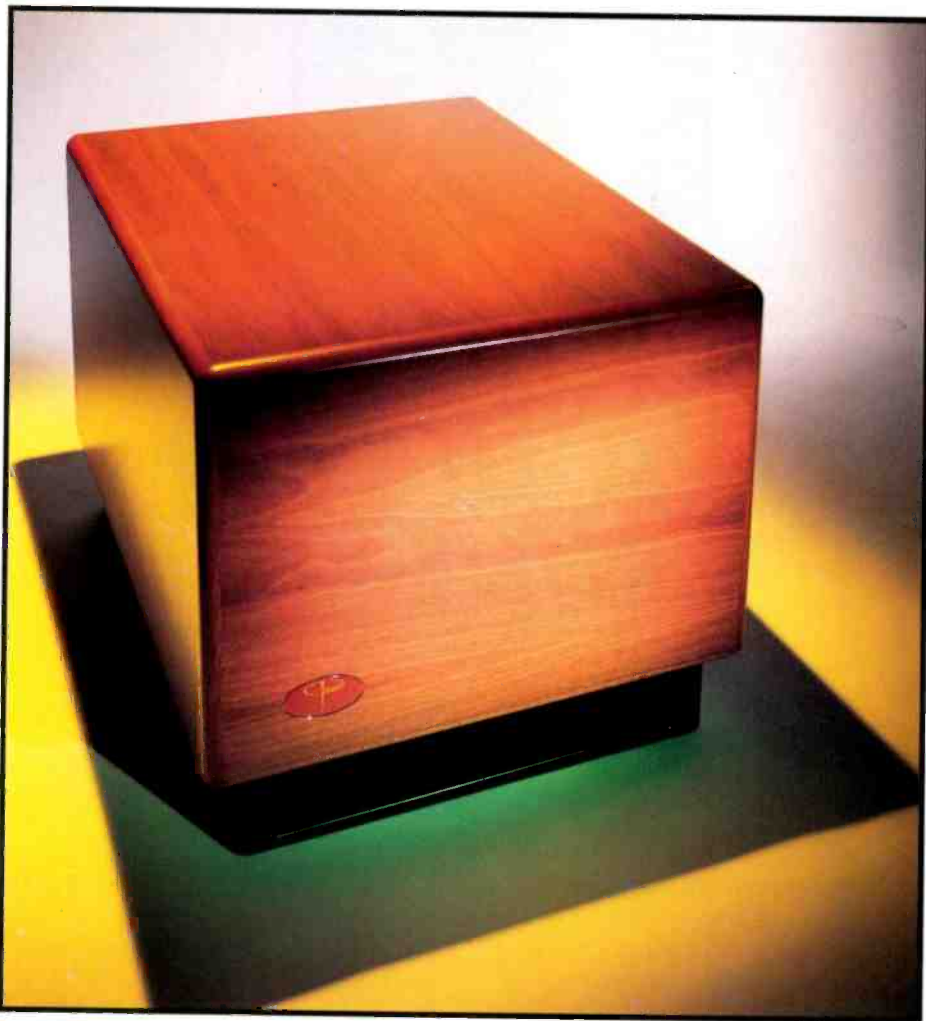
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D. B. KEELE, JR.

Whise Profunder 320 Subwoofer



Ever get really ticked off after reading something? I did over Michael Riggs's "Fast Fore-Word" column in the March issue. He was passing on information gleaned from a demonstration at the January Consumer Electronics Show (CES) of a new subwoofer using technology developed in Australia that purported to best the tried-and-true Thiele-Small loudspeaker enclosure design techniques. That subwoofer turned out to be the Whise Profunder 320, the subject of this review, which is now being marketed in the United States by TMH (for Tomlinson M. Holman) Corporation.

The description of the new technique, dubbed Parametric Acoustic Modeling (PAM), left me very skeptical. PAM's developers, Graeme Huon and Greg Cambrell, claim a number of extraordinary benefits, including: 4 to 5 dB higher efficiency, lower distortion, precise control of frequency response, control of group delay independent of frequency response, and the ability to make group delay very low. Is this just marketing hype and pseudoscience, or is it solid stuff? Read on to find out.

The Whise Profunder 320 subwoofer is based on a double-tuned vented bandpass enclosure. This enclosure has separate cavi-

ties attached to the front and rear of the driver cone, each of which is vented to the outside air through a tube, forming dual Helmholtz acoustic resonators. These resonators, which are typically tuned to high and low frequencies in the bass range, define the subwoofer's passband. Each acoustically loads the speaker at its resonance frequency, where it dramatically re-

Does this elaborate enclosure really deliver on the claims made for it?

duces cone excursion and distortion, and simultaneously increases the system's output with sound radiated from the vent. The Profunder 320 builds on the double-tuned bandpass principle by replacing the higher-frequency vent with a series of additional cavities that are connected by tubes or acoustic transmission lines), which are computer-optimized to increase the speaker's efficiency, decrease its distortion, and widen its bandwidth.

WHISE

Rated Frequency Response: 20 Hz to 150 Hz, ± 2 dB.

Rated Sensitivity: 89 dB at 1 meter, 2.83 V rms applied, half-space acoustic load.

Rated Impedance: 8 ohms, nominal.

Rated Power Handling: 200 watts.

Rated Output: 114 dB SPL at 1 meter at 25 Hz, half-space acoustic load.

Dimensions: 19 in. H x 22 in. W x 29 in. D (48 cm x 56 cm x 74 cm).

Weight: 115 lbs. (52.3 kg).

Price: \$4,900 each; available in limed oak, golden oak, grand walnut, and Victoria rosewood veneers, satin black, piano gloss black, stainless steel metal, and custom finishes.

Company Address: c/o TMH Corp., 3375 S. Hoover St., Suite J, Los Angeles, Cal. 90007; 213/742-0030; www.whise.com.au.

Actually, attempting to separate the system into cavities and adjoining tubes is a bit dicey, because a cavity can be viewed as a short, large-diameter tube, and a tube is nothing more than an elongated cavity! This calls for a unified analysis approach that treats all the elements equally in a detailed, consistent manner. The PAM technique presumably fills this need, because it treats the constituents not as lumped elements but as distributed continuous elements.

The Profunder 320 has a large, heavy enclosure, finished on five sides, containing a specially designed, heavy-duty 15-inch driver with a maximum excursion rating of 1¼ inches! Although Whise is quite open about the subwoofer's general operating principles, the company is secretive about the exact details of the cabinet's internal configuration. All I know is what is evident from examining it from the outside.

The cabinet is mounted on a 3-inch high base. On the back of the base is a set of gold-plated, double-banana, five-way binding posts. The front end serves as an outlet for the sound, with the bass energy exiting from a slot that extends across the width of the cabinet. The slot is fed by a wide, central flared tube and two smaller rectangular duct openings to the sides. Presumably the flared tube connects to one side of the driver and the outer ducts to the opposite side.

But of course, the question remains, does this elaborate enclosure really deliver on the claims made for it? Long before I got the subwoofer for testing, I started investigating this question on a theoretical basis. After reading the March "Fast Fore-Word," I immediately logged onto Whise's Web site and downloaded, printed, and read more than 12 pages of technical information. My skepticism persisted. Subsequently, I gathered additional information, including the two technical papers Huon and Cambrell gave at the 1995 Australian Regional Convention of the Audio Engineering Society (one describing the enclosure and the other the driver), a press release and promotional information, a TMH white paper, and copies of the overhead transparencies from two presentations (the original AES presentation and another much more recent) that Huon and Cambrell had given. None of this material succeeded in dispelling my doubts.

Don't get me wrong: Huon and Cambrell's work, as described in their technical papers, is very good. Included are a very detailed and careful analysis of the enclosure system and the prior art, using electrical network analogs modeled by the latest SPICE analysis software. They analyzed the enclosures using not only the traditional "lumped" modeling elements, but also including more sophisticated distributed transmission-line elements to improve the accuracy of their simulations. These Parametric Acoustic Modeling elements enable the simulations to extend higher in frequency than lumped elements would allow.

Another nice piece of work is their use of what they call the enclosure characteristic

The Profunder 320 proved to be one hot contender, besting all other subwoofers I have evaluated.

curve of driver displacement, or ECCDD (a mouthful!). This is a particularly good performance figure of merit—a direct way of relating a speaker's output SPL to the driver displacement that produced it. ECCDD is thus an excellent way to compare the operation of different types of bass enclosures.

Still, what about Whise's performance claims? Let's take them in the order they were presented in the March issue.

First, efficiency. I don't think Whise makes its case that its design is more efficient in terms of the fundamental relationships between box volume, low-frequency cutoff, and efficiency, as defined by Thiele and Small in *their* pioneering papers. Apparently, Huon and Cambrell's work essentially extends the upper-frequency operating range of a double-tuned bandpass enclosure up to the point where the added transmission-line elements themselves resonate. The bottom end of the system remains exactly as in a conventional double-tuned bandpass (CDT) system modeled with lumped parameters, including both the frequency response magnitude and phase. However, a point may be made that

the operating bandwidth of the bandpass (considering both its low- and high-frequency cutoffs) is increased beyond that of a simple double-tuned system. Hence an efficiency relationship relating operating bandwidth, box volume, and efficiency is definitely improved.

Huon and Cambrell state that their system is designed without the use of any deliberately lossy elements. This is quite evident in the abrupt onset of strong resonances and anti-resonances just above the system's upper operating limit, as seen in the frequency responses in their papers and presentations (and in my measurements for this review). These resonances make the subwoofer harder to cross over.

Huon and Cambrell also note that their enclosure designs are optimized by trial and error using SPICE simulations, and thus there is no methodical way to arrive at an optimum design. This is one area where Thiele and Small made an extraordinary contribution to the state of the art by describing in simple terms, using lumped parameter approximations, how to design an optimum system based on desired specifications of performance.

Whise's second major claim is lower distortion. The new enclosure definitely does decrease distortion, as judged by the ECCDD, but only in the range above the upper tuning frequency. At the upper tuning frequency and below, the Whise enclosure is essentially the same as a CDT system.

With regard to Whise's third claim, of more precise control of frequency response, the new enclosure does allow a greater degree of freedom and hence control. Again, however, only in the range above the upper tuning frequency. At lower frequencies, the control remains the same as in a conventional CDT system.

The fourth claim is the one perhaps most likely to raise eyebrows: control of group delay independent of frequency response. This was not shown or proved anywhere in the information I read. As I noted earlier, the phase of the system at mid to low frequencies should exactly follow that of a CDT system, which is minimum phase, and hence the phase would be directly computable from the magnitude response and not independent. These same comments

The Profunder 320's frequency response is shown in Fig. 1, with and without the 80-Hz, fourth-order, Linkwitz-Reilly low-pass filter Whise recommends. The responses are based on ground-plane measurements taken at 2 meters from the center of the slot with 2.83 volts rms applied. This condition corresponds to a 1-watt/1-meter measurement in a full-space anechoic environment. Note that all of Whise's specifications are referenced to a half-space acoustic load, and consequently their cited levels will be 6 dB higher than measured here.



The sub did what it was designed to do: produce gobs of loud, clean bass all the way down to 16-Hz.

Without the low-pass filter, two features of the response jump right out: the moderate 30-Hz hump and the peaky response above 150 Hz. Relative to the level at 80 Hz, the response is 3 dB down at 20 Hz and 6 dB down at a low 18 Hz, while the hump at 30 Hz is 2 dB higher. Below 18 Hz, the response rolls off at 24 dB/octave. Above 150 Hz, the response is extremely rough, with two main high-Q peaks at 170 and 355 Hz, which rise about 9 dB above the level at 80 Hz. Between these peaks and at higher frequencies, the response undergoes wild gyrations before finally dying

out above 2 kHz. Fortunately, the low-pass filter completely suppresses these artifacts, and the response rolls off smoothly above 60 Hz at about 12 dB/octave.

Averaged from 20 to 80 Hz, without the low-pass filter, the Profunder 320's sensitivity measured 83.4 dB SPL. This would appear to be substantially below Whise's 89-dB rating, but when the differences in measurement methods are accounted for, they are in excellent agreement.

I measured the subwoofer's phase response and calculated the group delay and waveform phase. The Profunder 320 definitely is not a linear-phase system. Its phase and group delay are typical of a 20-Hz high-pass system, exhibiting the usual nonlinear phase and group delay that increases as frequency decreases. The group delay levels out above 70 Hz in the range of 2 to 2.5 milliseconds. The group delay increases at lower frequencies, passing through 10 milliseconds at 40 Hz, 20 milliseconds at 30 Hz, and 34 milliseconds at 20 Hz, rising to maximum of about 40 milliseconds at 12 Hz. The waveform phase (often called phase intercept distortion) indicates that the subwoofer will not preserve waveforms in any band within its operating range; this is typical of conventional loudspeakers, however.

The Profunder 320's impedance magnitude (Fig. 2A) is very energetic, with three main peaks and two dips in between. This is the characteristic signature of a double-tuned bandpass vented-box system. (A classic single-tuned vented box—i.e., a bass-reflex enclosure—has only two peaks with a single dip in between.) The 6.6-ohm impedance dips at 20 and 50 Hz coincide with the vented-box Helmholtz acoustic resonances that dramatically decrease distortion and increase output. The double-tuned bandpass enclosure spreads the very beneficial effects of the resonances over a much wider range than does a single-tuned enclosure. The pronounced, narrow impedance peaks at 10, 29, and 141 Hz are indicative of a strong, high-efficiency woofer motor with low mechanical losses,

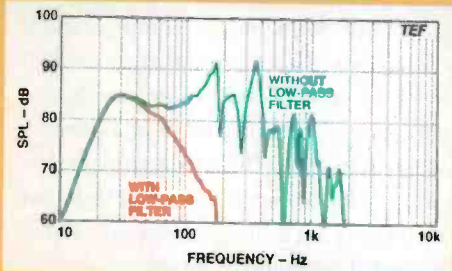


Fig. 1—One-meter, on-axis frequency response.

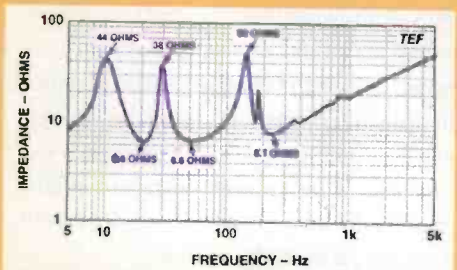


Fig. 2A—Impedance magnitude.

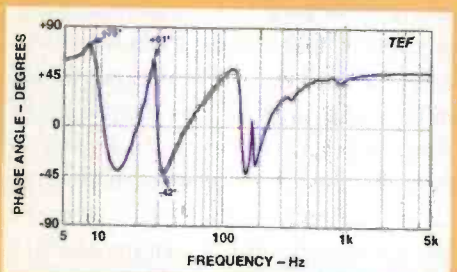


Fig. 2B—Impedance phase.

which are just the characteristics of a well-designed vented-box woofer.

A secondary dip-peak pair occurs slightly above the third main impedance peak and coincides with the first high-Q peak in the frequency response. This impedance variation presumably is due to the tuned ducts that load one of the vented-box ports, which are an integral part of the Whise design. The Profunder 320's impedance phase (Fig. 2B) exhibits a passband peak of +61° (inductive) at 27 Hz and a minimum of -42° (capacitive) at 33 Hz.

Although the 320's passband impedance variation of 6.6 to 38 ohms is fairly large, the relatively high minimum impedance relaxes cable requirements somewhat. If you want to keep cable-drop effects from causing response variations greater than 0.1 dB (very tight for a subwoofer), cable

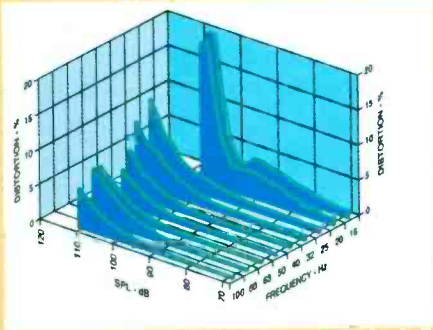


Fig. 3—Harmonic distortion versus frequency and level.

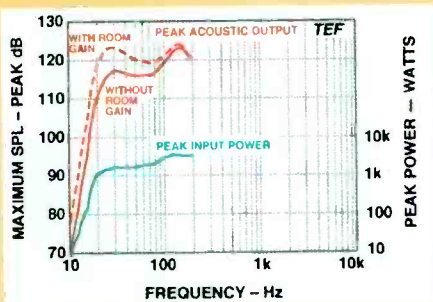


Fig. 4—Maximum peak input power and sound output.

series resistance should be kept to a maximum of 93 milliohms. For a typical run of about 10 feet, that would correspond to 16-gauge (or heavier) copper wire. Two paralleled 320s can be handled easily by any competent power amplifier.

When energized with a high-level swept sine wave, the 320's cabinet was essentially inert and exhibited no noticeable side-wall vibrations. Even at the highest input powers, vent turbulence and wind noise was very low.

Figure 3 displays the Profunder 320's harmonic distortion versus frequency and sound-pressure level. I ran the tests at nine frequencies, spaced $\frac{1}{3}$ -octave apart, from 16 to 100 Hz, at fundamental output levels ranging from 70 to 116 dB SPL. The measurements were near-field measurements but are referenced here to 1-meter free-field levels, with room gain taken into account. I arrived at the graphed distortion levels by summing the power in the first 10 harmonics of the fundamental and then referencing this power to the fundamental's power and calculating the distortion percentage. Effectively, this method

yields results quite close to total harmonic distortion (THD) but uses only the first 10 harmonics and does not include noise.

At 25 Hz and higher, the distortion stays below 10% while maximum levels are in the very loud range of 112 to 116 dB SPL. In the lowest bands, 16 and 20 Hz, the distortion rises above 20%, but maximum levels are still very robust at 106 dB SPL. At 40 Hz and above, the Whise's maximum output keeps up with that of my current champ, the Paradigm Servo 15, although at somewhat higher distortion. At 32 Hz and below, however, the Whise 320 bested all subwoofers I have tested, achieving maximum levels some 4 to 10 dB higher. At 16 and 20 Hz, the Whise outperformed the prior best subwoofer, the Hsu TN 1220 HO, by 4 to 5 dB. In short, at high bass frequencies the Profunder 320 could play as loud as or louder than any other subwoofer I have tested, and at low bass frequencies it could play significantly louder.

Whise claims an acoustic output of 114 dB at 1 meter at 25 Hz (half-space acoustic load). Did the 320 meet that spec? Yes! In my tests, the 320 generated 116 dB SPL, including room gain, with 11% distortion. When 8 dB of room gain is subtracted and 6 dB is added to account for the difference between full-space and half-space loading, the net result is 114 dB SPL, exactly as specified.

The Profunder 320's short-term peak power input and output are shown in Fig. 4. The 320 is an extremely powerful performer here. The peak input power rises very rapidly to a very high 1,250 watts at 20 Hz and then levels out somewhat, reaching 2,200 watts at 80 Hz and 3,700 watts above 125 Hz. Below 32 Hz, the Whise's power handling is the highest I have ever measured.

The 320's peak output with room gain was also extremely high, reaching levels of 106 dB at 16 Hz (which is actually below its passband) and in excess of 120 dB at and above 20 Hz. At 32 Hz and below, the 320's maximum output exceeded that of any other speaker I have tested.—D.B.K.

would apply to the fifth claim, of the ability to make group delay very low.

After all is said and done, it appears that most of Huon and Cambrell's work was applied essentially to extending the operating range of a CDT system to frequencies above its upper tuning frequency. For the Profunder 320, this range corresponds to frequencies at and above the recommended crossover point of 80 Hz! In this situation, the PAM technology serves only to make the task of crossing over the subwoofer more difficult, because of the extremely rough and peaky response of the 320 above 150 Hz. As to the claim of higher efficiency, I suspect that an equally or more efficient pure CDT system operating between 20 and 80 Hz, without the PAM-driven extra cavities and channels, could be designed to work using the same 15-inch woofer operating in the same internal volume available in the 320.

But enough about the theoretical advantages and disadvantages and the claims and counterclaims. How does the system sound and perform? In a word, like dynamite! In both my lab and listening tests, the Whise Profunder 320 proved to be one hot contender, besting all other subwoofers I have evaluated. It did exactly what it was designed to do: produce gobs of loud, clean bass all the way down to subterranean 16-Hz territory.

One might expect that from the 320's size and weight. But after struggling with the transport and unpacking of the sub, I was rewarded several times over by its extremely fine looks and equally impressive performance. Although I don't agree with some of the designers' claims, the end result is certainly first-rate.

My 320 came finished in a very handsome Victoria rosewood, a finish with a decidedly red-tinged hue, which Australians call Jarrah. The 320 looks as though it were hand-crafted from one large block of wood. The finish blends seamlessly on all surfaces and is the equal of the best I have ever seen. The cabinet's rounded edges and corners add much to the total look.

I evaluated the Profunder 320 in my stereo listening setup, using it as a low-frequency adjunct to my B&W Matrix Series 3 reference loudspeakers. As my B&W speakers

are no slouches in the bass department (they have a better and more extended low end than most speakers I have tested, including some of the subs), I was interested to see what the 320 would add to my setup. In short, a bunch!

As Whise did not supply a crossover for the 320, I used a Paradigm Servo 15 crossover I had on hand, set for 80-Hz low-pass operation with a third-order (18-dB/octave) slope, the steepest available from it. I used one channel of my Crown Macro Reference power amplifier to drive the 320 (the Crown is rated at 750 watts per channel with both channels operating). The B&W speakers were driven by a Krell KSA-250 amplifier (200 watts per channel into eight ohms). Other equipment included the Onkyo CD player and Straightwire Maestro cabling.

As I have for many past subwoofer evaluations, I derived the sub's drive signal from the main power amplifier's speaker lines through a passive summing network. This network compensated for a passive 100-Hz first-order high-pass RC filter inserted in the tape loop of the Krell preamplifier, which rolled off the low frequencies to the B&W speakers. This scheme eliminates the need to run unbalanced line-level cables back and forth between the power amps, which are at the speaker end of the room, and preamp, which is at the other end.

Whise packed no manual with the 320 subwoofer, but TMH supplied a five-page document that the company gives to its professional customers. TMH suggests that the 320 be mounted on a pliant surface that prevents direct contact between its cabinet and the floor. This serves to minimize rattles and "early sound." Early sound is solid-borne sound directly transmitted through walls, floors, and so forth and re-radiated into the room. Because solid-borne sound travels faster than airborne sound, the early arrival of the former may smear transient sounds. The paper also points out that the physical characteristics of the room and the location of the subwoofer can have far greater effect on what you hear than the basic characteristics of the subwoofer itself.

I placed the 320 in the right front of my listening room, about an inch from the right wall, with the front of the sub facing

the wall behind it and about 4 inches away. This located the sub's sound-output slot about as close to the corner as I could get it. The Profunder 320 takes up so much floor space that I could barely get the B&W speakers returned to their standard operating positions.

On a wide range of program material, some with considerable bass and other with moderate amounts, the Profunder 320 proved to be an extremely agile performer, generating the loudest, cleanest, and lowest bass that I have heard in my listening room. What was particularly noteworthy was its effortless and seemingly non-stop high peak sound output capability. On my favorite woofer-destroying demo track, the cannon on Telarc's *Tchaikovsky 1812 Overture* (Telarc CD-80041), the 320 took all I could give it, generating awesome levels of bass while sounding very clean, even though the Crown amp was driven to hard clipping!

I did listen to the 320 by itself on male speaking voice, with the Paradigm crossover set to the 80-Hz low-pass operating frequency. This trick is always worthwhile on any system with a subwoofer. Ideally you should hear only bass coming from the sub, with minimal overtones that might draw attention to its location. I was easily able to understand what the announcer was saying, however, which implies that the 320 requires the steepest crossover you can get. Fortunately, the higher frequencies coming from the main speakers mostly mask upper overtones coming from the sub.

I found myself getting out all my favorite bass CD's, including several I haven't listened to in quite awhile. The 320's low-bass capability was very strong in the range below 20 Hz, with plenty of extension and output. The sub was equally at home with kick drum on loud heavy-metal rock music played at concert levels, with full orchestra kettle drum, and with special effects, from jet and prop planes to explosions. One of my young friends from church was very impressed with how well the Profunder 320 would reproduce the bass on one of his

auto-sound demo discs, *Maximum Boom, The Ultimate Collection* (Pandisk Music PD-8878).

On band-limited, 1/3-octave noise, the 320 easily bested the B&Ws, even with both of the B&Ws operating! This was true for every band, from 20 to 200 Hz. At 20 and 25 Hz, the 320 could play much louder and



The Whise generated the loudest, cleanest, lowest bass I have heard in my listening room.

cleaner than the B&W's, and without the significant wind noise that the B&W's port generates. At higher frequencies, where the B&W's output would grow harsh at high levels, the 320 was still going strong. I did notice significant ringing and smearing on the 160-Hz burst when played on the 320. The B&W, however, was perfectly tight and clean sounding on the same burst. Of course, you would not normally operate a subwoofer to such a high frequency.

The Whise Profunder 320 is a big, expensive subwoofer, but it gives you an extremely big bass wallop in return. Its performance, looks, and workmanship are the best of any subwoofer I have tested. If you want all of this along with a lot of the latest technology, the 320 is for you. **A**

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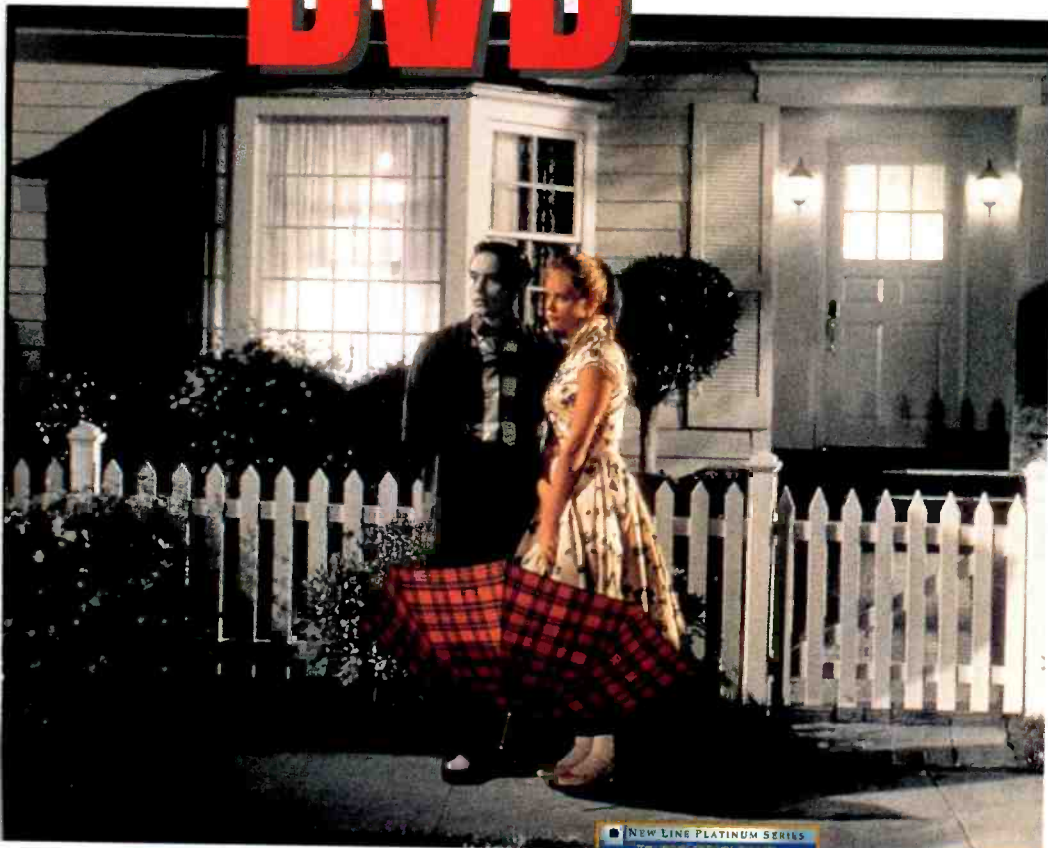
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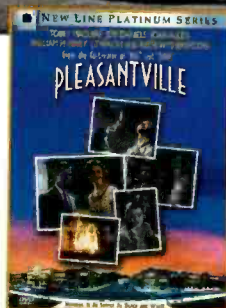
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'50s FANTASY

Pleasantville 1998; PG-13 rating; one-sided, dual-layer (1.85:1 aspect ratio); Dolby Digital 5.1 and Dolby Digital two-channel matrix surround; closed-captioned; includes two full-length commentaries, trailer, storyboard gallery, Fiona Apple's "Across the Universe" music video, a behind-the-scenes featurette, color television setup, and additional PC features (such as screenplay access). NEW LINE PLATINUM SERIES N4728, 124 minutes (feature run time), \$24.98

Screenwriter Gary Ross, author of the impressive screenplays for *Big* and *Dave*, takes on the additional task of directing in *Pleasantville*, an excellent neo-Capra movie. This time he examines the importance of self-expression and individuality in a fantasy setting by having young David (Tobey Maguire) and his sister Jennifer (Reese Witherspoon) transported back into the world of *Pleasantville*, a '50s sitcom currently being rerun on a cable



channel. The young kids find that suddenly everything in their new "old" environment is literally black-and-white; in this "ideal" place everything is also rigidly ordered—even to the point where self-expression is denied. As the two teens wake up various members of the town to different self-realizations—ranging from sex to career choices—people and their surroundings start to show color.

It sounds hokey, but until the very end, the script is so skillfully written and the direction so adroit that it works. It's timely, too, in a kaleidoscopic world on the threshold of a millennium that threatens so much order, control, organization, and protection that it risks returning to the black-and-white of *Pleasantville*, not realizing that the "good old days" might not be as they seem.

The movie is impeccably cast, with William H. Macy and Joan Allen outstanding as the all-too typical parents to whom David and Jennifer are affixed on arrival in sitcom land. The scene where Allen finds

she has turned to color, for example, demonstrates Oscar-caliber acting.

To accomplish the effects in this movie, the director and producers opted to desaturate color film, rather than colorize black-and-white. They found this produced a flat effect, so the black-and-white had to be digitally restructured with proper contrast to achieve real blacks and whites, as well as the gray tones in between. The results are terrific. As some characters begin to gain color, the black-and-white ones still hold their

Photo: Ralph Nelson/New Line/Courtesy Kobal

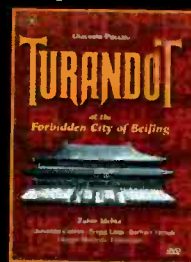
TURANDOT

Puccini: Turandot at the Forbidden City of Beijing 1998; no rating; one-sided, dual-layer (16:9 aspect ratio); Italian, Dolby Digital two-channel stereo; English, French, German, Italian, Japanese, and Chinese subtitles; includes "making-of" documentary and PCM recording of the complete opera with over 100 photographs. RCA 74321-60917, 117 minutes of opera, plus 30-minute documentary, \$34.95

Finally, here's an opera on DVD worth talking about. I don't think this is musically a great version of Puccini's popular work, but it is spectacular, visually stimulating, and makes good use of DVD features and capabilities. The production itself, directed by filmmaker Zhang Yimou, is massive in concept, as an outdoor production demands, and is often reminiscent of the director's voluptuous movie, *Raise the Red Lantern*.

On the DVD, however, there are some disturbing and disruptive postproduction shots of the Great Wall, as well as other local scenery; these seem so out of place that one wonders if they weren't dictated by the video director. Alternative camera angles, a seldom-used feature of DVD, are employed to great effect, however. Most typically, you can get the scope of certain specified scenes in a long shot or change the angle and examine it close-up.

The video is clean and clear, though not as sharply focused as I would like. The audio sounds like the multi-mike job it is;



own. In the transition scenes, the spots of color look incredibly natural, even though the viewer's brain knows they should not be there. The DVD faithfully reproduces it all—black-and-white and color—with great ease. This is a disc of demonstration quality, not just for the incredible video, but also for the well-balanced audio.

New Line's Platinum Series edition also offers two separate commentary tracks: one by Ross and the other by Randy Newman, the film's composer. Each is entertaining

TURANDOT

everything is easily heard and in proper balance but has the artificial ambience that can result from intricate mixing. For what it is, this is an excellent job. An alternate mix, claimed by RCA to be identical to the CD version of this production, is offered in PCM, accompanied by still frames from the production and of the artists involved. Electronic subtitles are provided in six languages, so you can use them or not, as you wish. There's also an intelligent synopsis, illustrated with still frames, in the same half-dozen spoken languages.

The singers have good voices, with an outstanding Liù from Barbara Frittoli, while the chorus and orchestra play exceptionally well. Solo and ensemble dancing, things not often mentioned in connection with this opera, are spectacular. If in a quarrelsome mood, one might complain that the only performer with star power seems to be conductor Zubin Mehta. But in this version, the production itself is the star, and it has been well realized on a DVD that exploits many of the format's best advantages and features. Consider that this single dual-layer disc provides not only the video version of the opera, but also a documentary and the CD version: I hope it proclaims the shape of the future.

One operational note: When I first put this DVD on, it displayed a cropped pan-and-scan image. The basic setup menu of my Sony player had to be changed, which resulted in a beautifully framed 16:9 picture, as advertised on the box. This is the only disc I've encountered that has needed such adjustment. Your player may or may not.

R.B.

and quite informative. There's also a featurette and some technical demonstrations that show how the dazzling effects were created and executed, as well as the usual trailers and other extras. If you have a PC with DVD-ROM drive, you can access even more features, including the complete shooting script. At such a low asking price, this DVD seems genuinely more like a miracle than a mere bargain.

Rad Bennett

Cats 1998; no rating; dual-layer (1.78:1 aspect ratio); Dolby Digital 5.1 and two-channel matrix surround; closed-captioned; includes a "making of" documentary. POLYGRAM 440 047 995, 120 minutes, \$29.98

Cats, perhaps Andrew Lloyd Webber's most popular show, debuted in London in



1981 and is Broadway's longest-running production. For this recently filmed version made in London, the cast—which includes Elaine Paige, Sir John Mills, and Ken Page—

was handpicked and rehearsed by composer Lloyd Webber, original choreographer Gillian Lynne, and director David Mallet.

A few changes have been made. "Growltiger's Last Stand," for example, has been omitted, but the orchestra is much larger. The costumes seem brighter to me, giving the characters a more authentic look. Though the show has lost some of its gritty charm, there are still lots of shining moments. Mills is absolutely mesmerizing as Gus, the Theater Cat; this consummate actor is still going strong at 90. The dance numbers are performed to perfection, and the overall flash and dash, replete with postproduction digital effects, is quite impressive. But it comes at the expense of this show's heart, which is what has endeared *Cats* to millions.

The video is first-rate, as is the Dolby Digital 5.1 mix, which makes frequent and effective use of the surround channels. The two-channel mix is anemic, pale, and down about 16 dB from the other. Why include it at all? R.B.

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La Traviata 1982; *G* rating; one-sided (1.66:1 aspect ratio); Italian Dolby Digital two-channel matrix surround; English and French subtitles; includes theatrical trailer. UNIVERSAL 20326, 105 minutes, \$24.98

Franco Zeffirelli's splendid movie of Verdi's popular *La Traviata* has much going for it. Its cast includes Teresa Stratas, Placido Domingo, and Cornell MacNeil, who give all of their considerable collective talent. The period sets and costumes are opulent, yet realistic. More important, the director, who also adapted the opera for film, struck a perfect balance in opening up this stage work as a movie. Included are outdoor shots, some sound effects, and even camera angles providing views that are impossible to attain from any seat in the opera house. These additions enhance the composer's work and expand its innate drama, rather than detract from it.



For my money, this effort is the most nearly perfect filming of an opera ever done. The transfer is quite good, if not quite ideal, since the video is just shy of razor sharpness and the audio lacks some presence. The English subtitles double for closed-captioning, so be prepared to see descriptions such as "Music begins" when there's no singing going on. The nice thing is if you don't like that, or don't need the translations, you can hit the appropriate button on your remote and they're gone!

R.B.

Hommage à Noir 1996; no rating; black-and-white; one-sided (1.66:1 aspect ratio); Dolby Digital 5.1 and stereo PCM audio; includes still-frame gallery and a brief director's comment. PALM PICTURES PALMDVD-3009, 47 minutes, \$19.98

German director Ralf Schmerberg's *Hommage à Noir* is a short film that presents a montage of African places and faces, specifically those of Cameroon. There is no commentary; the only sounds are those of music, a rhythmic New Age rock score by Ralf Hildenbeutel. The re-

sult is hypnotic, presenting many lovely, haunting images. Tribal masks are featured in several sequences, and the intricately adorned ones in the "The Elephantmen Society" segment are captured



in great detail. This chapter is a visual high point of the production, but the video throughout is excellent.

The audio is rich and full, with copious detail; both Dolby Digital 5.1 and PCM stereo mixes are models of their kind. The viewer can choose the one he prefers.

The chapters listed on the liner insert do not match the ones on the actual disc, however. The still-frame gallery, though limited, is excellent in offering each photograph in both full and detailed versions. (Note: Some of the initial release copies of this disc, including my review copy, had a brief 5.1 digital audio dropout in chapter 12, which has been corrected in subsequent pressings.)

R.B.

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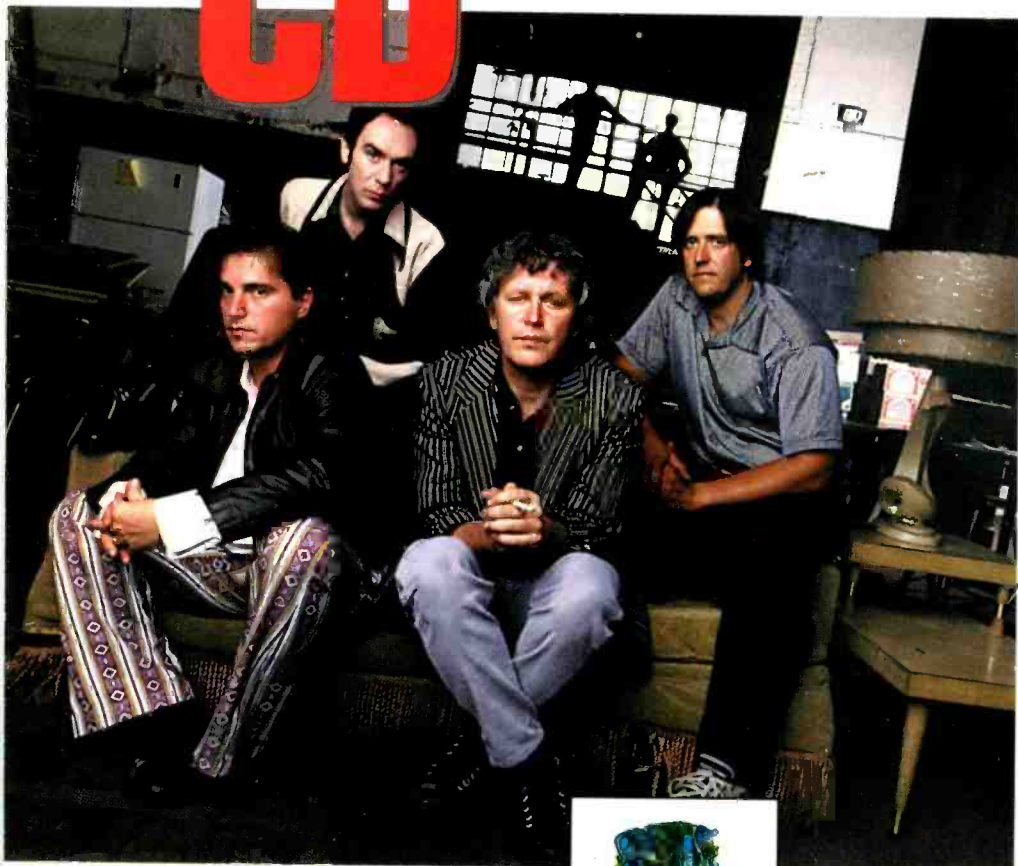
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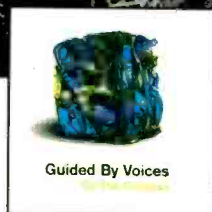
CD

Recordings



PULLING A "WEEZER"?

Do the Collapse, Guided by Voices
TVT RECORDS TVT 1980-2P, 43:33



T

he early Who/Kinks-like 3-minute bits of wonder pop that Guided by Voices (GBV) has been recording in leader

Robert Pollard's basement home studio have built the band a big cult following. These Dayton, Ohio, semi-geezers' mid-'90s classics *Bee Thousand* and *Alien Lanes* are two of my favorite records of the decade, giving me hope in a world where dickless pinheads like Soul Asylum are considered "classic rock."

But then *Mag Earwhig!* came along and the dream was over. GBV's malt-fisted lead singer/songwriter had replaced his long-time hops-alongs Tobin Sprout and Mitch Mitchell (no, not *that* Mitch Mitchell) with some slick young kids called Cobra Verde who didn't sound different enough from Rush for comfort, and the result was an album both nut-tight and anti-everything I ever liked about the band.

Pollard, who's been quoted in rock rags over the years as chafing to do a "Big Rock"

record after cranking out all of that sonically challenged indie squawk, decided to turn the production reins for *Do the Collapse* over to the Cars' Ric Ocasek. Best-case scenario had Ocasek finally giving Pollard his Big Rock record—which was also the worst case scenario. It was widely feared that Ocasek would pull a "Weezer" on GBV, trading Pollard's signature lo-fi buzz for the rich 'n' creamy, perfectly harmonized, FM-friendly sheen that Ocasek gave Weezer's first record. For SAT fans, Ocasek is to Weezer as Mutt Lange is to Def Leppard (or wife Shania Twain, take your pick).

And that's just what Ocasek has given us. With its pulsing, only semi-dirty synths and seamless Big Rock production, *Do the Collapse* sounds virtually nothing like any GBV record before it. Which is a good or bad thing, depending on whether, like me, you loved GBV's earlier records for all the right reasons—spirited, sloppy vocals and laughably raw recording quality—or, like my girlfriend, you found that stuff unlistenable for all the wrong reasons. Which, in her case, are the same as my right ones.

Lobos Run Loose

Dose

Latin Playboys
ATLANTIC 83173, 34:55

Soul Disguise

Cesar Rosas
RYKODISC RCD 10459, 44:15

Houndog

Houndog
COLUMBIA/LEGACY 65861, 39:28

It's been three years since Los Lobos' overlooked *Colossal Head*, but the band's principal songwriters, David Hidalgo and Cesar Rosas, have been busy. Hidalgo works with the idiosyncratic art-rock combo The Latin Playboys and backporch blues duo Houndog. Rosas is on his own, with his first solo recording, *Soul Disguise*.

Dose is the second album from The Latin Playboys, a lineup that also includes producer/musicians Mitchell Froom and Tchad Blake and Lobos drummer Louie Perez. As with any project involving auteurs Froom and Blake, The Playboys' music wheels freely down a generous, dreamlike musical highway, with a blend of rough-hewn, lo-fi instrumentation, innovative mood music, and loopy jazz excursions.

Hidalgo teams up with crotchety blues singer Mike Halby on *Houndog*, a gritty, homespun collection of deep, raw-boned blues that sounds like it was recorded to two-track in a portable toilet. Fortunately, Halby possesses a stirringly sad voice, which leavens songs such as "I Brought the Rain" and "Somebody (Stop the Bleedin')" with a mood of heavy and genuine sadness.

Soul Disguise is the first true solo project from any Los Lobos member; Rosas proffers a dozen tunes that draw on styles from Memphis soul to rock, norteno, and barrio blues. With Los Lobos, Rosas has always been a solid contributor, and here his performance flowers nicely as a singer and guitarist on tracks like the Springsteen-esque "Little Heaven" and the Tex-Mex "Struck."

Bob Gulla





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In the end, I do like the record: There are more than a few great moments in rock history scattered among the immaculate debris. Pollard's mastery with a pop hook and '60s-savant fake British accent are still in full force, and this time the backing band sounds more guided by Pollard than Geddy Lee. Still, it's hard to swallow a GBV record where everything's in tune, played with studio precision, and then wrapped in a delicious full-range pastry shell with all the audio trimmings. Die-hard Guided By Voices fans may shoot milk out their nose over this record, but, as always, the little girls understand.

Corey Greenberg

The Duke Ellington Centennial Edition: The Complete RCA Victor Recordings (1927-1973)

RCA 09026-63386, 24 CDs, 27:23:53

You may have heard the superlatives before, but they're all true: Duke Ellington was America's greatest songwriter, composer, orchestrator, and bandleader and a pianist of enormous talent. This compilation of all of Ellington's RCA Victor recordings into one beautifully detailed box set, including a lavishly pictured, intelligently essayed 128-page book, is a major step toward illuminating the man's genius.

Many of these hundreds of tracks have been released rather haphazardly in the past, often as sketchy compilations with sound quality that never has done the ma-

terial justice. But not this set. It's from the original source material and has been treated with the latest sonic virtuosity.

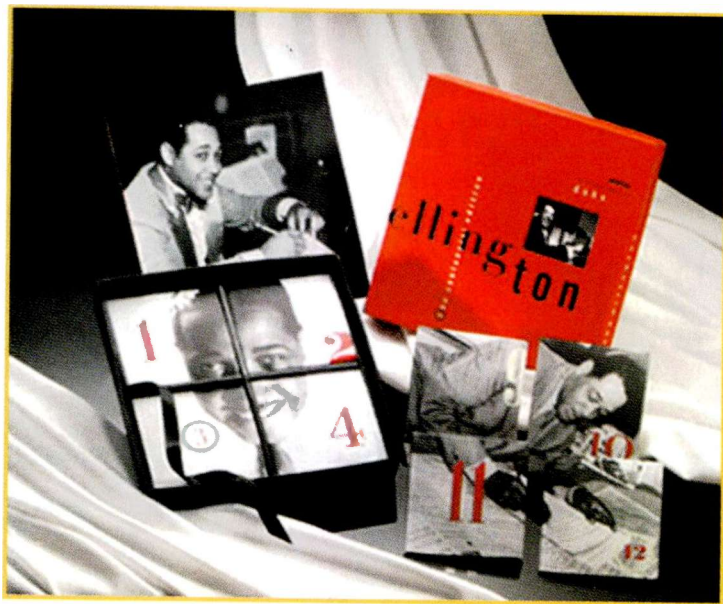
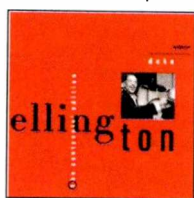
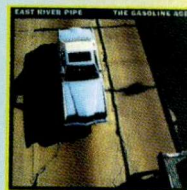
Then there's the material; its chronological completeness yields a sublime revelation. Producer Orrin Keepnews has organized these 24 discs (which include many alternates and previously unreleased tracks) into six distinct groups: The Early Recordings (1927 to 1934) include enlightening wordless vocals from Ellington's smallish "gutbucket," "jungle music" band that had broadcast live from Harlem's Cotton Club in Manhattan; The Early Forties Recordings (1940 to 1942) showcase the complete studio recordings from the Blanton-Webster band, renowned as Ellington's finest unit ever; The Complete Mid-1940s Recordings (1944 to 1946) premier the first recordings from "Black, Brown, and Beige," the composer's first major suite; The All-Star Sessions (from the mid-'40s) and The Seattle Concert from 1952, which mingles two styles, including a live Seattle concert featuring trumpeter Clark Terry; The Three Sacred Concerts (held in 1965, 1968, and 1973), which bring together these three masterworks for the first time (the second concert had been issued solely through Fantasy Records);

NEW JERSEY REVERB

The Gasoline Age, *East River Pipe*
MERGE MRG 164, 44:55

Sitting at home, hunched over his Tascam 388 min studio, F.M. Cornog—a.k.a. East River Pipe—records sublime yet dreary little pop anthems that crackle and shimmer in their lo-fi glow. *The Gasoline Age* is his fourth album and his first since relocating to suburban Summit, N.J., from the New York City borough of Queens. The move has not affected the psychedelic underpinnings of Cornog's basic guitar-keyboard attack, but lyrically his wry minimalism seems more than ever concerned with cars, travel, and simply getting there. His voice is a bit shy and unsure. But that's why God created reverb.

Rob O'Connor



its 50-year history, we have the luxury in this collection of discerning their individual musical development in conjunction with the subject's progression as a composer/orchestrator. The music herein sheds glowing light on an immensity of musical talent, including saxophonists Johnny Hodges and Harry Carney, trombonist Juan Tizol, and drummer Sonny Greer. Not to be forsaken in this context are Ellington's many fine vocalists, including Adelaide Hall, Baby Cox, and Ivie Anderson.

Ellington had a general disdain for categories, including "jazz," which he deemed as far back as the 1920s a race term. He felt it nullified his music and kept it from its place in the context of a greater whole.

We're always looking for heroes, and Ellington unquestionably is a *musical* hero.

As for the whole crew at RCA Victor, including producers Keepnews and Steven Lasker and sound engineers Dennis Ferrante and Paul Brizzi, once again it's time to make room for a Grammy. *James Rozzi*

Surrender, *The Chemical Brothers*
ASTRALWERKS ASW 47610, 56:51

Audiophiles who maintain a plain diet of blues, jazz, and rock don't know what they are missing. While those familiar sounds might keep the tubes glowing, nothing works frequency extremes like a potent electronica record, especially one from The Chemical Brothers.

For the futuristic funk of their first two albums, *Exit Planet* and *Dig Your Own Hole*, the duo of Ed Simons and Tom Rowlands sampled chunky breakbeats, screaming kamikaze dive runs, and stomach-wrenching 20-Hz synth bass lines that could level a subwoofer in nothing flat. For *Surrender*, the Chems change their dosage from '70s funk to early electro, disco, and Krautrock. Accordingly, the low end is emphasized, early Moog synths making the grooves quake with even greater power.

"Music: Response" re-creates the robotic pop of Kraftwerk, while "Orange Wedge" stirs droning hornet effects and sexy sighs

The Chemical Brothers still know how to chill, as in the title track, but their stock-in-trade are those beats: big, bad, and boisterous monsters that go up to 11, and then some.

Ken Micallef

Whereabouts, *Ron Sexsmith*
INTERSCOPE INT3P-6573, 39:11

Few musicians are as out of context as Canadian singer-songwriter Ron Sexsmith. As the lone troubadour on a music label that includes Marilyn Manson and Primus, Sexsmith is lucky anyone hears his quiet little musings above the din. Yet Elvis Costello

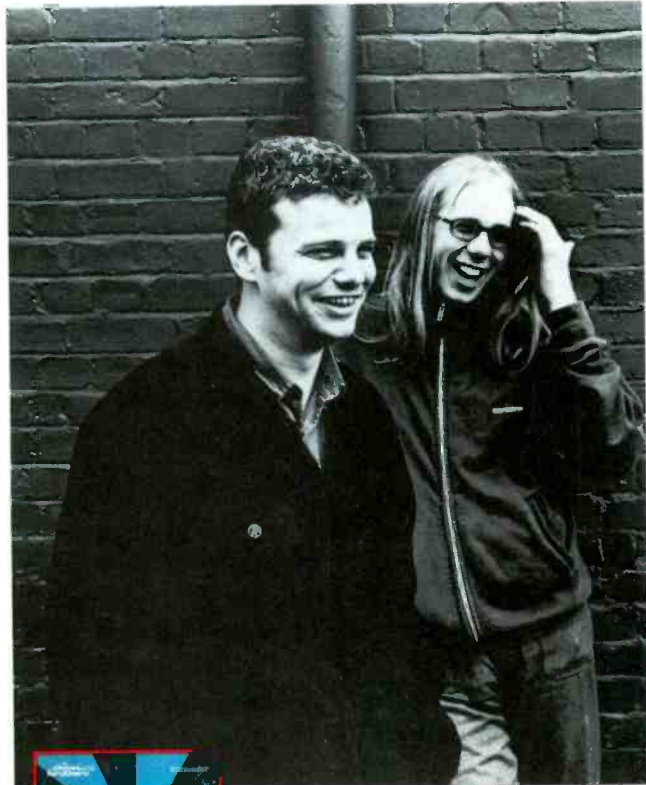


considers him one of today's finest songwriters—Sexsmith, in fact, is often Costello's opening act—and the Canadian's albums are revered for their honesty and lyrical and musical economy.

Sexsmith's previous album, *Other Songs*, is a perfectly shaped 14-song gem without a false or stray note anywhere and it remains his peak achievement. But while his third release, the 12-song *Whereabouts*, may have to settle for second best, it's still a mighty steep scale. Again produced by Mitchell Froom with assist from engineer Tchad Blake, Sexsmith has his songs cloaked in dense compression and reverb and unusually sprightly horn arrangements. The unusual and ironic bounce of "One Grey Morning" is great fun. In some ways, however, this is a shame, as Sexsmith's voice, which shares the same airy and vibrato-pitched qualities as Tim Hardin, is his highest card and could certainly stand adorned only by his exquisitely plucked

acoustic guitar. Instead, the arrangements harken back to the eclectic pop of the mid-to late '60s when genres were mixed like pharmaceuticals in a lab.

Still, Sexsmith's own vision is less Donovan than the tight, minimalist verse of a country songwriter such as Townes Van



over a slamming drum groove. Another number, "Sunshine Underground," drives a frantic timbale solo through harp and strings in a crackpot groove that scurries like a beat-hungry rat.

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Zandt. His lyrics are brilliant in their simplicity. "Riverbed" is nearly biblical. Over a soothing Mellotron, he sings, "I'll sleep until the sunlight fills the sky." An admitted Ray Davies fan, Sexsmith incorporates the Kinks leader's penchant for immortalizing society's misfits in song with the jaunty "The Idiot Boy," which pays homage to a rambunctious child and Jesus Christ—in that order.

"Feel for You" is an undeniably catchy upbeat pop number, but Sexsmith seems most enamored with his somber side, as the fatalist, melancholia of "In a Flash" and "Seem to Recall" are his most affecting moments.

Sexsmith will probably never be a household name, his vaguely titillating surname aside. He prefers the role of the understated underdog, which, in this age of raging egomaniacs, is as refreshing as one of his finely balanced tunes.

Rob O'Connor

Cowboy Rhumba, Ned Sublette

PALM PICTURES PALMCD 2020, 51:51

Ned Sublette is already known among aficionados of the avant-garde: He has written an opera inspired by the life of Simone Weil, performed works by John Cage and La Monte Young, and worked with Glenn Branca. During the 1980s, among many other projects, Sublette led a self-described honky-tonk salsa band around the New York club scene. More recently, he has produced recordings by Cuban bands like Los Van Van, Maraca Y Otra Vision, and Los Muñequitos de Matanzas.

Cowboy Rhumba captures Sublette's earliest, latest, and longest-running obsessions. Since he was born in Texas, it is very likely that "Ghost Riders in the Sky"—the opening cut—helped draw him to the guitar. Sublette long wondered what would happen if he performed country tunes with a Cuban salsa band. Los Muñequitos de Matanzas, NG



La Banda, and others help him achieve this goal of merging the country music of the Caribbean with the country music of his birth state. Nowhere is that more evident than on the track "Something To Lose," with its weepy slide Dobro connecting with the jibaro cuatro. Similarly, "Ready To Be" blends a storming horn chart and scads of percussion with Sublette's Sleepy la Beef-

like drawl. NG La Banda pumps similar hard-core salsa fire into "Que Electricidad." Conversely, the band also does a convincing conga-driven honky-tonk with pedal steel added to the bluesy rhumba on Sublette's

THE HISTORY OF JAZZ

These are My Roots: Clifford Jordan
Plays Leadbelly, Clifford Jordan
KOCH JAZZ KOC-CD-8522, 38:47

Originally released by Atlantic in 1966, but too long out of print, *These Are My Roots* digs deep into the history of the music we call jazz. Unlike any of the frothy songbook CDs from our present decade, Clifford Jordan's tribute links the very real social ferment of



its own time to one of the founding fathers of the blues, Leadbelly (Huddie Ledbetter). Jordan's virile tenor sax leads a rather limber band through nine Leadbelly tunes, though the best tracks feature Sandra Douglass wrapping her soulful pipes around "Black Girl" and "Take This Hammer." The whole affair celebrates the deep resilience of Leadbelly's blues.

Steve Guttenberg

"Feelin' No Pain," his redux of Webb Pierce's classic, "There Stands the Glass."

Equally telling is Sublette's distillation of "Not Fade Away" down to a percussion workout. With just Los Muñequitos de Matanzas' drums and coro, the players sound as if they are evoking the spirit of Buddy Holly through a Santeria rite. Similarly, they turn "Ghost Riders in the Sky" into a merengue. More remarkably, Sublette originals such as "Cheaters' Motel" sound instantly familiar.

This effort could have been a one-trick pony. Fortunately, it turns out to be a pretty good trick, one that sustains the entire album, becoming a feat of musical alchemy. It captures the spirit of "country music" from two diverse cultures; and it doesn't hurt that some of the best Latin musicians in the universe play it. Que sobroso! Hank Bordowitz

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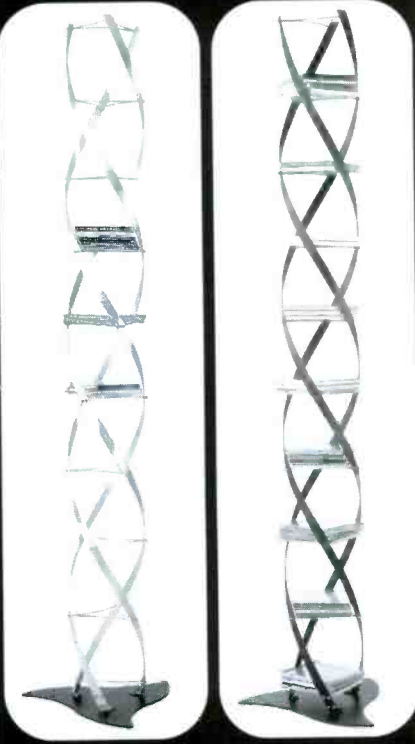


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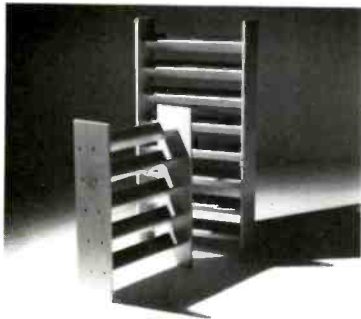
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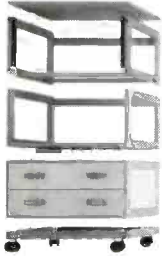
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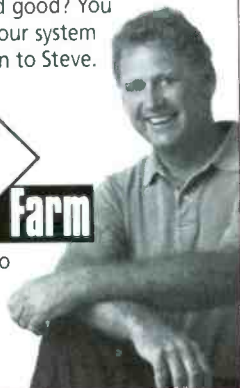
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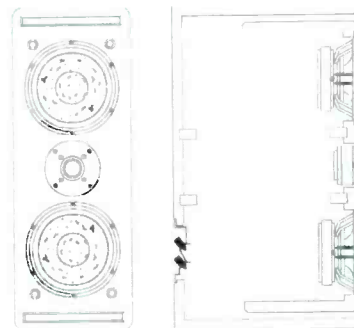
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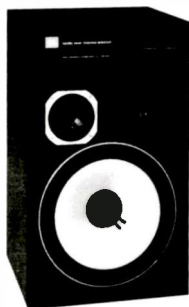
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AUDIO

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Our goal for the next millenium: more products, more incisive reviews, and more fun!

As I told you last issue to expect—and as should be obvious by now—we've made some pretty substantial changes to *Audio*. When you change something, people inevitably ask either why or what took you so long. Since there's never any answer to the second question, I'll ignore it and try to answer the first!

The fundamental reason is to cover more products. Considering what readers said they liked and wanted more of in the magazine—and remembering what we looked forward to in hi-fi magazines back when we were just reading them and not producing them—that seemed like a pretty obvious way to go. The question was how.

In that mythical best of all possible worlds, we would have as many pages available in every issue to do everything we wanted. Reality is not so kind. If we want to run gobs of full equipment reviews—say, twice as many as we typically have in the past—something will have to give somewhere.

We've approached this from several directions. One is to reduce the number of regular columns. "Front Row,"

"Mondo Audio," and "Playback" sleep with the fishes now. Corey Greenberg and Ken Kessler will devote their energy to reviews, and when we feel the need to do a short "Playback" type review on something, it will appear in "Spectrum." This space, previously occupied by "Playback," becomes the new editorial page (named partly for

its position and partly for the fact that it typically is the last thing in the magazine to get done). And in the space where the old editorial column, "Fast Fore-Word," used to appear will be brief introductions to some of the issue's contributors, starting this month (page 8) with a passel of newcomers.

The second major thing we've done is to try to tighten up the features section. We wanted them to be more concise, faster paced, and always relevant. No fat!

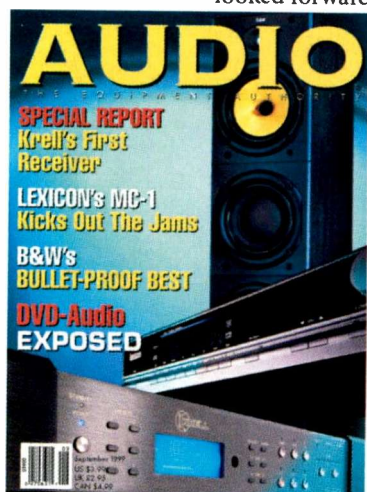
But the most significant change by far is to the structure of the equipment reviews themselves. We've done away with the old distinction between Profiles and Auricles. Every full equipment review (of which there

will be 10 or more per issue) will include laboratory measurements as well as a thorough subjective evaluation.

In the process of doing this, we've taken the opportunity to reorganize and streamline the reviews. As you can see this month, measurements are presented and discussed separately from the main body of the review. This allows the reviews to flow more easily and naturally and also makes life easier for those who are not much interested in the technical details. You will also notice that there are fewer measurements per review and usually less text devoted to simple description of basic operating features. Partly this is to conserve space and thus make room for more reviews, but it also serves to make the reviews read more fluidly. It had become increasingly apparent to us over the last several years that our traditional reviewing style was unwieldy with many current products—A/V components, especially—because of their complexity. Compare a stereo receiver from a decade ago with one of today's A/V behemoths, or a stereo preamp of nearly any era with a full-blown surround preamp/processor. It's a different, and potentially rather tedious, world.

The challenge is to cut through the complexity, to pare away excess but no more. What we want is for you to be able to find out what you need to know more quickly and easily without sacrificing rigor or vital information. We take our "Equipment Authority" tag line very seriously, so this part of the process has been by far the most difficult. As I mentioned last issue, we're very interested in hearing your opinions and ideas about the changes, either by email or regular mail. The email address is audiomag@aol.com. (I apologize, by the way, to anyone who tried to write us there during the month of June and had difficulty. We had some problems with the AOL account that have since been fixed.)

Magazine production is a complicated process, which means that any significant change tends to involve a certain amount of hair-pulling and exhaustion in the beginning. The making of this issue was certainly no exception. With that in mind, I want to give special thanks to our art director, Cathy Cacchione, and our Technical Editor, Ivan Berger, for their herculean efforts. We hope you agree with us that it was worth it.



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