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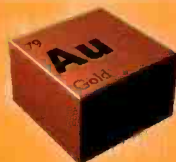
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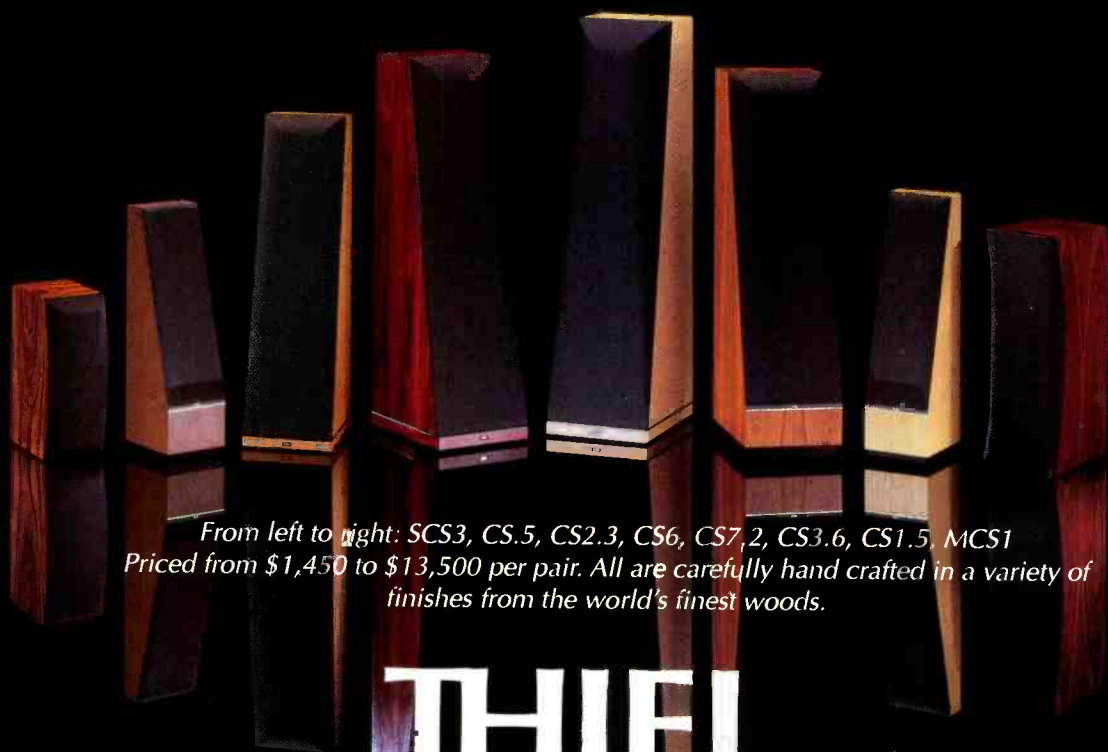
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AUDIO

JANUARY 2000

VOL. 84, NO. 1



102



99

DEPARTMENTS

ABOUT OUR CONTRIBUTORS *The people behind the pages* 8

CROSSTALK *Tough tweeters, the "ideal" sampling rate, and the 24-bit thing* 11

AUDIO CLINIC Joseph Giovanelli
Aiming a sub and too many volts. 16

NEW GEAR *Apogee's A/D and D/A, CAIG's cleaner, and Denham's pyramid speaker* 22

SPECTRUM *In the house of the future, the boxes aren't black.* 33

POST-PRODUCTION Michael Riggs
Good news for two-channel enthusiasts. 116

45



33



FEATURES

BURN, BABY, BURN! Corey Greenberg
If you yearn to burn, a guide to dubbing your LPs to CD-R 38

BETA REPORT:
TECHNICS DVD-A10 DVD-AUDIO PLAYER
Corey Greenberg
The alpha to omega will have to wait; for now, here's the first taste of DVD-Audio sound. . . . 45

RECORDINGS

DVD *Up periscope.* 99

CD *Enjoy a refreshing Beck* 102



38

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AUDIO



61



69



55



95

75

REVIEWS

KLIPSCH REFERENCE SERIES

HOME THEATER SPEAKERS D. B. Keele, Jr.
Tooting the horn for both home theater and stereo . . . 48

HNB CDR-850 CD-R/RW RECORDER John Gatski
CD recording without limits . . . 55

McINTOSH MC7205 FIVE-CHANNEL AMP
 Doug Newcomb
A multichannel muscle amp from Binghamton . . . 61

TACT AUDIO RCS 2.2 DIGITAL ROOM-CORRECTION SYSTEM Anthony H. Cordesman
Fixing room and speaker problems digitally . . . 69

WILSON AUDIO WATT/PUPPY 6 SPEAKER SYSTEM
 Ken Kessler
A dream of a listening tool . . . 75

HEWLETT-PACKARD CD-WRITER MUSIC CD-R/RW BURNER Paul Tataro
CD-R drive, he said . . . 83

PARASOUND HCA-2205A FIVE-CHANNEL AMP AND AVC-2500 A/V TUNER/PREAMP Anthony H. Cordesman
Maybe better than high-end epiphanies . . . 87

YAMAHA RP-U100 PC RECEIVER Paul Tataro
Not just another day at the office . . . 95



87

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DON KEELE is Senior Research Engineer at Telex Communications and has worked for a number of audio-related companies in the area of loudspeaker R&D and measurement technology, including Electro-Voice, Klipsch, JBL, and Crown International. A Fellow of the Audio Engineering Society and a regular speaker at industry events, Keele holds three patents on constant-directivity loudspeaker horns, two B.S. degrees in electrical engineering and physics, and an M.S.E.E. degree from Brigham Young University. He is a past member of the AES Board of Governors and is a past AES Vice President, Central Region U.S.A./Canada.

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 recently married the awe-inspiring Jill Hilycord.

KEN KESSLER was born in the United States but has lived in the U.K. since 1972. Over the years, his work has appeared in more than a hundred publications in 15 countries, including *Audio*, the British magazine *Hi-Fi News & Record Review*, *Robb Report*, and the late, lamented rock magazines *Fusion* and *Let It Rock*. Kessler's recent projects include the completion of not only his dream listening room but also a self-penned novel. Among his obsessions are record collecting, vintage wristwatches, detective fiction, the blues, and '60s British rock. A goal of his is to see Louis Prima canonized.

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.

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A Changed Outlook

I love the changes you've made to *Audio*. I wanted to make sure my opinion was heard, because I'm sure you'll get a bunch of old fogies saying they hate it.

Frankly, about a year ago I considered dumping my *Audio* subscription because the magazine was so thin and kind of dull, for the most part. Well, it looks like you've turned it around, thanks to more and better content. Congrats. I'm staying with you.

Rob Hughes
River Forest, Ill.

Word Up?

Congratulations on *Audio's* new format and design. I particularly enjoy the emphasis on equipment reviews, though I would prefer more technical data and measurements and less subjective evaluation. I think it's great Corey Greenberg is your editor. He set me straight with speakers after he reviewed the NHT 2.9 and 3.3s.

I have a question, however, concerning Edward J. Foster's article in the September 1999 issue, "DVD-Audio Gets the Green Light." Foster dismisses the sampling rate and 24-bit word size of DVD as unnecessary. While I agree that the bandwidth exceeds anything likely to be audible, his argument against the word size is based solely on the resulting dynamic range. Isn't amplitude resolution also equally important? I'm still trying to figure out why I prefer records to CDs, and I thought that it might be related to amplitude resolution.

Jim Fitzgerald
via e-mail

specified, was down in the range of about 17 bits).

As for why you prefer records to CDs, LP reproduction is prone to a variety of artifacts, some of which can be rather appealing, depending on the recording and the playback system. The most significant is frequency response error. It is difficult to maintain high-frequency response on records, particularly toward the inner grooves. This plus the tendency of many phono cartridges to exhibit a mild dip in the brightness range, around 3 kHz, where the ear is most sensitive, can soften the sound slightly. Next is the fact that all phono cartridges exhibit some progressive loss of interchannel phase coherence at high frequencies and some excess difference (L-R) signal in their outputs. This is effectively like introducing a mild spatial-enhancement circuit to the system; it can make the record sound a bit more open and deep than if it were played perfectly.—M.R.

Corey's a Scream!

I like Corey Greenberg's style. The only thing I enjoy more than an informative article is an informative and *funny* one, a trait Greenberg has repeatedly demonstrated. I may not always agree with what he has to say or even agree with how he says it, but I appreciate an author who can challenge me. Moreover, he makes me laugh, perhaps reminding us what this hobby is really all about—not numbers and figures, but enjoyment.

John Capriotti
via e-mail

New Clothes, Better Fit

By any measure, I am an old subscriber; so from this perspective, I want to compliment you on the changes you have made. In particular, I appreciate your having objective measurements accompany subjective evaluations and appreciate the demise of "Auricles."

But with amplifiers, you should go back to also testing them with a simulated speaker load, something that *Stereophile* started and that I would like to claim some measure for. And since some manufacturers claim their speakers' output signals are in phase with the input signal, you ought to make sure in evaluations of such speak-

ers that you drive them with an amp that is not only flat but also has zero phase error.

Most of your subjective reviewers are like so many others at other magazines: almost great literary masters, who use astounding terms for musical observations. Others are pure stylists, some are sophomoric, and some are just pedestrian. A few even show a fondness for vulgarity. I guess you've got to have this mix to appeal to the widest (and youngest?) audience. Still, I like you better in your new clothes; good luck!

D. J. Meraner
via e-mail

Editor's Reply: Amplifiers are minimum-phase devices, meaning that their phase responses are locked to their frequency responses. So an amp with flat frequency response will also have flat phase response. In cases where there is error, it is the frequency response deviation that you will hear. The ear is a very acute judge of frequency response but a relatively poor detector of phase error.—M.R.

Numbers Crunching

I enjoy your magazine's new format. Initially I subscribed to *Audio* to read about high-end products that I'll probably never be able to afford. Regardless, I still like reading about \$10,000 monoblock amps and speakers. I do get tired of reading about the countless \$400 products, though; I have another magazine for those.

I'm also pleased you separated the lab tests from the reviews. Reading the numbers seemed nearly endless at times. I was on the verge of cancelling my subscription for that reason, but the magazine's now a lot easier to digest.

Name withheld
via e-mail

Tough Tweeters

First, I'd like to say congratulations. Your magazine excels at reviewing equipment that the average person would look to buy. I do have one question, though. In your September 1999 issue, in the review of the B&W DM605 S2 speaker, the only full-frontal photograph shows the dome appearing to be pushed in. The domes on my DM302s don't look like that. Is this an unknown way to control high-frequency

Editor's Reply: Dynamic range is essentially a measure of the amplitude resolution (and LPs are much worse in this regard than CDs, by the way). The better the amplitude resolution, the lower the noise floor, because noise is the way that loss of amplitude resolution expresses itself. The problem with the whole 24-bit thing is that it's not really possible to make a converter with true 24-bit resolution, unless you run it in something like liquid nitrogen to get the thermal noise down. About 20- or 21-bit is about the best resolution you can hope for (and I have seen data sheets for nominally 24-bit converters whose true resolution, as

dispersion or merely like the face on Mars—a natural disturbance? Inquiring minds want to know.

Again, thanks for putting out a wonderful magazine. At the age of 18, I now know there's a world between the electronics superstores and the gold-encrusted hi-fi of local audio shops.

David Hunt
via e-mail

Editor's Reply: Thanks for the catch.—M.R.

Liking What He Sees, but...

Congratulations on the redo of *Audio*. It's always been one of my favorites, and it's now certainly more to my liking. Thanks also for including photographs of speakers with the grilles off; they're sorely needed. More reviews and technical tests, if possible, would be even better.

Further, the September 1999 issue would have been even more interesting if the Mackie HR824 had been reviewed as a hi-fi speaker, not just as a home studio recording tool. It is quite good, as are the JBL LSR28P and the NHTPro A-20. Life could be a lot worse than a pair of any of these with a reasonable subwoofer—or five of them for home theater, which I'm considering.

I'd also like to see more detail on amplifier performance into a simulated speaker load along with a good explanation of what's going on. Coverage of output impedance might be helpful as well. (I have found that speakers and rooms are the greatest variables.) You'd probably consider me a hard-core objectivist, but that's most likely owing to my 35 years in the related fields of guitars, guitar amplifiers, and pro audio equipment. Still, I'm all for preference, once value is shown.

Oh, one final thing: There's really no need for juvenile language, though I did grin at "chastity belt." Nice job and best wishes.

Roger Cox
via e-mail

Ending a Relationship

For some years I've been wavering at renewal time but have stayed with your magazine because of the interviews, articles evaluating the audible effects of speaker cables, and the occasional helpful music re-

view. But now it seems that *Audio* really has become a magazine for equipment hobbyists, period. So this will be my last year as a subscriber.

Thanks for the memories. Richard Hall
via e-mail

Chilly Reception

I recently let my *Stereo Review* subscription expire: I am not interested in video at all and was irritated by the 10-issues-a-year frequency.

Now the same happens at *Audio*, where I just renewed my subscription. I feel short-changed by two issues, no matter how I look at it. Do you all need vacation time there, or what? I could recommend that you publish just one issue at the end of the year with everything included. But it's not a good idea.

Ernest Winter
via e-mail

Editor's Reply: Anyone who renewed before the change will get 12 issues for each subscription "year."—M.R.

Just Like the Other

When *Stereo Review* started seriously dumbing down from an already fairly low plateau, I shrugged my shoulders and consoled myself with the belief that *Audio* would still provide me with the technically serious reviews that I had long enjoyed. How wrong I was!

With the September issue, I found to my horror that *Audio* had become a clone of *Stereo Review's Sound & Vision*. Most of the graphs in the reviews have shrunk in size and are unreadable.

How can you treat your readers with such contempt! Richard Cooper
via e-mail

Editor's Reply: We agree that the legibility of the graphs in the September issue was not always good. This was the result of production problems, however, not malice. We hope they're looking a bit better to you now.—M.R.

Achieving What's "Ideal"

I enjoyed Edward J. Foster's feature, "DVD-Audio Gets the Green Light," in the September 1999 issue. There was one

point, though, on which Foster seems to have missed the mark: the relationship between sampling rate and signal fidelity. His comments imply that the goal of higher sampling rates is to extend the frequency range reproduced. "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," the author writes. This is not the point, however. The point is better reproduction of the top octave, from 10 to 20 kHz.

If you took engineering or physics in college, you learned that in the ideal case you need only a sampling rate of two times the frequency of a signal to reproduce that signal. Many people—including, apparently, Mr. Foster—don't think about just how far from the "ideal case" music recording and reproduction are. If you dig into what the "ideal case" means, you find that the two-times sampling gives you only the ability to determine the underlying signal if you sample the signal over a sufficiently long period of time and you have all of those samples available to do your calculation.

Music usually gives you enough signal duration to determine the shape of a signal at 10 to 20 kHz with a 44.1-kHz sampling rate. The problem is that you need to analyze all the samples over that period of time before calculating the signal shape. Music reproduction equipment, however, doesn't do that. It just assigns an amplitude 44,100 times per second, and that is it. No analysis goes into it at all.

If this is unclear, do the following experiment in your head (or do it for real with pencil and graph paper). Imagine a smooth sine wave at 20 kHz. It starts at zero and then swings smoothly up to some maximum amplitude and then sweeps down, through zero, to a minimum, negative, amplitude before returning to zero. At 44,100 samples/second, you will get two—or occasionally three—amplitude samples over the period of one 20-kHz cycle. What will those samples tell you? If you are unlucky and the timing of the sample happens to be when the cycle starts at zero, then the first sample will be zero! Since the sampling rate of 44,100 samples/second is faster than two times the signal, the second sample will occur as the signal has finished

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cresting over its maximum and just before it hits zero again. Thus, the second sample will be positive amplitude but far lower than the maximum of the actual amplitude of the signal. The third sample will catch the signal as it is returning to zero from its maximum negative amplitude. It will show a larger (although negative) signal than the second sample, but it still won't show the full amplitude of the real signal. Over time, the samples will "walk" over the shape of the signal. Occasionally the sampling will catch the signal near its maximum and minimum, but just as often it will catch the signal when it is near zero. The reproduced signal will be nothing like the underlying signal. Instead of a steady signal at 20 kHz, the reproduced signal will have a widely varying amplitude. (It is this widely varying amplitude that, when analyzed over time and compared to the sampling rate, could allow you to calculate that the signal is, in fact, a 20-Hz signal of a certain amplitude. Actually doing this, however, is impractical and is not done.)

In the clearly non-ideal case of music reproduction, you need a sampling rate of five or ten times the signal frequency to get an audibly clear reproduction of the original signal. The 44,100 samples/second of CD is great from 20 Hz to 10 kHz. For that last octave of 10 to 20 kHz, though, it is not sufficient. For most adults, who can't hear all the way to 20 kHz, a sampling rate of 96k/second should be enough. But to cover the full range of human hearing, you will need 192-kHz sampling to do an accurate job of reproducing the signal.

Thankfully, someone on the WG-4 knows his physics. I look forward to hearing sparkling cymbals and triangles, and piercing harmonics from violin high notes, once DVD-Audio becomes available.

I am in complete agreement with Mr. Foster's comments regarding word length, however. When fully used, 16 bits gives more dynamic range than most equipment can deliver and is quite enough. Twenty bits should be much more than enough, and 24 bits is clearly overkill.

*Gene Bamman
Los Altos, Cal.*

Editor's Reply: Provided the sampling rate is at least twice the highest frequency to be

recorded, there will be no loss of fidelity due to the sampling process. You can, in fact, put a low-pass filter at the output of the sample-and-hold amplifier of an A/D converter, and what you get out will be exactly what you put in. Otherwise, it would not be possible to get perfect 20-kHz sine waves off CD, which very definitely can be done. (Just try making a 44.1-kHz digital and an analog recording of a high-frequency sine wave, then comparing the recorded signals on an oscilloscope. You will be shocked at how much cleaner and more accurate the digital recording is.) The reason is that digital recording does not rely on a piecewise, or connect-the-dots, approximation to construct the analog output on playback.

The most intuitive way of considering how it *does* operate (that I know of, anyway) is to think about what a waveform looks like after sampling. You get a stair-stepped version of the input. The steps are introduced to facilitate quantization, but the signal components that create the steps are all ultrasonic. Strip those away, and you get back the original.—*M.R.*

Carriers of Iverson's Flame

I have some good news for those readers with audio gear designed by John Iverson. I have an old Eagle amplifier and an older EK-1 strain-gauge phono system. As our styli wear out and our capacitors start to leak, we are tempted to trade in our aging components for something new and post-modern. (You remember what happened when you did that with your computer software. Right!)

Well, if you own Electro Research or Electron Kinetic gear, there are two companies you should know about. The first is Expert Stylus in England (44/137-227-6604). When my stylus wore out, I sent them the bad stylus. In the meantime, I found a replacement stylus at Whirl-a-Disk (516/694-1144) in Farmingdale, N.Y. The Music Exchange ("A Vinyl Phenomenon") in Kansas City (816/931-8422) also stocks these styli. Apparently the Pfanstiehl Corp., of Waukegan, Ill. (847/623-1360), still makes styli for the Panasonic EPS 456 QD cartridge in the EK-1.

After a year, I tried the replacement stylus from the folks at Expert Stylus, and it was really better. So you can get added vitality from your EK-1 cartridge that way. Expert Stylus also has magnetic, moving-whatever, phono cartridges, such as Grados, Denons, and Koetsus. Wyndham Hodgson is a skilled craftsman with a watchmaking background (horology) and a willingness to explain his craft on the telephone.

Another company readers may be interested in is EKSC Eagle, in Olathe, Kansas (913/780-4495). To those who still appreciate Iverson's audio vision, I can say that Russell Sherwood has taken it to the next level. He can refurbish your electronics, mostly replacing failing parts, or he can bring a new level of performance through reasonably priced upgrades. Sherwood also sells upgraded amplifiers directly, without a trade-in. In a sea of "digital-ready" tube gear, I had never heard any electronics that came close to the Eagle 7A or the Eagle 2 until I heard EKSC's own Eagle 4.

With Expert Stylus and EKSC Eagle out there, there is no reason to give up the quality of reproduced music that Iverson gave us years ago.

*Adam N. Rosenberg
Justin, Tex.*

Mirror, Mirror

The product Corey Greenberg described in May's "Front Row," Sonic Foundry's Acoustic Mirror, seems quite cool. If my memory serves correctly, the mathematical principle behind Acoustic Mirror's ability to impart the sound of a particular microphone to a musical sample is called convolution. One of the neat features about convolution is that you can also "deconvolve" a signal; that is, given a piece of music and the microphone with which it was recorded, you should (in theory) be able to remove from the music the microphone-induced coloration.

Theoretically this would leave you with a perfect copy of the original music. Of course, you should be able to take this one step further and use this program to model your complete sound system and remove its effects from the music reproduction at the listening end.

Gerry Roston, Ph.D. and P.E.

*(in mechanical engineering)
via e-mail*

Aiming a Subwoofer

Q *I am building a subwoofer that is designed to fire downward, at the floor. But would it be better to face the driver outward?—Roosevelt Kilpatrick, Utica, N.Y.*

A Try it both ways and see. You may find the sound is better when the woofer faces down, because the designer has made acoustical use of the floor's proximity. Other than that, which way you fire the sub will probably make little difference, as low frequencies are relatively nondirectional.

How to Ruin an Output Transformer

Q *Your reply to a recent letter ("Impedance Matching and Tube Amps," October 1999) made me wonder about something I was told regarding tube amplifiers—that they should never be run in an unloaded condition. Based on your explanation of output transformers, it seems to follow that if the output terminals are not connected to a speaker, then the impedance presented to the output tubes must be infinite. I recall that I was told that this could damage the output transformer. Is this correct?—Thomas W. Weber, via e-mail*

A It is certainly true that output transformers used with tube amplifiers can be destroyed if they are fed a large signal and not terminated with a load of some kind. I don't think it's so much a matter of infinite impedance as of back EMF (electromotive force) that is generated because the signal is not dissipated by the load. Of course, because AC circuits are complex, I am oversimplifying this somewhat.

Come to think of it, if the impedance were really "infinite," the transformer would not consume any power and no harm would come to it. The fact is that the input signal causes a buildup of a magnetic field in the transformer's primary winding. The AC cycle reverses, causing that field to violently collapse and then build up in opposite polarity. These rapid buildups and collapses can cause arcing within the windings, shorting them out. If the amplifier is

driven very lightly, no harm will result; there will be very little voltage developed, so no arcing could occur.

An Odd FM Antenna Situation

Q *How can I enhance the performance of an undercabinet FM radio in my kitchen? Changing the position of its single-wire antenna didn't help, nor did lengthening that 30-inch wire. I also tried tying the center conductor of a 75-ohm cable from an FM antenna in my attic to the kitchen radio's antenna, but I had no idea what the actual resistance of the antenna should be. The only wires exiting the rear of the radio are the power cord and that antenna; there is no ground. Any hints?—Doug Guerette, via e-mail*

A Apparently the radio was designed to work in strong-signal locations and does not seem to provide you many options. Try wrapping the antenna wire around the power cord. I don't expect you'll be able to pick up much extra signal, but it's worth a try. A better idea is to connect a terminal to the radio chassis and use it as the ground for the shield from your attic antenna. Cut off all but about 6 inches of the radio's wire antenna and connect it to the hot (center) terminal of your coaxial cable. You must also connect the coaxial cable's shield to the ground terminal that you've added.

Passive and Active Preamps

Q *I am thinking of buying a solid-state preamp that has passive and active outputs. What are passive outputs? How should they be used?—S. Campanile, Laguna Niguel, Cal.*

A Some audiophiles believe that the fewer electronics in a sound system, the better. They prefer passive (unamplified) preamps that offer source selection but have no active devices—transistors, ICs, or tubes—to supply gain. A preamp with passive wiring does not have tone controls or any other active circuits that would let you adjust bass or treble. However, for the preamp you are

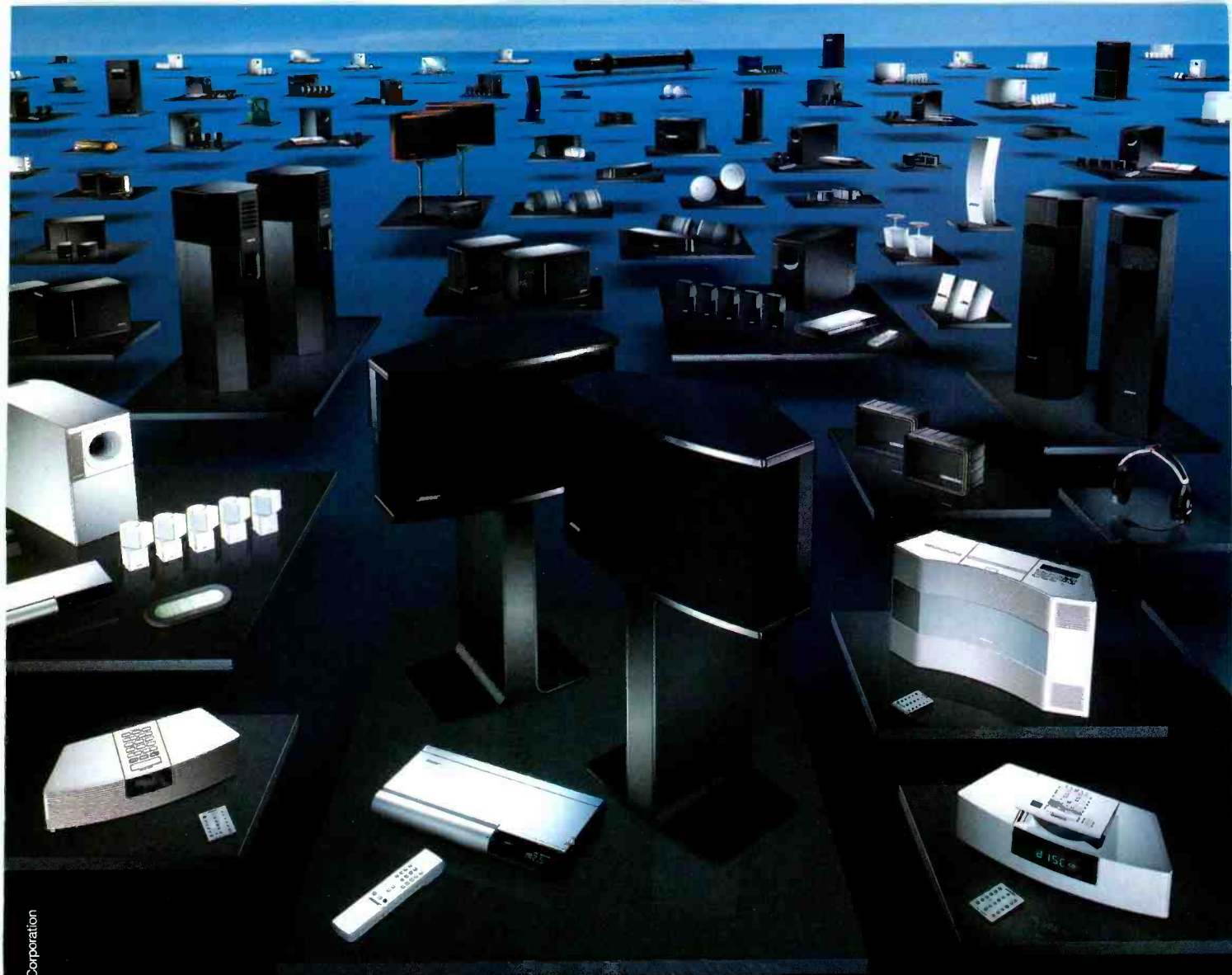
considering, perhaps the manufacturer is thinking of "passive" in a different way. The company may be referring to a "CD Direct" circuit, in which a line-level analog input (CD, tape, MD, or DVD) is routed straight to the preamp's output jacks. Doing so bypasses the balance and tone controls and any other active circuits, thereby preserving the "purity" of the signal from the source component. On the other hand, your preamp might be primarily passive but have a gain or buffer stage feeding the active output. In any event, some care is required in using a passive preamp output, as it may have a high impedance and thus be prone to interactions with power amps and cables that result in frequency response errors.

Output Tube Failures

Q *I have a stereo integrated amp that develops 50 watts per channel into 8 ohms, using four Chinese-made KT88 output tubes. Instead of using the amp's own preamp section, I initially connected it to a separate preamp. After I'd run this combination for about four hours, one of the KT88 tubes overheated and it looked like the metal filament inside it was burning. To stop this, I turned off the power and then turned it on again. Someone told me that this happened because the preamp delivers more signal than the amplifier can handle. I'm not sure that I understand this, but when I took the preamp out of my system and connected my CD player directly to the amp, it worked fine; no tube overheated. As an experiment, I tried switching the positions of the tubes, and one of them overheated after a few minutes. Why?—Rene Macamay, the Philippines*

A Connecting a preamplifier to your power amplifier is definitely not causing tube failure. A preamp's volume control regulates its output voltage. Even if your preamp could de-

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liver a higher voltage than your amp could take, distortion would make you turn the preamp's volume down long before it was high enough to damage the amp. In this regard, you were given wrong advice.

At the least, you have a defective KT88. It is also possible that the amp's bias settings allow one or more output tubes to draw excessive plate current. This must be checked by a technician who has a service manual for your amp. Another possibility is that your amp's input cables and speaker output cables were so close to each other as to pro-

duce high-power oscillations. You would not hear this if the oscillating frequency were well above your hearing range.

Too Much Voltage?

Q I have a tube amp and tube pre-amp in my midtown Manhattan apartment. Unfortunately, the building suffers from an over-voltage problem that causes my amp's bias to become unstable and "burn" the tubes. When I monitor the voltage with a digital voltmeter, the line stays at 122 to 123 volts 95% of the time but some-

times climbs to 125 volts and remains there for a few minutes. To my knowledge, tube components can operate up to 125 volts, but I suspect it's not healthy. Once, while the amp was on, the reading hit 125.8 volts and the output tubes started to glow brightly. Even at 123 volts, I have concern. I have an AC line conditioner, but it doesn't stabilize the voltage; someone suggested I use a Variac to reduce it. Would it be safe to use with my audio system or might it cause hum or noise? Would it solve my problem? If so, could I leave the Variac on permanently? Because I like tube sound and haven't much money, is there any other inexpensive option?—Badeephol Inpirom, New York, N.Y.

A Using a Variac (variable voltage transformer) is an excellent idea, and they are often available in electronics warehouses. It is important that the Variac be capable of handling the power consumed by all of the gear you plan to connect to it. (Factor in 50% more power for safety.) Adjusting the line to about 115 volts will help. There will still be power surges, of course, but because of the lower initial voltage they won't be as large as the surges you're getting now.

A Variac can be left running all the time. Generally an electronic component is designed to handle up to 10% above or below its nominal AC voltage. Therefore, your tube amp should easily accept 125 volts. However, I suspect that its bias is set a bit too low. Raising it a little will reduce output-stage plate current, which will, in turn, reduce tube gassing and heating. You can also add a small fan to cool the tubes.

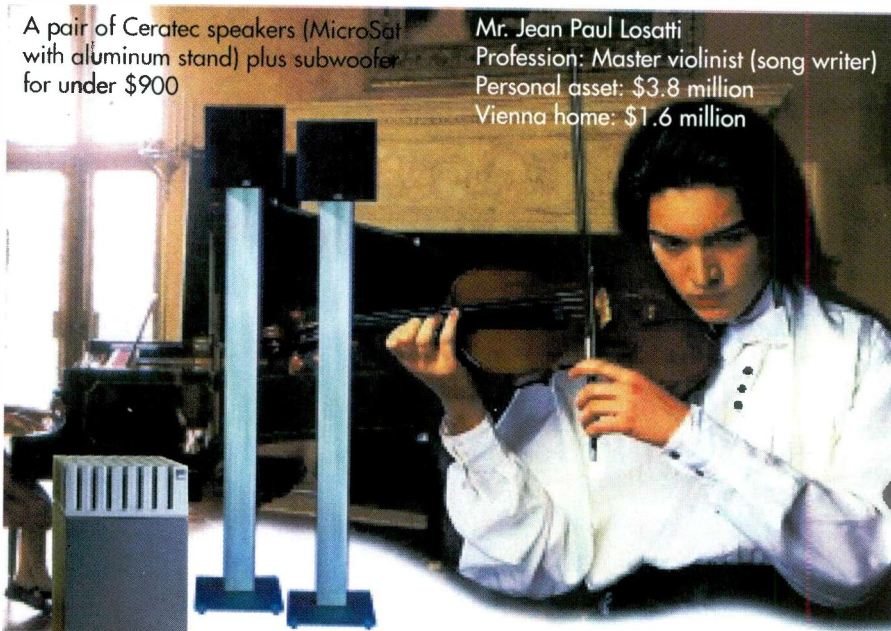
Good Headphone Sound

Q I don't own a stereo system, so I was hoping I could get my fix, especially low bass, using headphones and a portable CD player. With standard 'phones and bass boost, I can already hear low test tones and sweeps. Will a portable CD player drive the headphones to adequate volume, or will I require a separate headphone amp?—Name withheld, via e-mail

A The answer is maybe, depending on the acoustical efficiency of the headphones you select. Some are rather low in acoustical efficiency; others, particularly those that have highly efficient samarium-cobalt magnets and are intended for portable use, can produce

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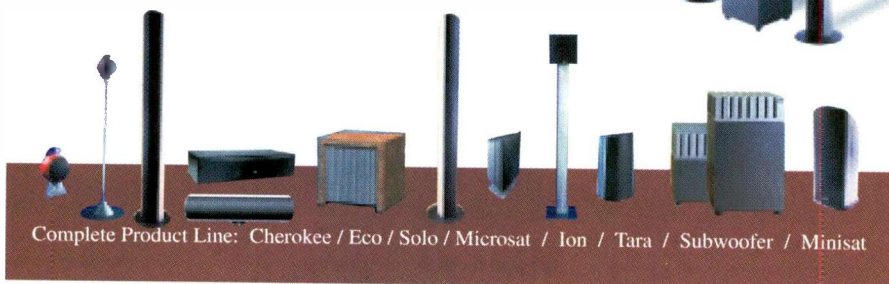
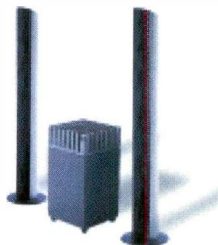
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deafening sound levels when driven by a portable CD player. Nevertheless, numerous 'phones designed for home use have very high sensitivity and will produce plenty of volume from a portable player. You might want to check sensitivity specifications in the "Headphones" section of our Annual Equipment Directory (October 1999). Sensitivity is expressed in dB sound pressure level (SPL), usually for a 1-milliwatt (mW) input. To ensure enough volume from your CD portable, look for headphones whose rated sensitivity is 100 dB SPL or higher.

It's not a good idea to use the bass-boost switch on your portable CD player. Most circuits of this type overemphasize low frequencies and cause distortion. Oddly enough, these switches sometimes boost treble excessively as well. Better you should choose headphones that deliver authentic deep bass response on their own without heavyhanded electronic assistance. Shop around for a cooperative retailer who will let you try out a pair of 'phones in the store with your portable CD player.

Does Adding Speakers Increase Sensitivity?

Q Does the sensitivity of a pair of speakers change when they're connected in parallel or in series? A single Spondor SP100 is an 8-ohm speaker with a rated sensitivity of 90 dB SPL. I plan to stack two pairs of SP100s. I know the impedance becomes 4 ohms if a pair is wired in parallel and becomes 16 ohms if a pair is connected in series, but does sensitivity change or remain at 90 dB SPL?—David Melchizedek, via e-mail

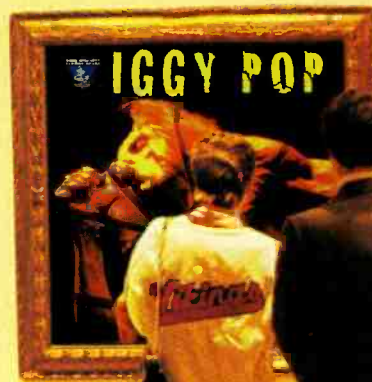
A Although the sensitivity of each speaker does not change, adding a second pair of speakers in parallel will increase overall acoustical output by 3 dB for a given setting of the volume control. (A 3-dB boost in output is subjectively termed "somewhat louder" by most listeners.) The reason for the increased output is that the amount of air moved by two speaker cones is greater than that produced by a single cone, and in a parallel connection, each speaker will receive as much power as one alone would, doubling the

acoustical power output (which amounts to a 3-dB increase) for the same *voltage* input. A serial connection will do the opposite.

An Unusual Biamp Setup

Q My new receiver has less power than my old amp, but it has preamp outputs. My speakers can be biamped or triamped, so I'm driving my tweeters from the receiver's speaker outputs and feeding the receiver's preamp output to my old amp to power my speakers' woofers and mid-ranges. Does this pose any danger to the receiver, amp, or speakers? It sounds okay; there's no hum or buzz.—David Kennedy, via e-mail

A What you have done is fine, as far as it goes. Your old amp and your receiver's amp section are each carrying full-range signals, but your speaker system's built-in crossover is sorting out the frequencies to feed each driver. A setup like yours would also be good if you knew that one of your amps had really superb treble response and the other had superb bass response but not such great treble. However, I much prefer using an



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electronic crossover for biamping or tri-amping, because each amp then handles only the frequencies that the drivers it feeds will use. Also, the frequency divider networks in separate electronic crossovers are sometimes more precise than those in speakers.

Y Connectors and Digital Transfers

In response to Eduardo A. Benet's question about digital Y connectors (September issue), I'd like to share my experience on the subject.

A Y connector will indeed send a digital signal to two sources. I have never had a situation where there was any sort of clash of information, but I always suggest that the unused receiving source be turned off. Also, you can feed two digital sources into one receiving source (e.g., a DAT and a CD player into a CD burner) so long as the unused source is powered down (you touched on this subject; I'm just elaborating).

Hosa (800/255-7527) has recently introduced some interesting products that I have used in the field, and they work wonderfully.

For example, the ODL-276 converts coax to Toslink and vice versa, simultaneously. The ODL-312 does the same for AES/EBU and Toslink. And the CDL-313 performs the same chore for coaxial and AES/EBU. The ODY-314 is an optical splitter (one in, two out). Each device comes with a power supply and is priced at about \$99. Great units. (And, no, I don't work for Hosa!)—Scott Rubinoff, Sherman Oaks, Cal.

Treble Harshness

Q After a lengthy break-in period, my system is still exhibiting very unappealing characteristics. When I play recordings of classical music, particularly solo violin, they sound harsh and lacking in timbre. Even at moderate volume, it's fatiguing to listen to them. I don't notice it nearly as much—or at all—with jazz, blues, or other types of music. I've tried different cables and CD players but without success. When my dealer helped me analyze my room's acoustics with a test disc, we found that the problem area was between 4 and 7 kHz. Because I spent \$7,500 on my audio system, I'm desperately looking for advice. Would using a tube amp or preamp or an equalizer help? I know that many audiophiles abhor using an equalizer, but I'll do whatever it takes to solve this problem.—Mike Blakey, Anchorage, Alaska

A Your loudspeakers contribute most to what you hear from your system; sonic differences among amplifiers, CD players, and so on pale by comparison. Did you thoroughly audition your speakers before buying them, or did you read about them and select them based on a reviewer's opinion? Equipment reviews should be considered guides, not gospel. There is no substitute for listening with *your* ears.

Let's assume for the moment that you heard your speakers demonstrated in a dealer's showroom and loved them, so we can rule them out as the source of your treble harshness. Room acoustics are the next most likely culprit. If your listening room is acoustically "live," i.e., bare—lacking carpets and bookcases and without drapes or heavy, stuffed furniture—then harsh treble is very possible. Acoustical tile on the ceiling, thick carpeting with padding, and sofas or other soft and comfortable furniture may all do wonders. (I hope the room has not just been redecorated!)



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I'd rather see you try to deaden your room's acoustics before trying equalization, but if you can't change the acoustics, then look into using EQ. Purists may frown on it, but purists also frown on poor sound. So try it and see what happens. I'm not sure you'll get really good results with a conventional octave equalizer. You may need to use a 1/3-octave equalizer or perhaps a parametric EQ, whose filter bandwidths can be adjusted to suit your room's needs. It seems that you have a knowledgeable dealer, so have him help you set up the equalizer.

Jazz and blues, by the way, are not usually played with violins (except for recordings of jazz violinists), and violins are often the very instruments that can best reveal harshness in a sound system. A surprising number of classical violin recordings sound harsh because the studio mikes used to capture the solo violin have peaky response from 1 to 8 kHz—just where our hearing is the most sensitive. Another common failing of recording engineers is to position a microphone too close to a violin. Before you make major changes to your room or system, I suggest that you play several violin recordings on a hi-fi system you know to have smooth response. Then choose one of the recordings that doesn't sound harsh on that system and use it to test your own.

Recommended Power for Speakers

Q Each of my speakers has a 12-inch woofer, a 5½-inch midrange, and a 2½-inch tweeter and is rated to handle 200 watts music power. My receiver is rated at 85 continuous watts per channel but has lots of bass. Should I be cautious about the volume levels I use so I don't blow out the speakers?—Roger Koll, via e-mail

A I hate "music power" ratings; I'd guess your "200-watt" loudspeakers are 100-watt units when we get to what counts. Your receiver's amp section can supply 85 watts per channel, so that's not too bad. I usually like to see an amplifier with a bit more power than the speakers can handle so it won't tend to clip at high levels. As to volume, just keep it down to where you don't hear distortion. If your speakers are reasonably efficient, they will play loudly enough long before they "see" the full 85 watts available from your amplifier. **A**



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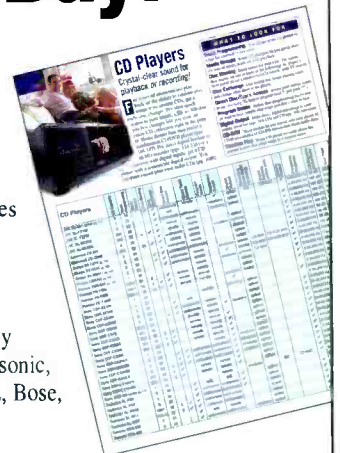
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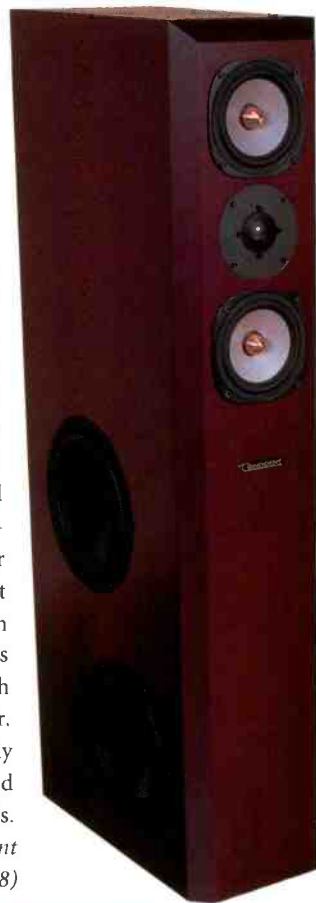
Bush A/V Center

Part of the Prairie Collection and finished in oak, the AV25650 is large enough to accommodate most 32-inch TVs. With its Mission furniture look, this A/V center has one glass door, behind which are fixed and adjustable shelves for components, and two wood doors for a storage compartment. Overall, it is 54½ inches tall, 59¾ inches wide, and 19½ inches deep; the TV compartment is 32½ x 28½ inches. Price: \$249.99. (Bush, 800/950-4782)



Coincident Speaker

With its enclosure only 8 inches wide, the Super Eclipse is said to virtually eliminate front-baffle diffraction effects. And the use of dual, mirror-imaged, side-firing 8-inch woofers is claimed to provide great flexibility in speaker placement and consequent bass loading of the room. A 1-inch titanium-dome tweeter is positioned between dual 5-inch magnesium-cone midranges, which have their own sub-enclosures to prevent intermodulation distortion from the woofers. Frequency response is rated at 28 Hz to 35 kHz, ±3 dB, with sensitivity at 92 dB/1 watt/1 meter. Finished in cherry veneer, the heavily braced cabinet is 42 inches tall and 16 inches deep; it weighs 92 pounds. Price: \$5,499 per pair. (Coincident Speaker Technology, 905/886-6728)





Apogee A/D & D/A Converter

Its design derived from Apogee's professional studio digital converters, the PSX-100 is intended for home studio buffs and audiophiles who wish to transfer their LP collections to CD-Rs or CD-RWs with no

degradation in sound quality. According to its maker, the PSX-100's 24-bit signal path is capable of preserving the character and musical integrity of analog recordings. Features include two-channel 24-bit A/D and D/A converters, gold-

plated XLR jacks, two-channel LED bar-graph meters, S/P DIF coaxial and optical connectors, balanced or unbalanced analog inputs and outputs, and sampling-rate compatibility at 44.1, 48, 88.2, and 96 kHz. Price: \$3,995. (Apogee Electronics, 310/915-1000)

B&W Speaker

Designed by Morten Warren, creator of the Nautilus 800, the two-way LM 1 is said to be ideal for matched five-channel surround sound, as a desktop monitor in computer setups, or for multiroom home or patio installations. Its swiveling, tabletop stand converts to a wall- or ceiling-mount bracket. At less than a foot tall and with

a footprint of just 5½ x 7½ inches, the speaker is magnetically shielded as well as weather-resistant. It has a 5-inch woofer, and its 1-inch dome tweeter is in a pod-like protrusion to help eliminate diffraction effects. Rated frequency range is 65 Hz to 20 kHz. The LM1 is available in black, pearl white, silver, burgundy, or turquoise. Price: \$350 per pair. (B&W, 800/370-3740)



CAIG Contact Cleaner

With its cleaning and deoxidizing properties, R5 Power Booster preserves and lubricates electrical switch contacts and cleans up noisy potentiometers and volume controls. The cleaner is available in a nonpressurized, 125-milliliter pump spray dispenser and in a 20-milliliter aerosol. Prices: aerosol, \$10.95; pump spray, \$24.95. (CAIG Laboratories, 800/224-4123; www.caig.com)



Aragon Preamp/ Processor

Besides switching HDTV, RGB, or component-video signals, the Soundstage decodes Dolby Digital, Pro Logic, and DTS soundtracks. Prompts from its own display help you get the system going in minutes, and its Automatic Format Channel Balance memorizes and recalls preset speaker/subwoofer balances for different sources. The processor can be upgraded by changing plug-in circuit cards. The Soundstage has single-ended and balanced audio outputs and comes with a learning remote. Price: \$4,000. (Aragon, c/o Mondial Designs, 914/693-8008)



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Ruark Home Theater Speakers

Ruark says its magnetically shielded Prologue main and Dialogue center-channel speakers use dual 5-inch woofers and a 1-inch silk-dome tweeter to extract the best from music recordings and film soundtracks. The Epilogue (surround) has a single 5-inch woofer and a ¾-inch silk-dome tweeter. The Prologue's rated frequency response is 48 Hz to 20 kHz, ±3 dB; the Dialogue's is 65 Hz to 20 kHz, ±3 dB. Prices: Prologue, \$1,900 per pair; Dialogue, \$599 each; Epilogue, \$499 per pair; complete system, \$2,998. (Ruark, c/o The Sound Organisation, 972/234-0182)



Bowman Mini Headphone Amp

Inventor Tom Parker says his Boostaroo enables any portable CD, cassette, or MP3 player (or portable TV) to drive as many as three sets of headphones simultaneously. Pocket-sized (1 inch x 1 inch x 4½ inches) and powered by two AA batteries, which should last about 20 hours, the Boostaroo plugs into any portable's stereo headphone mini-jack and is said to provide a 40% increase in audio level with no increase in distortion. Parker also claims it extends the life of the portable audio source's internal batteries. Price: \$17.95 plus \$3.50 for shipping. (Bowman, c/o All Media Productions, 800/800-4354; www.boostaroo.com)

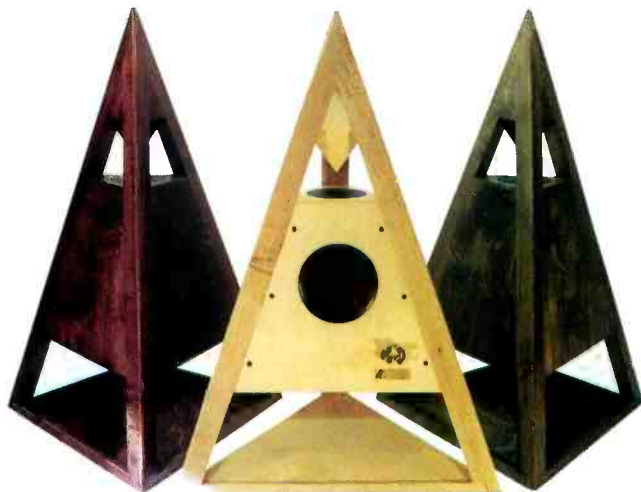


Athena Speakers

Part of a new line of magnetically shielded, passive speakers that interlock with optional companion powered subwoofers (also magnetically shielded), the S2 has a 6½-inch woofer and a 1-inch dome tweeter. Frequency response is rated at 50 Hz to 20 kHz, ±3 dB, with sensitivity at 93 dB. To extend bass response down to 25 Hz, you can add the 100-watt, 8-inch P2 subwoofer. The S2 slides on rails atop the P2; these rails electrically contact the P2's controls to optimize phase and crossover points. Prices: S2, \$375 per pair; P2 subwoofer, \$375 each. (Athena Technologies, c/o API, 416/321-1800)

Denham Speaker

To achieve 360° omnidirectional sound radiation, Denham's three-way speaker has an 8-inch woofer firing downward into an upward-facing pyramidal reflector and a 1-inch tweeter firing upward into a downward-facing pyramidal reflector. Consequently, sound is directed outward from each side wall in three directions, 120° apart. A 5-inch midrange fires from the back to reflect sound from a wall or other hard surface behind the speaker. Made of birch plywood over a maple frame, the speakers are available in a mahogany, natural wood, or black ash finish. Price: \$1,399 per pair, factory-direct. (Denham Pyramidal, 219/946-4072; www.denhamcorp.com)



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Bose Home Theater System

Included with the Lifestyle 50 home theater system is the Personal Music Center, a portable control and multiroom interface whose two-way radio-frequency communication lets you operate the system from anywhere in the home; its r.f. receiver can be hidden from view. About the size of a VHS videotape, the device's multilayered menu and backlit touch panel provide control options for any selected source. The Lifestyle 50 also includes five mini-speakers, a powered Acoustimass bass module, and a combination CD changer and AM/FM tuner. In the bass module are active EQ, digital signal processing, and Dolby Digital 5.1 decoding. Price: \$3,700. (Bose, 800/444-2673)



Niles In-Ceiling Speaker

To solve the problem of how to get stereo sound in areas where there is only enough space to install a single speaker (hallways, alcoves, small rooms, and the like), Niles Audio designed the CM650SI with a "stereo imaging" faceplate that has two canted, ultrawide-dispersion, 3/4-inch dome tweeters that deliver left and right channels separately. Bass frequencies are fed to a 6 1/2-inch dual-voice-coil woofer. The CM650SI includes a flip-tab mounting system, an aluminum grille, and brass and stainless-steel hardware to facilitate installation in a bathroom. Price: \$139.95. (Niles Audio, 305/238-4373)

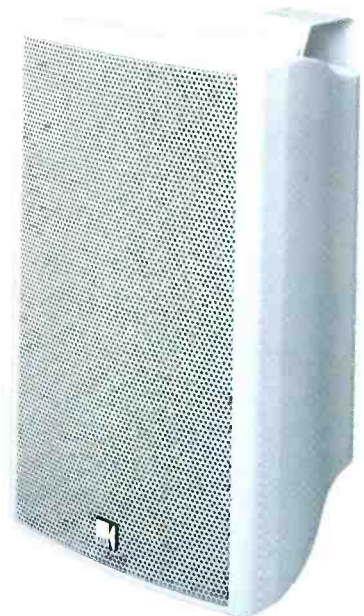


KEF Outdoor Speaker

Said to be sufficiently weather-resistant for use on an oceangoing yacht, the Ci 500AW uses a passive radiator in place of a port to keep moisture out yet retain efficiency. Intended for areas outside the house—garden, pool, and patio—the speaker comes in white and can be painted; it is supplied with a pivoting mounting bracket. Rated at 8 ohms and said to be capable of handling 70 watts, the Ci 500AW weighs 7 3/4 pounds and is 11 1/2 inches tall, 7 inches wide, and 6 3/4 inches deep. Price: \$400 per pair. (KEF, 732/683-2356)

Nakamichi Tabletop System

Housed in one of the SoundSpace 3's three separate, identically sized, brushed-aluminum chassis is a CD player with motorized lid, a tweeter, an AM/FM tuner with 30 presets, and a clock with alarm functions. The companion unit, which can be placed on the other side of your bed, houses a second speaker to create the stereo soundstage, a power amp, and a second clock/alarm display. Each clock/alarm can be set independently. The third unit contains the system's woofer, which can be hidden away or wall-mounted. Other features include optical digital and analog inputs, a headphone jack, and a remote control designed for operation in the dark. Price: \$500. (Nakamichi, 310/538-8150)



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Thinking Beyond the Box

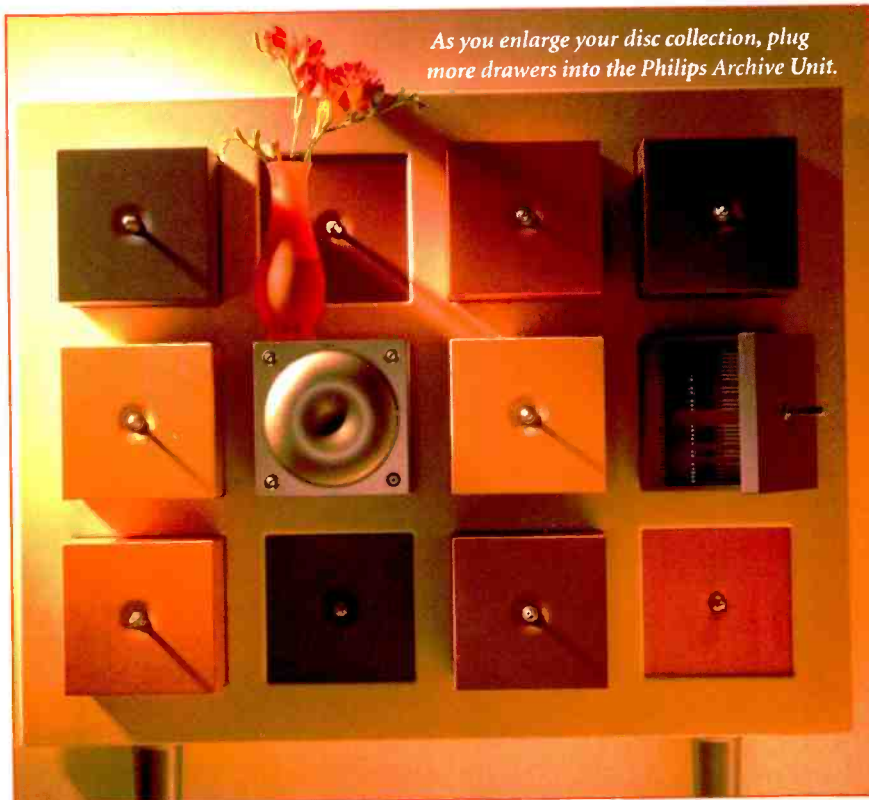
My home is dominated by artifacts of enjoyment: books, recordings, audio and video gear, comfy chairs and reading lamps, a computer, and a cat. The comfy chairs are in the living room, the computer's in my home office, and there's black-box A/V gear in just about every room. (Virgil the cat, of course, can be found wherever he damn well pleases.) In the house where I grew up, electronic gear was far less visible. All we had was one 16-inch TV with inlaid wood doors to cover the screen, a couple of radios in wood cabinets, and a record changer. And there was no cat or computer.

According to Philips, tomorrow's homes will look less like the house I live in now



Access is the Philips future system's remote control.

than the one I grew up in. To prove its point, the company set up a House of the Near Future for Milan's International Furniture Fair last April, then moved it to New York's Saks Fifth Avenue for a month last fall. There were electronics aplenty in every room of the exhibit house but nary a black box to be seen—hardly a box of any color, in fact, save for the array making up the living room's Archive Unit. The Archive's CD/DVD drawers were designed to click into a wall-mounted or freestanding frame to keep up with storage needs; CD booklets

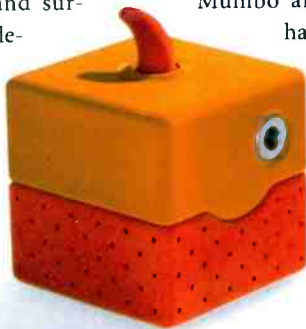


As you enlarge your disc collection, plug more drawers into the Philips Archive Unit.

rested in pockets of a leather-bound album that included remote control to initiate play. The TV was a flat, 42-inch plasma screen on wheels for use in any room; it was accompanied by main and surround speakers and by a detachable subscreen TV, cordless and handheld, that could display a different channel. Access, the remote control for this and other gear, resembled a tabletop pic-

ture frame and could be operated by touch or by voice, though it had a semitraditional knob to change volume.

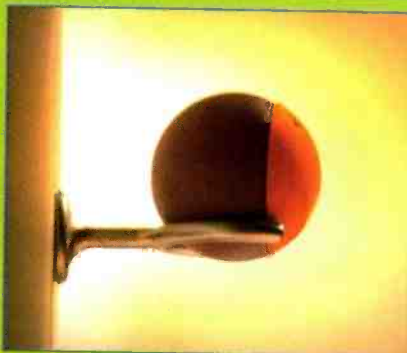
In the kids' room, sound came from Mumbo and Moby. The former was a handheld device that played music from solid-state memory, the house's wireless network, or the Internet and enabled



These robot pets may or may not be lovable, but they are perfectly housetrained.

NEWS+ NOTES

- The format war between the Sony/Philips Super Audio CD (SACD) and the DVD Forum's DVD-Audio (DVD-A) discs may be over before it really has a chance to begin. Philips has shown a prototype player compatible with both formats, which should be available here early this year, at a price estimated to be about \$1,500. Cirrus Logic has announced D/A converter chips that can handle both formats, and other manufacturers are reportedly not far behind; this should speed the development of dual-format players at lower prices.
- It took 37 years, but the invention of the electret microphone recently landed Jim West and Gerhard Sessler in the National Inventors Hall of Fame. Sessler, now in Germany, and West developed it at Bell Labs.
- The earth is humming quietly to itself, generating about 50 frequencies at once. If you haven't heard the hum, it's because the frequencies are too low—between 0.002 and 0.007 Hz.
- Larry Schotz, best known in audio circles for the Schotz circuit once popular in FM tuners, has patented a wireless digital system for transmitting audio signals to speakers. The system, invented by Schotz, William Steinike, and Mark Wolski, is said to carry signals from room to room over distances of up to 300 feet; the patent number is 5,946,343.
- If the price of audio components using ICs has gone up recently, September's earthquake in Taiwan may be to blame. The quake did not hit Taiwan's semiconductor factories but did interrupt their electric power, causing them to lose or scrap enough production to affect chip prices worldwide.



You needn't sit up for late-night TV; just aim the projector at the ceiling (top) and pivot the wall-mounted speakers toward you.



Cordless devices abounded, as did shelves and racks that doubled as rechargers (top) and a tablecloth that could power food warmers.

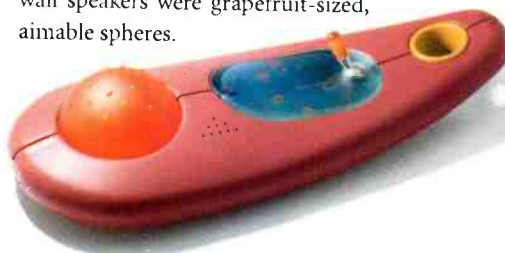
the kids to mix sources and add reverb or other effects. Moby, a rugged and waterproof speaker, reproduced signals picked up from the home's network. Both devices were cordless, which brings up what I consider the exhibit's most significant innovation: universal recharging. Virtually every gadget-storing shelf or rack, including the shelf under the bathroom mirror/TV screen, doubled as a recharger. Even the tablecloth in the dining room could supply power by induction to food warmers and other appliances on the table while remaining cool.

In the master bedroom, a breakfast tray contained a removable touchscreen for easy reading of news and e-mail (green eggs and spam, anyone?). The TV was a small projector that could be aimed at the wall or ceiling, letting you watch action flicks from a comfortably supine position; the on-wall speakers were grapefruit-sized, aimable spheres.

No sign of a cat, alas. But the Philips future home exhibit did include two "ludic robots," which were defined as "small, unpredictable electronic pets that respond to voice commands, touching and gestures." These robots could teach themselves about their environment and be taught to perform simple tasks. "Through this interrelationship," Philips says, "they may become objects of affection for their owners." Yeah. Sure. Not until they jump on your lap, nuzzle you, and purr.

Ivan Berger

For children, Philips came up with the Mumbo music player and the easy-to-carry Moby speaker, which rests on a cushion when not in use.



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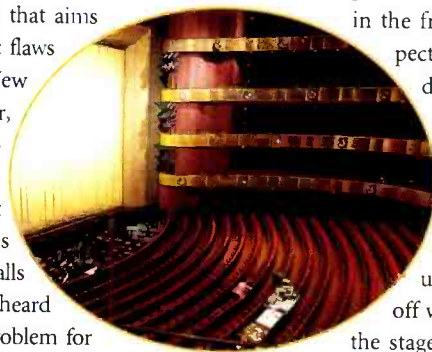
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SPECTRUM

Opera Hits the Slippery Slope

Opera has long been the last bastion of unaltered, unamplified, natural sound. But opera fans are worrying that the bastion may be crumbling. This season, the New York City Opera is experimenting with an "acoustical enhancement" system that aims to overcome the sonic flaws of Lincoln Center's New York State Theater, where the opera company is based. Originally built with ballet in mind, the hall was designed so that footfalls on stage would not be heard by the audience—a problem for anyone making music on that stage. The system's goal, acoustical consultant Lawrence Kirkegaard told *The New York Times*, is to overcome the effects of dead spots on stage and in the house, not making the sound louder but to make the singers "sound like they are singing in a more intimate space." So far, reaction has been mixed and cautious. Some listeners feel that the hall's problems are far from solved, while an anonymous singer quoted on the Internet said, "The theater simply sounds warmer, more like a European house."



Attending City Opera for the first time in a few years, and sitting in a better seat than I'm accustomed to, I couldn't swear to any differences between the old sound and the new. But I can swear that nothing sounded the least bit artificial. When I shut my eyes to better assess the sound and imaging, I could always tell where the singers were on stage and even which way they were facing. I had the opportunity to listen from Row A of the orchestra and from the back row of the first ring, under a low-hanging balcony. I was not surprised at the clarity of the sound in the front row, where I'd expect the system to make no discernible difference, but I suspect the system may have accounted for the almost equal vocal clarity in the back. Volume, however, dropped off when I was farther from the stage, just as it would have done without the enhancement system.

Afterward, I had the opportunity to ask the principals of that afternoon's superb *Madame Butterfly* for their opinions of the system. Oksana Kroyvtska, who sang the title role, said, "I think you can hear yourself a little better, but you sing the same way." Andrew Richards, who played Lt. Pinkerton, remarked, "I hear it's a real help with smaller orchestras, solo flutes, and so on, but they're still fighting with it on big orchestras like Puccini's." There were no signs of battle I could hear.

Electronically enhanced acoustics aren't that new (Edward Tatnall Canby praised a similarly enhanced hall in Eugene, Oregon, back in our October 1983 issue), and a number of European theaters and several North American opera houses now have such enhancements. That doesn't stop aficionados from worrying that opera's glorious, unassisted human voices may give way to the inglorious amplified sounds heard in Broadway musicals a few blocks down from Lincoln Center. Judging from what I heard at City Opera, that needn't happen. And wouldn't it be great if the people responsible for the sound of musical theater walked those few blocks to hear how City Opera does it!

I.B.

Photo: © 1999, Carol Rosegg

NEWS+NOTES

- Ever get stuck trying to recall a song lyric? Next time, you might try the International Lyrics Server (www.lyrics.ch/index.htm). The interface is a little klutzy (e.g., if you search by artist name you have to put the last name first, with no comma following it), and the first few songs I looked for weren't there. But if you luck out, you'll be able to view (but not print out) the lyrics, hear the song, and buy the album on CD or cassette if you want to.

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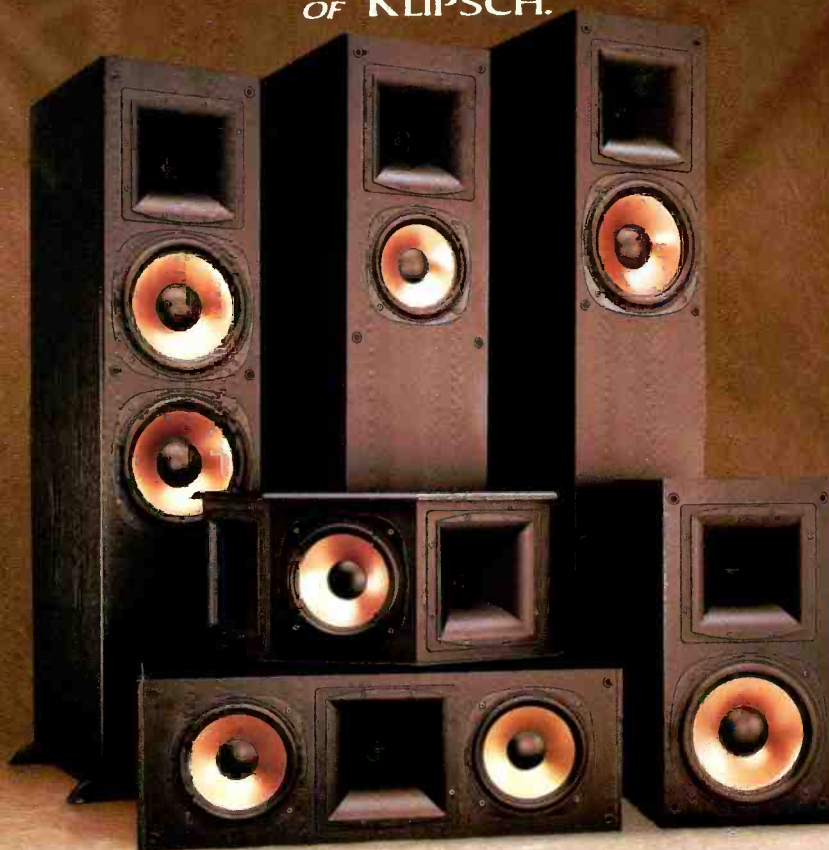
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BURN, BABY,

by **COREY GREENBERG**

If you don't already own a CD-R burner, you probably will soon. It's no secret that recording your own CDs is now one of the hottest trends in audio. Falling prices for both hardware and software have transformed the CD-R format from an expensive solution for backing up business data just a few years ago to an eminently affordable, must-have audiophile toy today. Hell, just this past week I saw a Philips burner on sale for \$99.95, and even name-brand (think TDK) CD-R blanks can be had for under a buck a pop. If you'd told me five years ago that it would someday be cheaper to create my own CDs than cassettes, I'd have looked at you real funny-like and taken a step or two backward, balancing on the balls of my feet in case you made any sudden moves. But we've reached that point and then some. While the high

prices and slim pickin's of HDTV, Super Audio CD, and DVD-Audio have kept most real-world audiophiles in wait'n'see mode, it seems like everyone and his mother's diving into CD-R.

CD-R is big, big fun. Kids are already calling it "the cassette of the '90s"; I'll up the ante to "cassette of the double-oughts," because I definitely see CD-R gaining more popularity this year as even inexpensive PCs start shipping with recordable drives as standard equipment. And when stand-alone, component-style CD recorders hit the magic \$300 price point right around the same time the late Dick Clark's animatronic double counts down the seconds to 2001, watch out: CD-R is poised to finally displace the roach-like (at least in terms of stubborn Darwinian longevity) analog cassette as the most widely used recordable music format.



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There are ways to dub your LPs to CD-R,

I've already changed over. I haven't recorded a single cassette in over a year—these days, it's all about CD-R. I make CD dubs of my favorite store-bought discs for when I travel, because, after having my CD wallet stuffed with 30 discs stolen right off my seat on a plane last year, cheap and easily replaceable (and fully legal, by the way, just in case any of you squinch-faces out there try to sic the Man on me because you're still sore I used the word "nipple" in a review) CD-R copies are the only thing I'll take on the road now.

My latest cool thing to do with CD-R is burning my own Video CDs straight off of DVDs and videocassettes with Adaptec's nifty \$295 Vide-Oh! add-on video converter. You plug the A/V outputs of any video source into one end of this thing (it's even got an S-video input, for chrissakes!), plug the other end into your PC's printer port, and boom—you've got a finely pixelated yet thoroughly watchable MPEG movie file ready to burn onto CD-R, one that'll play back on any computer's CD-ROM drive (and even in some DVD players, too).

Video CD looks cheesy as hell compared to DVD, but dammit, it's only a *buck a disc!* That Video CD is *huge* in the Mysterious East but never caught on here in the U.S.—where we value cheap, greasy thrills over actual quality every damn time—is a complete riddle to me. Before we even got in line to see *The Phantom Menace*, our brothers in Asia could go to any street corner and buy a bootleg Video CD of the movie for less than the price of a bucket of popcorn! The hardcore videophile who walks around with a light meter on a cord around his neck like some kind of video-geek's version of a '70s swinger's ram's horn pendant will cringe at such a bastardization of the form, but with an hour's worth of MPEG-1 video and stereo "near-beer" CD sound squeezing onto a single CD-R, I routinely dub DVD movies like *Rushmore*, *Mean Streets*, and Radiohead's *Meeting People Is Easy* onto a couple of discs for Grado-headphone-assisted "laptop theater" on long plane rides and those lonely hotel nights when the hottest thing on SpectraVision is the "Tommy Lee and Margaret Thatcher" video.

SPINNING BLACK INTO SILVER

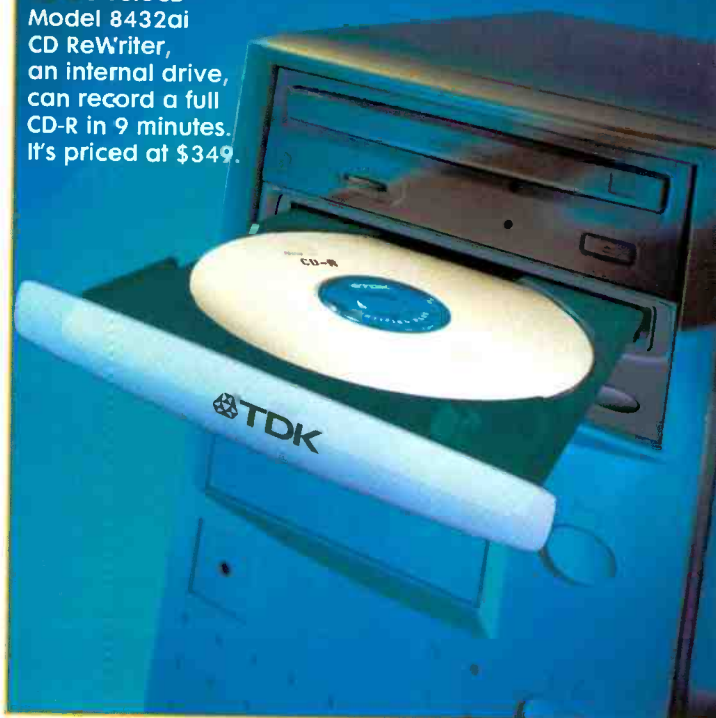
But burning your own homemade Video CDs is, I admit, pretty advanced-level CD-R wankery. What the vast majority of audiophiles are doing with CD-R these days is transferring LP collections to CD before mothballing their turntables for good. While I'm not quite ready to retire *my* analog rig to the Great Stack of Brown Cardboard Boxes in the Attic, I've dubbed many of my favorite LPs to CD-R for those times when I just wanna hear the music without

going through the whole audio-druid ritual of finding/cleaning/playing the LP. However, there's ways to dub LPs to CD-R, and then there's the *right* way. I've made all the mistakes already myself, believe me—I've made enough "coasters" (a.k.a. flubbed discs you might as well put under a cold can of Colt 45 to protect the coffee table) to choke a goat. But I finally got my dubbing setup dialed in and tweaked to perfection, and now's your chance to benefit from my learning curve and get the job done right from the get-go.

STAND - ALONE OR PC?

The first thing you need to do is decide what kind of CD-R recorder you want to buy—stand-alone component-style or a CD-R drive for your home PC or Mac. Me, I strongly recommend going the PC route. Unless you absolutely don't want to mess with your PC to burn CDs and you're not flexing for the ultimate sound quality, take my advice and buy a CD-R drive for your home computer (see Paul Tatar's review of the H-P external CD-Writer Music CD-R burner in this issue). For one thing, it's a lot cheaper; my professional-grade Plextor 820 burner sells for a mere \$300, and it'll kill

TDK's veloCD Model 8432ai CD ReWriter, an internal drive, can record a full CD-R in 9 minutes. It's priced at \$349.





and then there's the **RIGHT** way.

any of the \$1,500 high-end consumer stand-alones in terms of speedy, error-free disc creation. For another, you can record data and video files as well as audio tracks to the discs, whereas the stand-alones can do only audio CDs (and then only on the more-expensive royalty-paid "audio" CD-R blanks, while most PC-style drives can burn all of the above on regular buck-a-pop data CD-Rs). Note that CD-RW (rewritable) drives are merely CD-R drives with the added capability to burn rewritable discs. You can still record write-once CD-R discs, which, unlike CD-RW discs, can be read by any CD player. You'll also see different schemes for hookup to your PC, but these days it really doesn't matter whether you go with a SCSI, ATAPI-IDE, or external USB connection. I've gone all three routes, and they should all work fine as long as your PC is a recent-vintage Pentium or better.

Why am I so gung-ho on the PC-style burners as opposed to the stand-alones? First and foremost, the stand-alones can't do any of the multimedia tricks that the PC drives can—all they can do is create audio CDs. And many of the stand-alones can't make perfect bit-for-bit clones of a CD because of their nondefeatable sampling-rate conversion. In other words, a lot of stand-alone CD-R recorders resample incoming digital signals even if they are already at 44.1 kHz, which can only degrade them. (Some component-style burners bypass their sampling-rate converters when the incoming signal is CD-standard 44.1 kHz, but make sure before you buy.)

Don't get me wrong; if you just want to hook up a CD recorder to your hi-fi rig and make CDs for your daily commute, a good stand-alone CD-R deck will do the job. But if you want the greatest flexibility in optimizing your LP-to-CD-R dubs, installing a CD-R drive in your computer is the way to go.

MASTER BLASTER

Okay, so you've installed a CD-R drive in your PC, now you need a way to get your analog and digital signals into your computer. Enter the sound card. If you're serious about sonics, you'll want to upgrade to a high-end card. That cheesy \$25 SoundBlaster that came with your PC will suffice in a pinch, but your CDs will sound lousy, and later you'll wish you'd spent the dough for the good stuff. I know this all too well, having gone back and reburned a bunch of CD-Rs after thinking I could get away with the low-rent card that shipped with my Dell.

If you want audiophile-grade CD-Rs, it definitely pays to add a high-end sound card like the \$400 Event Gina I reviewed in the December 1998 issue. You can find less expensive high-end PC sound

cards, but expect to pay at least \$200 for a clean, noise-free card with both a high-quality A/D chip and an S/P DIF digital input. Avoid the gaming-aimed schlock found at warehouse PC huts. (Even Creative's upscale SoundBlaster Live! is still a mediocre gamer's card at heart. When I tried burning CD-Rs with it, I wasn't happy with the sound of my dubs at all.) Just as in high-end audio, the best sound often comes from the little-known brands. Look for Event, MOTU (which stands for Mark of the Unicorn—insert weary shoulder shrug here), Lexicon, Gadget Labs, and Digital Audio Labs (whose original CardD+ can be found on the used market for around \$100 and offers much better sound than anything meant to be used in conjunction with a joystick and ray-gun sounds).

TABLE DANCING

If you haven't tweaked your turntable setup in a while, now's the time. As this is probably the last time you're going to go to the trouble of dubbing your precious LPs, it definitely pays to get your act together before you start converting analog squiggles to digital bits. The name of the game is getting the best possible sound off your records before dubbing. Make sure your cartridge alignment is dead-on and that your needle's fresh as a doe-eyed intern. If it's been more than a year since you changed the stylus, by all means slap on a new one before you start dubbing. This is often a good idea even if you haven't been playing LPs each and every day. Depending on exactly what it's made of, the little elastic suspension "doughnut" your cartridge's cantilever rides may get a little harder and less responsive to the needle's wiggle even if it just sits there unused, so installing a fresh needle assembly (or, in the case of some high-end pickups, replacing the whole cartridge) will often vastly improve the sound of your LP-to-CD transcriptions. You certainly don't have to go all-out here; I've found that fresh out of the box, Grado's unbeatable mid-priced cartridges outperform many of the high-dollar jobs when their rubber's past its prime.

Of course, it goes without saying that cleaning your records before dubbing them is a Very Good Thing. Nothing's worse than a CD-R with permanent ticks and pops and surface noise that can't be quieted no matter how many times you wipe the disc on your pantleg. A plain old Discwasher or other handheld brush is better than nothing, but truly miraculous noise reduction can be achieved only by using a vacuum record-cleaning machine, like the VPI HW-16.5 I grudgingly forked over 350 clams for well-nigh seven years ago but have since come to regard as one of the best hi-fi-related

If you are **serious** about sonics, you will want

purchases I ever made. This may be the most important trick I can hip you to about getting the best-sounding LP-to-CD dubs: If you don't own one of these record Hoovers, try to borrow one from a friend or your local dealer, as scrubbing your LPs with one of these rigs before you dub will go a long, long way toward making your CD-R dubs sound like remastered gold CDs instead of crackly, noisy bootlegs.

SOFTWARE SELECTION

So you've got your turntable all tweaked and ready to go, you've got a new Audiophile Approved sound card installed in the PCI slot in your computer that once a lowly gaming card did darken, you've run a pair of audio interconnects from your preamp's record out jacks to the sound card's analog inputs, and your CD-R burner's disc tray is yawning open and waiting for a fresh, shiny blank. Are we ready to dance? Not quite. We still need to choose the CD recording software that makes this whole shooting match fire.

Now, I'm not going to lie to you here. I haven't tried each and every CD recording software package on the market. What I did do was try a bunch of them until I found something that was easy to use and worked flawlessly each and every time, and that was Adaptec's \$99 Easy CD Creator Deluxe. Since then, I've come across a few that seemed decent, like Sonic Foundry's CD Architect (meant to be used in conjunction with the company's \$400 Sound Forge multitrack audio recording software), but Easy CD Creator is the one I've stuck with day in and day out. It's intuitive and effective, and once I dialed in all the right settings for my system, I haven't crapped a single coaster since. In fact, I just got hold of the latest 4.0 version, and it's even easier to use. Lots of internal PC-style burners come bundled with the "lite" version of Easy CD Creator. Though that's fine for many people, it's well worth the \$99 to upgrade to the Deluxe version if you want the most control over your LP-to-CD dubbing.

IT NEEDS MORE DUBLY

Any discussion of transferring LPs to CD-R needs to address noise reduction. We've all grown spoiled by the noise-free CD era, and it can be a bit of a shock to slip a CD-R into your player and hear all sorts of clicks, pops, and surface noise come out of your speakers. Old-school devotees may dig that ol' analog detritus as a kind of nostalgic reminder, but the rest of us would prefer our CD-R transfers to be as noise-free as possible.

Most of the CD recording software packages come complete with a whole mess of DSP noise-reduction schemes to de-noise LPs for dubbing. Take my advice and ignore them! The thing is, there's no free lunch when it comes to consumer-grade DSP noise reduction. Yes, the clicks and pops are removed, but the process strips away much of the music as well. I've spent hours with Easy CD Creator's settings trying to bleach the noise and leave the music in a virginal state, but to no avail. Even tweaked to the nth degree, it still degrades the resulting audio signal, leaving behind a phasy ghost imprint of the noise that, while greatly reduced in level, still rides on top of the music in an annoying fashion.

The bottom line is, you're never going to get rid of all the LP surface noise before you dub your records to CD-R. The best you can do is to get in there like a skilled surgeon and remove the most bothersome pops and clicks manually, mouse click by mouse click, with a stereo waveform editing program. Easy CD Creator includes a simple, crude editor for this very purpose, but I highly recommend you download the freeware CoolEdit '96 program from www.syntrillium.com if you want to de-click your LPs. It's really meant to be used as a two-channel editing tool, but I've found it to be a godsend when dubbing LPs to CD-R.

PUTTING IT ALL TOGETHER

It's very important to make sure your recording levels are set properly. With analog sources like cassette, you can get away with quite a bit of slop; recording to digital requires a lot more attention and precision. Recording levels that are too hot—i.e., whose signal peaks overshoot the meter's maximum range—will result in distortion in the form of nasty clicks and fuzz. But if you back off on

Harman Kardon's CDR 2 dual-tray stand-alone recorder does high-speed CD-to-CD-R/RW dubbing. Price: \$799.



to upgrade to a **high-end** sound card.



The **Yamaha CRW6416SZ** can record a CD-R at six-times normal speed. It's \$349.

the levels too far and your loudest peaks register only -6 dB on CoolEdit's meters, your CD-R will sound quieter than other CDs at the same volume setting. More important, you won't be taking advantage of the full 16 bits of resolution on the CD-R; you'll be making a 12- or 14-bit CD, at best. (Strictly speaking, you get 6 dB per bit, so setting peak level at -6 dB will give you 15-bit resolution, setting it at -12 dB will give you 14-bit rez, and so on.) Set recording levels so your loudest peaks hit 0 dB. Assuming your preamp's phono section is feeding your PC's sound card a healthy signal level, you can adjust the recording levels on your PC and CoolEdit by clicking on the Windows toolbar's volume-control icon and then choosing "Options/Properties/Recording." You'll see a vertical fader control, which is where you can raise or lower the recording levels going to CoolEdit.

The idea here is to upload your LP to your computer, prep it in the digital domain on your PC, and then download it onto CD-R for posterity. You'll need around a free gig's worth of space for all of this. Once you've brush-cleaned your LP and it's ready to spin, launch CoolEdit, begin recording a two-channel, 16-bit/44.1-kHz audio WAV file from your sound card's analog inputs, and then set the needle down into the groove. Play both sides of the record, but don't worry about the gap in between—you are going to edit that out later.

After your LP's flip side fades into the lead-out groove, click "Stop" on CoolEdit and you should have a pretty humongous audio WAV file containing an entire LP's worth of music. CoolEdit's screen looks like a big oscilloscope, with the waveform a green squiggle on a black screen. Looking at the entire file in CoolEdit, you should see each song on the album as a cluster of audio, followed by brief intertrack silence, then the next song, and so on. Now you can use CoolEdit to split all this up into individual WAV tracks and de-click them as well. Because CoolEdit lets you view the waveform like an oscilloscope, all the clicks and pops look like obvious spikes on an otherwise smooth squiggle, making them easy targets for mouse-clickable removal. Playing the same passage over and over and seeing the spikes as you hear the clicks will make it easy to locate and obliterate them. And every time you cut out a click, CoolEdit automatically fills in the millisecond gap where the spike used to be, connecting the dots seamlessly as if the click had never been there.

Depending on how much free time you have, you can get obsessive about eliminating every single pop and click, great and small, or you can do like I do and just go after the biggest ones and leave it at that. I don't mind a little bit of surface noise; it's the big pops and clicks I'm after, and it's always a pleasure to listen to the CD-R later and have them gone forever.

Once you're done deboning the individual WAV files, you can launch Easy CD Creator and assemble them all in the order you want for burning to a CD-R blank. Most of the time, I find I can double up and dub two LPs to a single CD-R. The Adaptec software gives you a running count of how much time you've got left on a CD-R as you add tracks to the layout, and since many old records take up only half the 74 minutes that fit onto a disc, you can double your pleasure and halve your dubbing expense.

While many newbies go whole-hog with CD-R and invest in all kinds of label makers and art-creation software for jewel box booklets, it's a good bet you'll ultimately wind up like the rest of us and just use a black magic marker to label your CD-Rs (or a green one, if you've still got one lying around from that short, frenzied spurt at the beginning of the decade that we'd all prefer not to think about today).

As with everything else we do in the quest for perfect sound, burning CDs the audiophile way involves a few more steps and bucks than usual. But when you're stuck in bumper-to-bumper traffic or wedged between two fat guys in coach somewhere over Des Moines, you'll be glad you took that extra step or two, because there's nothing like bathing in the sweet sound of silver-plated analog you made with your own two hands. **A**

"Steal this system."

Matt Polk, Speaker Specialist

"\$2,699 for a complete system this good is not just a 'good value,' it's an outright steal!"

-Wayne Garcia, *Etown.Com*

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-Daniel Kumin,
*Stereo Review's
Sound & Vision*, Oct. '99

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-Gary Reber, Editor,
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BETA REPORT

Technics DVD-A10 DVD-Audio Player



Waiting for the first DVD-Audio players to hit the market has been a real knuckle-gnaw. Ever since Matsushita announced last year that it would be the first company to plant the DVD-A flag on planet Earth with its Panasonic DVD-A7 and higher-end Technics DVD-A10 DVD-Audio players, I've been bugging the company to send us one to review in what became a weekly series of "family car trip" phone exchanges with Martha Whiteley of Matsushita:

Me (for the 23rd consecutive week): Are we there yet?

Martha: No, we're not there yet; it's going to be another few weeks. And stop touching your sister's *Mad Libs* book, or, so help me, I'll pull this car over and you can *walk* to Grandma's!

But finally, in mid-October, Martha was able to score us a pre-production sample of the Technics player, for a sneak preview. Meaning that this was a 99%-of-the-way-there unit, not quite ready for bench-testing but able to play DVD-A discs for demonstration purposes. By the time you read this, I should have the real McCoy for a full formal review, so consider this a preview of what we can look forward to from the next chapter in high-end digital audio.

by Corey Greenberg

The DVD-A10 is Matsushita's higher-end DVD-Audio player, hence the Technics brand name and a higher price, \$1,195, than the \$995 Panasonic DVD-A7. Since I don't know what will be changed when the final version ships, I won't get into the player itself very much. (Of course, I'll dig in like a dung beetle when Technics ships me the production version for the real review.) But after living with DVD-Audio for a while, I can offer some choice nuggets on this brave new world of high-rez multichannel audio.

Right off the bat, you should be aware that first-generation DVD-Audio players will have only analog outputs for DVD-A playback. So to add one of these players to your rig, your preamp or receiver will need to have a dedicated six-channel analog input in addition to its complement of stereo analog and digital inputs. What's that? Yours doesn't have a six-channel analog input? Join the club! I'm right there with you, wondering how the hell I'm going to hitch this new toy up to my current rig without too much bloodshed. It's kind of a cruel joke, actually—the irony of DVD-Audio is that the first guys who'll be able to enjoy this new format are mainly owners of recent-model A/V receivers, not separates jockeys. The big guns—like Theta Digital, Madrigal, Lexicon, and Meridian—have

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announced plans to offer six-channel inputs as options for their existing surround preamps and processors; so far, only Meridian has brought such an upgrade to market, for its flagship 861 surround preamp.

But damnit, I wanted to hear DVD-Audio! So I unplugged my A/V preamp from my Bryston 9B-ST five-channel, 100-watt power amp and jacked the analog outputs of the Technics DVD-A player directly into the Bryston with 1-meter lengths of Canare L-2B2AT interconnect. With fingers crossed and ears plugged, I slid a DVD-A sampler disc into the Technics, hit play, and got ready to pounce on the mute button if the first blast was too hot for the system to handle.

Luckily, everything went okay. Between the gain structure of the Bryston amps and the sensitivity of my NHT speakers (two pairs of full-range 3.3s for main and surround and the matching Audio-Center-One for the center channel), the volume of the direct DVD-A hookup was just slightly louder than my normal listening level and never overloaded the amps. (I stayed away from full-scale test tones, which surely would've popped fuses all over the place.) I let out a sigh of relief and settled back to audition the smattering of music available to me in the new format.

Now, here's where things get interesting. At the time I had the Technics preproduction player, there existed on the face of the Earth just two DVD-Audio titles, one demo sampler from Panasonic and one from Universal. And lest ye believe that all DVD-Audio discs shall strictly hew to the much-touted 24-bit/96-kHz resolution, let these two discs abolish such errant faith on ye's part. Because when it comes to word length and sampling rate, future DVD-Audio releases are going to be all over the map. They could be 24/96 or 20/192 or 24/44.1, and the channel count might be anywhere from mono to stereo to four to five to 5.1.

The number of channels on a given DVD-Audio track has little to do with how many bits or how high the sampling rate can be. It's all variable, having to do with what resolution each track requires in each of the six channels, what the original digital recording resolution may have been, how much space is needed to fit the whole recording on one disc, and whether MLP (Meridian Lossless Packing) is used. You could have a track

that's got 24/96 in the front channels and 20/48 in the surrounds or a mono 16/44.1 compilation of the entire Sonny Boy Williamson catalog on one disc. Make no mistake, the "V" in DVD-Audio stands for "Vat the hell am I listening to here?!"

For example, the Panasonic DVD-A sampler disc has eleven tracks: two in 5.1-channel (five full-range plus low-frequency effects channel) format, four in five-channel format, and five in two-channel stereo. The 5.1-channel tracks were recorded in 16-bit/48-kHz, the five-channel tracks are 20-bit/96-kHz, and the stereo tracks are 24-bit/192-kHz. The Universal sampler, on the other hand, has twelve cuts. All are duplicated in surround and stereo versions, for a total of 24 tracks on the disc; all but



three of the multichannel tracks are 24-bit/44.1-kHz, with the remaining three in 24-bit/48-kHz. And the stereo versions of these same tracks vary from 24/96 to 48/96 to even 24/44.1.

So what's DVD-Audio sound like? I'm loathe to judge a new format based on preproduction hardware and two iffy sampler discs, but based on what I heard from the Technics player, I have to say, "so far, so @%#\$ good!" The sound was *much* more immediate and open than even the best CD playback I've heard anywhere. Believe me, this is not a difference you have to squint to hear, and then only on the best and most expensive systems. It isn't sticking hockey pucks under your amp and lighting up a stick of Money Luck incense while you and your buddies nudge each other on to describe ever more ludicrous sonic revelations. This is the real deal, and now that I've heard it in my system, I'm itching even more crazily to get my hands on some real software titles. (Though great-sounding, both samplers have typical flaccid demo

fare, such as remixed/remastered Sting, Lyle Lovett, and Dave Grusin. Yeesh—when Diana Krall's the toughest punch on a sampler disc, you know you're in trouble.)

But I'm not here to whine about the choice of music on sampler discs designed to entice the average consumer to fork over a paycheck for one of these first-generation players. (Well, maybe one more whine: Boyz II Men are the spawn of Satan. There, I've said it.) This sneak preview is all about *sound quality*. And from the first seconds of DVD-Audio play, I got the same exciting tingle in my ears that I get when listening to original master tapes in a studio—that utter lack of the subtle cloudiness and congestion that still exists, though in ever-diminishing levels, in today's best CD mastering chains.

It's a sense of absolute clarity and see-through midrange purity that I've always yearned for but never heard from even the best CDs in my collection.

And then there's the bass. I didn't really expect to hear any improvements in the low end from DVD-Audio or Super Audio CD (SACD). If there's one thing CD should be able to nail—and nail as perfectly as it can possibly be nailed—it's the range from 20 to 100 Hz. The CD standard is utter overkill for such low frequencies. And yet, it's the revelatory

low end that I noticed at first listen with both SACD and DVD-Audio. Maybe the engineers are goosing up the low end to make the new discs more exciting; I don't know. But I do know that the low-end detail and punch of these new formats is a step above what I hear from CD.

If you've never heard a master tape, it's natural to consider CD sound as perfect as it gets, and I'll be honest, I'm real happy with the best-sounding CDs in my rack. But now that I've had a chance to hear what DVD-Audio can deliver on a \$1,195 player, I'm even more insane to get my hands on it for real. I can't imagine any music lover who wouldn't be.

This beta report is just a first sniff of DVD-Audio. We'll give you the full scoop on the Technics DVD-A10 itself, with a slew of measurements and the whole shebang, when I finally get a production player. Until then, the wait continues—even more agonizingly than before, now that I've gotten a taste of what tomorrow will sound like. **A**

D.B. KEELE, JR.

Klipsch Reference Series Home Theater Speakers

Paul Klipsch, who founded his speaker company in 1945, is renowned for his idiosyncrasies. For example, he wears three watches on one wrist when he goes out of town (for local time, time at his home, and Greenwich Mean Time), and he carries yellow "Bullshit!" buttons that he flashes at or gives to people he has technical disagreements with (usually about loudspeakers). Having worked at Klipsch for about a year in the 1970s, I doubt that he's mellowed out, even at the age of 95.

Klipsch speakers are idiosyncratic, too. From its first product, the Klipschorn, the company has always emphasized high efficiency, high output, low distortion, and wide dynamic range through the use of horns. And though other speakers come and go, the Klipschorn is still in the line, at \$5,798 per pair, albeit incorporating 55 years' worth of updates.

The six speakers in Klipsch's new Reference Series home theater line all contain Klipsch-designed 90° x 60° Tractrix horn tweeters, supplemented by conventional cone drivers for the lower frequencies. The horn, which works with a titanium-dome driver, uses its the 90° angle to cover the listening area while limiting reflections from the room's side walls; its 60° vertical coverage greatly reduces floor and ceiling reflections. For this review, I tested four of the speakers in this series: the RP-3 tower, the RC-3 center speaker, the RS-3 surround (which has two of the Tractrix horns), and the RB-5 (a bookshelf speaker that can double as a surround or a conventional stereo speaker). In addition to the horns, each model has a 6½- or 8-inch woofer with a distinctive, copper-anodized aluminum cone and a cast polymer frame; the

Controls and connections are on an aluminum plate at the bottom rear of the cabinet. The subwoofer amp has speaker- and line-level connections. Straps normally connect the binding posts for the subwoofer's speaker-level input to those for the woofer and tweeter; the posts are heavy-duty, five-way types spaced for double-banana plugs. With the straps removed, the subwoofer amp can be fed directly via these posts or line-level RCA jacks. Two such inputs are provided: "Line" (which feeds the



RP-3 incorporates an additional, powered subwoofer. All of the woofers, except the RB-5's, operate in sealed enclosures.

The RP-3, the second of three tower speakers in the Klipsch Reference line, has its horn and 6½-inch woofer mounted near the top of its front panel. The 10-inch powered subwoofer is on the cabinet's side.

amp through a detented volume control) and "LFE" (a fixed-level jack for THX use). Each of these inputs has a matching output jack so that you can daisy-chain subs. Regardless of the input used, the level of the lower bass frequencies can be adjusted with another detented control, "Bass Contour." Two small PC boards and a heat sink make

Photos: Michael Groer

KLIPSCH

RP-3 POWERED TOWER

Rated Frequency Response: 27 Hz to 20 kHz, ± 3 dB.

Rated Sensitivity: 95 dB SPL/1 watt/1 meter.

Rated Impedance: 8 ohms, nominal.

Rated Power Handling: 110 watts maximum, continuous (300 watts, peak).

Dimensions: 40½ in. H x 9 in. W x 16¼ in. D (102.9 cm x 22.9 cm x 42.7 cm).

Weight: 62 lbs. (28.2 kg).

Price: \$1,500 per pair, black ash vinyl veneer.

RC-3 CENTER SPEAKER

Rated Frequency Response: 60 Hz to 20 kHz, ± 3 dB.

Rated Sensitivity: 97 dB SPL/1 watt/1 meter.

Rated Impedance: 8 ohms, nominal.

Rated Power Handling: 150 watts maximum, continuous (400 watts, peak).

Dimensions: 8 in. H x 23 in. W x 9 in. D (20.1 cm x 58.2 cm x 22.9 cm).

Weight: 29 lbs. (13.2 kg).

Price: \$350, matte black vinyl finish.

RS-3 SURROUND SPEAKER

Rated Frequency Response: 49 Hz to 20 kHz, ± 3 dB.

Rated Sensitivity: 95 dB SPL/1 watt/1 meter.

Rated Impedance: 8 ohms, nominal.

Rated Power Handling: 110 watts maximum, continuous (300 watts, peak).

Dimensions: 8½ in. H x 18¼ in. W x 7¾ in. D (21.6 cm x 47.5 cm x 18.8 cm).

Weight: 12 lbs. (5.5 kg).

Price: \$550 per pair, matte black or white vinyl finish.

RB-5 MONITOR

Rated Frequency Response: 48 Hz to 20 kHz, ± 3 dB.

Rated Sensitivity: 96 dB SPL/1 watt/1 meter.

Rated Impedance: 8 ohms, nominal.

Rated Power Handling: 150 watts maximum, continuous (400 watts, peak).

Dimensions: 17 in. H x 9 in. W x 12½ in. D (43.2 cm x 22.9 cm x 30.9 cm).

Weight: 23 lbs. (10.5 kg).

Price: \$800 per pair; black, medium oak, or mahogany wood veneer.

Company Address: 8900 Keystone Crossing, Suite 1220, Indianapolis, Ind. 46240; 317/574-3866; www.klipsch.com.

up the RP-3's MOS-FET-output subwoofer amp, rated at 220 watts, which is mounted inside the control and connection panel; an 8-foot, two-wire power cord is attached.

The 2.8-kHz crossover between the front-panel drivers is a passive network built with air-core coils and film capacitors. It has an 18-dB/octave high-pass filter feeding the tweeter and a 12-dB/octave low-pass feeding the woofer (these slopes are the same for all the speakers in the Reference Series). Despite the subwoofer's presence, there is no high-pass filter rolling off the front woofer's response, so it also is driven down to the lowest bass frequencies. The subwoofer is fed through a 90-Hz low-pass filter.

The RP-3's cabinet is built solidly of ¾-inch MDF. No internal bracing is used other than the strengthening provided by the sealed chamber enclosing the front drivers. Klipsch provides extension feet for the bottom of the cabinet, to increase its lateral sta-

bility, and spikes and rubber-tipped pads for use on various surfaces.

The RC-3 center speaker has two 6½-inch cone woofers flanking a Tractrix horn. One of the woofers operates up to the rated 2-kHz crossover point, while the other is rolled off above 850 Hz. The input connections support bi-wiring.

In contrast to the RC-3 center system, the Klipsch RS-3 surround speaker has two Tractrix horns flanking a single 6½-inch woofer. The two horns are angled 90° apart to provide hemispherical coverage when placed against the wall. The grille is a clever design made of five pieces of thin (0.4-inch) MDF connected by plastic hinges so as to wrap around the front and sides of the enclosure. Rated crossover frequency is 2.1 kHz, and bi-wiring is not supported.

The RB-5 bookshelf speaker is something of a maverick in the line. It's the only multipurpose model, intended for use as a

main, center, or surround speaker. It's also the only model offered in real wood veneers, the only one to have an 8-inch woofer, and the only one with a vented enclosure. The Tractrix horn and woofer take up most of the front panel; the rear panel holds bi-wirable connections and a large, flared port (2¾ inches in diameter and 5 inches long). Rated crossover frequency is 2 kHz.

All the Reference Series systems except the RS-3 share a "floating" grille design, suspended off of the front baffle. The molded-plastic grille frame forms a curved surface that wraps around the front of the cabinet and holds the grille nearly 1½ inches away from the box at its center.

I listened to the RP-3 tower speakers in both my stereo listening room and my home theater setup. The RB-5 bookshelf systems were evaluated only as two-channel playback speakers, while the RC-3 center and RS-3 surround speakers pulled duty in my home cinema.

Klipsch's manual for the Reference Series speakers is an eight-page, 8½ x 11-inch booklet, four pages of which contain quite detailed information related to setup and operation. When unpacked and installed, all the systems were very attractive, their single most striking feature being the bronze-look woofer cones. And except for the RB-5, which had a beautiful mahogany-veneer finish, all were supplied in black vinyl. Cabinet construction and workmanship were first-rate throughout.

The Klipsch speakers performed excellently, delivering everything needed for exciting home theater.

So how did they perform? As I write this it's October 31, and I just finished watching the Halloween episode of *Hercules* as I ate my dinner. (My one television vice is a liking for *Hercules* and *Xena!*) I listened to these shows with the Klipsch speakers, operating with a Pioneer Elite VSX-99 receiver and PRO-98 50-inch rear-projection TV. The RS-3 surround speakers were mounted

TEST RESULTS

The RP-3 tower's frequency response is quite broad and extended and, with the Klipsch speaker's "Bass Contour" at its flat position, quite well balanced overall (Fig. 1). The deviations caused by the grille look severe, changing the response by about +2 to -8 dB. But because these are sharp, high-Q, variations and occur at closely spaced frequencies, they may not be too audible. Note, however, that with or without the grille, there are two fairly sharp dips.



The upper dip, at 2.3 kHz, indicates potential crossover problems between the front-mounted woofer and tweeter, which will cause severe lobing, aiming the output in that range above or below the axis rather than straight ahead. When I reversed the front woofer's leads as a test, the dip shifted up a bit, to 3.2 kHz, but remained about the same depth; this indicates that the phase difference between the two front drivers at crossover is about 90°, which would maximize lobing.

The lower dip, at 58 Hz, disappears as the RP-3's "Bass Contour" control is rotated from one extreme (the flat position) nearly to its maximum. It is caused by interference between the side-mounted subwoofer and the front woofer, whose drive signal is not rolled off at low frequencies. At 58 Hz, the outputs of the two bass drivers are out of phase. With the contour control turned up, the subwoofer's output increases enough to overcome this interference. Adding a high-pass filter to the front woofer or phase compensa-

tion to the side woofer's power amplifier (or both) would minimize this effect.

The RP-3 subwoofer's output peaks at about 50 Hz, rolling off at 12 dB per octave above and below that point. The contour control mainly affects response in a half-octave range centered on 53 Hz. With the control at its 3 o'clock position, near its maximum, output is boosted about 8 dB; when it was turned all the way up, the boost increased to a little more than 10 dB.

Averaged from 250 Hz to 4 kHz, the RP-3's sensitivity measured 90.3 dB, which is moderately high but 4.7 dB below Klipsch's rating. The right and left systems matched fairly closely, within ± 1 dB.

The RP-3's horizontal off-axis responses (Fig. 2) are quite uniform to 10 kHz, but there's a dip from 12 to 15 kHz at angles 30° or more off axis. This dip is not present in the responses above the axis (Fig. 3) or below (not shown). Except from 2 to 4 kHz, in the crossover range, the above-axis curves are very uniform, as were the curves for below-axis response. In the main listening window, however, within $\pm 15^\circ$ of the axis, the responses were significantly smoother below the axis than they are above, a consequence of lobing. In fact, response 10° below axis was significantly smoother than it is on axis (0°).

Figure 4 shows the on-axis responses of the other Klipsch Reference speakers I tested. The RS-3 surround-channel speaker's response (Fig. 4A) is different on the axis of its center woofer from on the axis of either horn tweeter. Neither curve is particularly flat, and each has its own idiosyncrasies. On the horn's axis, the curve is extended but somewhat sway-backed, its ends 4 to 7 dB higher than its middle. On the woofer's axis, the response is similar (barring a peak at 1.2 kHz) until 8 kHz, then drops off steeply, bottoming out at 12 kHz. (I suspect this dip has the same causes as the similar one in the RP-3's horizontal off-axis responses.) Surround speakers of this type usually are designed more for flat power response and off-axis listening than for flat response on any particular axis, however, so it is perhaps not a good idea to make too much of these results. Averaging the woofer-axis re-

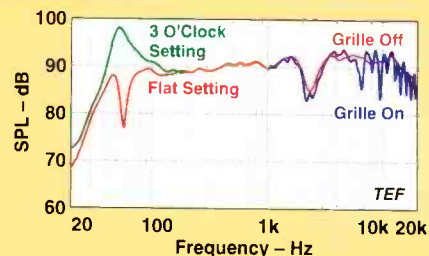


Fig. 1—Frequency response, RP-3 Tower.

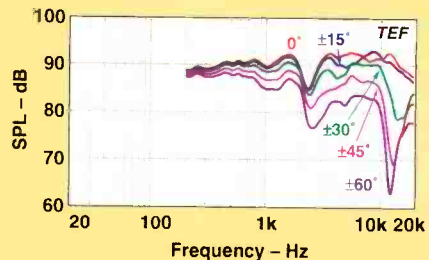


Fig. 2—Horizontal off-axis frequency responses, RP-3.

sponse (the higher of the two) from 250 Hz to 4 kHz yields a moderate sensitivity of just 87.6 dB.

There's a closer match between the responses of the Klipsch RC-3 center and RB-5 bookshelf speakers (Fig. 4B). The curves were taken on the axis of each speaker's horn, which is where you're likely to be when you listen. Above 100 Hz, the RC-3's response is similar to the RP-3's, albeit with a shallower dip in the range from 2 to 3 kHz. The RB-5 has the smoothest and flattest response of the four Klipsch Reference speakers I tested. Between 100 Hz and 20 kHz, it fits a fairly tight window of about 6 dB. Reversing the polarity of the RB-5's tweeter produced a sharp dip at 2 kHz, indicating that the alignment of this bookshelf speaker's crossover is significantly better than the RP-3's and should produce much less lobing. The RC-3 and RB-5 were more sensitive than the RP-3 tower but, again, less sensitive than specified. Averaged from 250 Hz to 4 kHz, the RC-3's sensitivity measured 93.4 dB, the RB-5's 91.7 dB.

The impedance curves of the Klipsch Reference speakers were quite similar, except for the single low-frequency impedance peaks of the three sealed speakers versus the double peak of the vented RB-5. The RP-3's impedance reached a minimum of 3.5 ohms at 210

TEST RESULTS

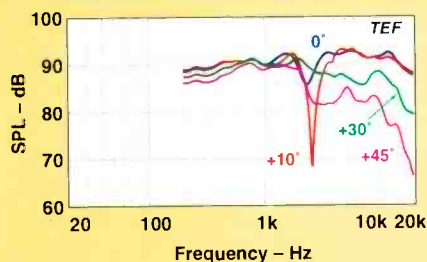


Fig. 3—Above-axis frequency responses, RP-3.

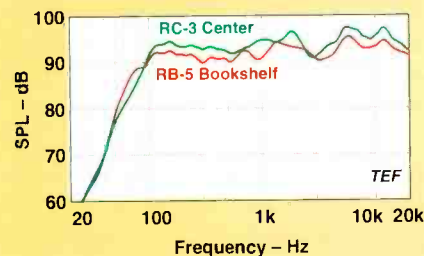
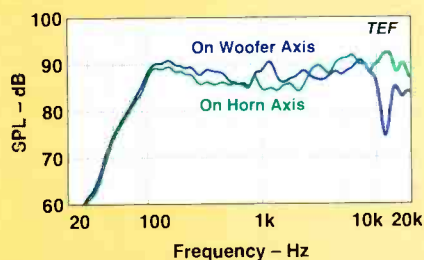


Fig. 4—Frequency response of RS-3 surround (A) and of RC-3 center-channel and RB-5 bookshelf speakers (B).

Hz and had a 28-ohm peak at 83 Hz, its enclosure resonance. Tuning frequency for the RB-5 (indicated by a dip between its two bass impedance peaks) was 65 Hz, which is rather high and probably accounts for the speaker's lack of significant output below 50 Hz; Klipsch has clearly traded off some low-frequency extension to maximize the RB-5's efficiency. This speaker's impedance range was 3.7 to 41 ohms. For the RB-5 or RP-3, you would need to limit cable series resistance to 0.05 ohm or less to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, that would correspond to 14-gauge (or heavier), low-inductance cable. There were no surprises or extreme values in the phase curves for any of the four speakers.

The RP-3 tower exhibited little wall vibration when subjected to a high-level sine-wave sweep, except for some activity at and near 230 Hz on the top, sides, and rear of the upper half of the cabinet. The side woofer managed a healthy maximum excursion of 0.8 inch, peak to peak, at 35 Hz. At lower frequencies, the excursion tapered off with frequency. More typically for a closed-box system, the front woofer's maximum excursion did not decrease with frequency, peaking at 70 Hz and then staying there for all lower frequencies. Its excursion capability was also quite healthy, about 0.5 inch, peak to peak, before distortion became objectionable.

The RB-5 bookshelf's cabinet was also quite inert, as were the remaining systems I checked. The RB-5's woofer had a strong excursion minimum at 70 Hz, the box-resonance frequency. Its woofer could move nearly 0.65 inch, peak to peak, before distortion became annoying. None of the drivers in the Reference Series speakers produced any dynamic offset distortion.

For Fig. 5, the RP-5 tower's 3-meter room response, I used the same "Bass Contour" settings as for Fig. 1 and extended the measurement down to 20 Hz rather than my usual 100 Hz. Since this makes the graph a bit busy, I omitted the raw room response above 100 Hz, leaving only the smoothed response above that frequency. In this range, the curve is fairly well behaved and fits a loose, 15-dB window. Significant aberrations include a moderate lift of about 5 to 7 dB between 900 Hz and 2 kHz and a somewhat similar depression between roughly 200 and 500 Hz. The response above 4 kHz is commendably smooth and flat. I measured the response below 100 Hz with a very slow sine-wave sweep and no smoothing. In this range, the effect of room gain is clearly evident as a significant boost below 50 Hz, with output remaining strong down to 20 Hz. With "Bass Contour" at its 3 o'clock position, nearly full boost, the response fills in between 40 and 70 Hz and is actually quite flat between about 25 and 65 Hz! The only major aberration is a deep and very sharp, high-Q dip at 80 Hz, which further tests revealed to be a result of interference between the two woofers and not a room effect.

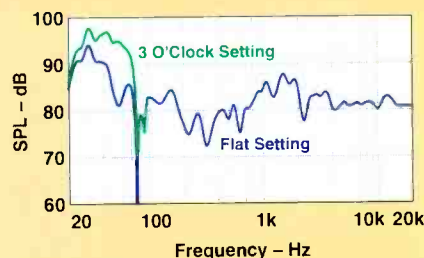


Fig. 5—Three-meter room response, RP-3.

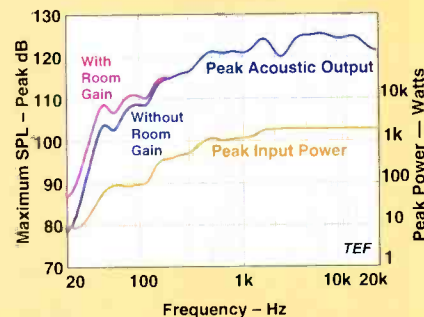


Fig. 6—Maximum peak input power and sound output, RP-3.

I checked the Klipsch RP-3's harmonic distortion at 41.2 Hz (E_1) with "Bass Contour" at its flat position and 15 volts rms applied to the speaker terminals (which resulted in near full excursion of the side-mounted subwoofer). At this frequency, most of the fundamental energy came from the subwoofer, which also generated most of the second-harmonic distortion; the main source of third harmonics, however, was the front woofer, which contributed a significant amount of harmonic distortion to the speaker's total acoustic output at 41 Hz. When the 41.2-Hz tone was mixed with a 440-Hz (A_4) tone of equal power, the RP-3 generated 10% IM distortion.

The RP-3's short-term peak input capacity and output are shown in Fig. 6, with "Bass Contour" at its flat position. At 40 Hz and below, the side woofer was the primary limiting factor; at 63 Hz and above, the front woofer was the limiting component; at 50 Hz, they contributed about equally. The peak input power starts low, at 10 watts at 20 Hz, but eventually reaches 1,000 watts at 450 Hz and 2,000 watts above 2 kHz. The peak acoustic output, however, starts somewhat strong—88 dB SPL at 20 Hz—and rises quickly, passing through 100 dB at 33 Hz, 110 dB at 74 Hz, and 120 dB at a high 420 Hz.—D.B.K.

CAST OF CHARACTERS



Klipsch Reference Series RC-3 center-channel speaker (above), RP-3 tower (left), RB-5 bookshelf monitor (right), and RS-3 surrounds (below).

above and directly to the sides of my listening location. (Other equipment in the system consisted of a Toshiba SD-2109 DVD player and a Paradigm Reference Servo-15 subwoofer.) The Klipsches performed flawlessly on this demanding (but fun) test, reproducing the gurgling sounds of Vlad the vampire very realistically as Herc wasted him with the enchanted knife!

On more, ahem, serious material, such as the "Jurassic Lunch" cut on *The Great Fantasy Adventure Album* (Telarc), recorded in Spatializer 3D sound and played back in Dolby Pro Logic, the Klipsch systems reproduced the special effects at very loud levels without compression. (Particularly effective was the T-Rex burp at the end of the cut.) I operated the RP-3s on their own, driving

their LFE inputs with a low-passed signal provided by the Paradigm subwoofer's processor, and in normal mode with the Paradigm sub on the LFE channel. I found that the pair of RP-3s could easily keep up with the Paradigm on most bass material. However, the RP-3s did not reproduce the lowest frequencies of the T-Rex footfalls on the Telarc CD as effectively as the Paradigm subwoofer. The footfalls contain high levels of sub-25-Hz energy, which the Klipsches attenuated.

When I set channel balance using the rotating pink-noise signals provided by the Pioneer receiver, I was impressed with the evenly matched tonal characteristics of the main, center, and surround speakers. The RC-3 center speaker was clearly the most

sensitive of the bunch and had to be attenuated significantly relative to the others.

On various DVDs, including *The Fugitive* and *Mars Attacks*, the Klipsch speakers proved to be very versatile and excellent all-around performers, delivering everything needed for an exciting home theater experience. Through the surround speakers, the reproduction of the applause and crowd sounds on *Christmas Live*, a DVD by Mannheim Steamroller (American Gramophone), was extremely realistic.

The RP-3s were also quite good performers in my stereo listening room, where they impressed me with their dynamic range, wide, even coverage, and smooth sound. They were quite sensitive and had to be attenuated some 5 to 6 dB to match levels with my B&W 801 Matrix Series 3 reference speakers. I drove the RP-3s, with straps in place, through Straight Wire cable attached to a Crown Macro Reference amp. Depending on the low-frequency content of the music, I set the speaker's "Bass Contour" control between the flat and 12 o'clock positions. As with other systems having bass level controls, I found the extra degree of freedom provided by the control very exhilarating. I increased the level on rock and jazz and decreased it on other source material. I just wish the control were more accessible or could be operated remotely. Although the RP-3s could play very loud on heavy-metal rock, such as AC/DC, it was possible to overload them occasionally on high-level kick drum, which produced large excursions of the front and side woofers. On third-octave band-limited pink noise, the RP-3 (with "Bass Contour" at its flat position) generated no usable output at 20 Hz, some usable but distorted output at 25 Hz, quite usable output at 32 Hz, and plenty of fairly clean output at all higher frequencies. But with levels matched, the B&Ws tended to sound a bit cleaner at the higher frequencies.

I started the two-channel session by playing Janis Ian's *Breaking Silence* (a very-well-recorded audiophile CD from Analogue Productions). Track 4 was particularly effective. Ian's voice sounded slightly forward but quite sweet and clear, and there was no trace of harshness. (This contrasts with the

Continued on page 67



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JOHN GATSKI

HHB CDR-850 CD-R/RW Recorder



CD recorders are amazing, no? An optical disc recorder lets you make compilation CDs of your favorite songs or copy a treasured platter for the car—and do it for a few dollars per disc. These days, about \$500 will get you a stand-alone, component-type CD-R/CD-RW recorder, which will be perfectly fine for infrequent recording. But what if your needs are more complex? If you want to record a lot of discs or you are a home musician and want to digitally dub your bass player's latest licks from a homebrew CD, you may find a typical component-style CD recorder frustrating because of certain inherent and practical limitations. For example, the CD-R blanks sold for music recording on consumer component-type machines cost slightly more than the blanks for a computer CD-R/RW drive. And the Serial Copy Management System (SCMS), which cannot be disabled on consumer decks, prevents you from digitally

copying a CD that has been cloned from another CD—even if the original is a home recording of your own music.

One solution is to buy a CD-R/RW drive, provided your computer has the horsepower—that is, enough memory and hard-drive capacity—to do the job and you don't mind not being able to do anything else on it while you are recording. Though it's more expensive, I can suggest another solution: Buy a stand-alone CD recorder expressly designed for home musicians and professionals.

The CDR-850, from HHB Communications, is a professional CD-R/RW deck sold at stores that cater to musicians. It's jam-packed with controls, features, and connectors and can record on low-cost computer write-once CD-R and rewritable (erasable) CD-RW blanks. (Naturally, it will also record on consumer audio CD-Rs and CD-RWs, although they will cost you about a buck a pop more.) Built for HHB by Pioneer, the CDR-850 has delta-sigma (“1-

bit”) A/D and D/A converters and a built-in sampling-rate converter that automatically translates digital signals between 32 and 48 kHz to the 44.1-kHz CD standard.

Perhaps best of all, the CDR-850 has defeatable SCMS circuitry. On consumer digital recorders, SCMS allows you to make only first-generation digital dubs of an original digital disc or tape. SCMS writes an inhibitor flag onto the copies, which prevents consumer decks from digitally dubbing the dubs. This is a bummer for musicians who may want to record tracks from a fellow musician's CD-R copy of his latest tunes or do multigenerational digital editing of their own work. On consumer CD recorders, the only recourse is to bypass SCMS with a detour through the analog circuits. (But why have digital if you have to resort to such a measure?) As a pro deck, however, the CDR-850's SCMS circuitry can be set to make recordings that will allow no digital copying, single-generation digital copying, or totally unlimited digital dubbing.

Although numerous buttons adorn the CDR-850, it's not overly complicated to operate once you read the owner's manual and learn what it can do. The remote duplicates many of the front panel's functions, but its buttons are a tad small. The right-hand side of the front panel sports typical CD-burner controls: for play, stop, pause, open/close of the loading tray, record, and recording mute. There are concentric knobs for left- and right-channel recording level and an input selector. The CDR-850 also has “Set” and “Clear” controls for the skip-

HHB

Rated Frequency Response: 2 Hz to 20 kHz, ± 1 dB.

Rated Distortion: With digital input, 0.0022% THD; with analog input, 0.006% THD.

Dimensions: 19 in. W x 3½ in. H x 15½ in. D (48.2 cm x 8.9 cm x 39.3 cm).

Weight: 15½ lbs. (9 kg).

Price: \$1,249.

Company Address: 1410 Centinela Ave., Los Angeles, Cal. 90025; 310/319-1111; www.hhb.co.uk.

TEST RESULTS

The HHB CDR-850's frequency response (Fig. 1) is essentially dead flat up to 10 kHz and then rolls off to about -2 dB at 20 kHz. Since the response is almost identical for analog and digital input, the rolloff must come primarily from the reconstruction filters in the D/A converters rather than the anti-aliasing filters in the A/D section. This aspect of the deck's performance could be better, but the rolloff is small enough and starts at such a high frequency that you're not likely to hear it.



Total harmonic distortion plus noise (THD + N, Fig. 2) is admirably low. With a digital input, it is no more than about 0.003% over almost the entire audible band. Even through both the A/D and D/A converters, distortion is barely higher below 1 kHz and at worst is just a shade over 0.01%. This is excellent performance, further supported by the analysis of noise versus frequency (Fig. 3) and the DAC linearity plot (Fig. 4). The noise plots are of digital silence referenced to 500 millivolts out from a 0-dBFS signal. Noise is somewhat higher in the right channel than in the left, and there is a very small 60-Hz hum blip in both, but this is quite good performance. The total A-weighted noise power works out to -96 dB. You shouldn't hear it. The CDR-850's D/A converter linearity is essentially perfect over the full 16-bit CD range.

Figure 5 shows channel separation with analog and digital inputs. As one would expect, the analog-input results are somewhat worse, but they are still much better than necessary for ideal stereo performance. All in all, the CDR-850 is one clean machine.—*Michael Riggs*

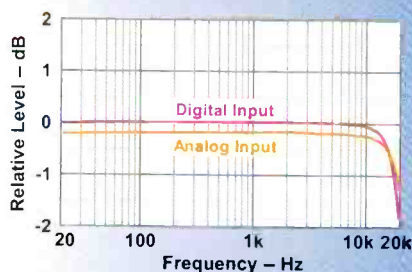


Fig. 1—Frequency response.

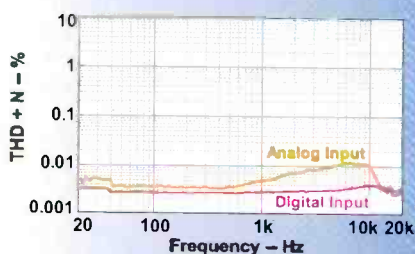


Fig. 2—THD + N vs. frequency.

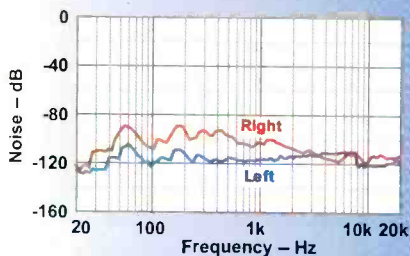


Fig. 3—Noise spectra.

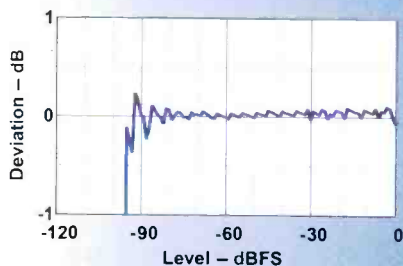


Fig. 4—DAC linearity error vs. frequency.

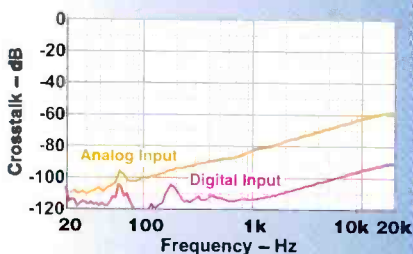


Fig. 5—Crosstalk vs. frequency.

ID function and “Auto/Manual” and “Write (Manual)” buttons for track numbering; you use these controls to set up track sequences and write track IDs when you're recording.

The “Skip ID Set” button doubles as a memory recall key to select options from the CDR-850's menu. These include the SCMS settings, activation of the sampling-rate converter, auto-track level, fader duration, activation of the auto-pause mode, switching the digital output on or off, switching the remote control on or off, adjusting the level of the balanced analog outputs, and setting the auto-stop delay.

The HHB's rear panel contains just about every input and output connector a serious home recordist could want. Digital inputs include jacks for Toslink optical, coaxial, and AES/EBU; on the analog side are balanced three-pin XLR and unbalanced RCA jacks. Outputs include balanced analog XLR, unbalanced analog RCA, and

**You can set
the HHB's SCMS
to allow
unlimited copying
of any digital source.**

Toslink and coaxial digital. (If you want an AES/EBU balanced digital output, you will have to get the CDR-850 Plus.) Also on the back panel is a port for an optional wired remote.

I popped the CDR-850 into my home music studio rig, along with a Mackie 1402 analog mixer, a Sony PCM-2700 DAT recorder, and a Digital Domain digital distribution box. I also connected a Sony CD player as a dubbing source for CDs. Next, I called up the HHB's options menu and set SCMS to “Permit,” to enable unlimited copying from digital sources. Then I set up the sampling-rate converter. Because the CD standard specifies a 44.1-kHz sampling rate, digital signals at other sampling rates, such as those from 48-kHz DATs, must be resampled to 44.1 kHz before they can be burned to disc. Sampling-rate converters are not always audibly transparent, howev-

one bell, one whistle,



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strong recommendation"*

— Corey Greenberg, Audio, on the *Miami Monitor*

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REVIEWS



er, and some CD recorders with such converters keep them in the circuit even when the incoming signal is already at 44.1 kHz. This will, at the very least, change the data, and it may affect the sound. So it's a good thing the CDR-850 lets you bypass its sampling-rate converter when necessary. In fact, if your source recordings are always at 44.1 kHz, just leave the sampling-rate converter off.

Once I had everything configured to my satisfaction, I made some test dubs, beginning with a DAT of some of my acoustic guitar recordings. I simply connected the coaxial digital output from the Sony DAT machine to the HHB, popped in a cheap CD-R blank, and got down to business. After the HHB automatically initialized the CD-R, I punched the record button on the 850 and then play on my Sony DAT deck. I often find that DAT track IDs don't transfer well, so I used the CDR-850's manual mode to write the tracks one by one.

Next, I copied a commercial CD using the CDR-850's "Digital Synchro" mode, which makes the whole process a breeze. Once you've engaged this mode and hit the record button, the deck will start recording when you hit play on the source deck, copying audio, track numbers, and times. You can even have the machine automatically finalize the disc, which writes the CD's table of contents (TOC) to make it compatible with ordinary players.

Finalization takes about 4 minutes. Rewritable CD-RW discs will not play on most standard CD players even after finalization, the main exceptions to this rule being some new players from Philips, equipped with universal laser pickups, and some DVD players. But you can use CD-RWs over and over for practice purposes or as audio sketch pads, like a DAT or an analog tape. Before a CD-RW is finalized, you can record a new track by erasing a previous track. After finalization, a CD-RW must be completely erased before you can use the

disc to record on again, a process that takes about 5 minutes.

I also made some guitar recordings using mikes routed through the Mackie mixer to the CDR-850's analog inputs. Again, it was easy. You can write track IDs manually by pushing a button on the remote or the recorder or have the HHB write them automatically via its "Auto Track" function. In the "Auto Track" mode, it will write a new track ID any time it detects at least 2 seconds of silence. A nice touch is that you can adjust the level of what constitutes "silence" to compensate for background noise, such as from analog sources.

The HHB CDR-850's recorded sound quality was excellent. The home-brew guitar recording sounded as open on the CD-R dub as on the original DAT. Switching between the commercial CD in the older Sony

**Recorded on the HHB,
the home-brew guitar
CD-R sounded as open
as the original DAT.**

player and the clone played through the CDR-850 revealed slightly better sound from the HHB, likely the result of superior DACs in the CDR-850 rather than any difference in the discs.

The only quibble I have with the CDR-850 has to do with the rack ears, which make more sense in a pro environment than in a home studio. But, heck, removing eight screws will take care of that. If you find your recording projects hampered by the idiosyncrasies of consumer component CD recorders or computer CD burners, the HHB CDR-850 might just be your ticket to paradise. Until higher-resolution digital disc recorders come along, the HHB is about as good as it gets. **A**

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DOUG NEWCOMB

McIntosh MC7205 Five-Channel Amp

This amp's styling is pure McIntosh: a black aluminum chassis with brushed-aluminum end pieces, a glass façade with two honking silver-rimmed knobs, and three old-fashioned analog power meters. The decidedly retro look is or ain't your bag, in much the same way one worships late '60s and early '70s American muscle cars or regards them as antiquated hulks. I, for the record, belong to the former group.

One of the two knobs on the front panel, marked "Power," has a "Remote" setting that you use when the MC7205 is connected to a McIntosh MX130 preamp/processor or to any other A/V surround processor that provides a 12-volt on/off trigger signal (the Mac receives such signals on an RCA-jack trigger input). The other knob, "Meters," toggles between the display modes of the three meters. A pair of red LEDs above each meter indicates which channels are being monitored, and orange LEDs (a pair for the left and right meters and one for the center) glow when the amplifier's Power Guard anti-clipping circuitry is engaged. Also, a small red indicator above the McIntosh logo illuminates when the amp is switched on.

The MC7205's back panel is almost as sparse and neatly laid out as the front. Five-way binding posts are logically grouped: right front and right surround on the left, left front and left surround on the right, and center



Whoever coined the maxim "you can never be too rich or too thin" obviously never lived in my Los Angeles neighborhood, an area known in real-estate parlance as "Malibu-adjacent." That wog apparently never saw the ostentatious salmon-colored mansions of show-biz moguls who have way more moolah than taste or the Malibu Barbies who emulate the look of the starving children of sub-Saharan Africa. I happen to subscribe to the belief that you can never have too much power—of the audio variety, that is. Two years ago, for example, some of my friends thought that I had lost my mind when I loaded the trunk of my '96 Chevy Impala SS with 1,500 watts of ampli-

fication for a cross-country drive from California to South Carolina. Yet though I played music eight to ten hours a day on that trip, never once did I experience listening fatigue—an absolute first in my experience.

The engineers at McIntosh Laboratories, bless their pocket-protector-covered hearts, must also share this hunger for power. Their latest power plant is the five-channel MC7205 amplifier. This solid-state design is rated at 120 watts per channel into 8 ohms and 200 watts per channel into 4 ohms. Though maybe not enough muscle to rattle the floor-to-ceiling windows of my Malibu-adjacent neighbors, the juice is adequate to satisfy my demands for uncompromising audio reproduction.

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Rated Power: 120 watts per channel into 8 ohms or 200 watts per channel into 4 ohms, all channels driven.

Rated Distortion: 0.005% THD, 20 Hz to 20 kHz.

Dimensions: 17½ in. W x 7¾ in. H x 22½ in. D (44.5 cm x 19.5 cm x 56.2 cm).

Weight: 53 lbs. (24 kg).

Price: \$4,500.

Company Address: 2 Chambers St., Binghamton, N.Y. 13903; 607/723-3512; www.mcintoshlabs.com.

in the middle. Inputs are similarly arrayed along the top. A "Sub In/Out" jack next to the center channel's input activates the middle meter's subwoofer power mode. Or, if a DB-25 cable links the MC7205 to a McIntosh A/V preamp, the jack will send a turn-on signal to a subwoofer amplifier. Below each set of inputs are level controls for each channel, with markings of "2.0 V" and "1V THX." Grouped with the center-channel level control is a meter calibration control for use with McIntosh powered subwoofers. Finally, in addition to the power-cord receptacle and main fuse holder, there's a port for a DB-25 computer-style cable that handles all audio and control links between this amp and McIntosh's new MX130 A/V preamp. Because the MC7205's RCA inputs are all linked to the DB-25 connector, you don't have to use such a cable for system hook-up—just run standard RCA-type interconnects between any manufacturer's A/V preamp and the MC7205, and you'll be fine.

The MC7205 is intended for home theater applications, but as a music lover first and foremost, I used it mainly for two-channel music listening in order to get a handle on its sound. I connected the amp to a pair of Paradigm LCR-350 speakers with 4TC Kimber Kable. The signal source was an NAD 522 CD player, and the system was controlled by an Adcom GTP-500II tuner/preamp. As part of the evaluation, I A/B'd the McIntosh with two other amplifiers I'm intimately familiar with: an Adcom GFA-545II power amp (100 watts per channel into 8 ohms, 150 watts into 4 ohms), which I've used for years, and a Thule Spirit IA 60 integrated amp (60 watts per channel into 8 ohms, 85 watts into 4 ohms) that I've pressed into service in the last six months. I carefully level-matched all of the amps' outputs with an AC voltmeter and a 1-kHz tone from a test CD.

The title track of singer/songwriter/guitarist Stephen Bruton's most recent release, *Nothing but the Truth* (New West), has a lurching, bare-bones arrangement: Guitars, keyboards, drums, and percussion dart in and out of the mix along with Bruton's

reedy vocals. The song's uncluttered, airy feel, coupled with the disc's clean sound, makes it ideal for detecting deficiencies in an audio system or one of its components. With the MC7205 pumping the power, the track's bass guitar was rich and beefy, while Bruton's voice had an appropriate raggedness without being abrasive. With my old



The McIntosh handled taxing transients and killer drumbeats with aplomb.

Adcom, the bass guitar was more blunted and flat, and Bruton's voice had a little undue edge, although the track's crisp transients were maintained. With the Thule amplifier, the bass was wimpy, Bruton's vocals were thin, and the overall presentation lacked punch. "Everything Happens for a Reason," from the same disc, begins with a brutal, hammering guitar riff that the

McIntosh simply nailed. There was no coloration to the off-kilter guitar lead that kicks in at around 2:26, and the furtive trumpet that closely tails the guitar wasn't harsh in the least. The MC7205 reproduced the delicate acoustic guitar and brushed cymbals that start the gorgeous ballad "Against My Will" in precise detail, and I even heard some subtle organ fills at the song's end that I hadn't detected previously. Switching over to the Adcom amp, I noticed that some of the acoustic guitar's subtleties vanished and that the brushed cymbals were too far forward. With the Thule amp, the acoustic guitar was dull and the cymbals hissed. In "Trip Around the Sun," the accuracy and ambience of the reggae-style drums and percussion, as rendered by the McIntosh, were superb. The Adcom gave the big Mac amp competition here: Only the impact of the bass drum was slack, whereas the same track through the Thule made the percussion sound unnatural.

Another disc I listened to repeatedly was Rykodisc's 20-bit-remastered gold CD reissue of the Linda and Richard Thompson classic "breakup" record *Shoot Out the Lights*. Through the McIntosh amp, there was more passion to Richard Thompson's vocals on "Don't Renege on Our Love" than there was through the Thule or the Adcom amp. The track's male background vocals were hauntingly evocative with the McIntosh but distant and detached with the Thule and the Adcom. All three amps did a fine job reproducing Thompson's wiry electric guitar fills on this track, though they were clearly more biting through the MC7205. Linda Thompson's vocals were disappointingly thin on "Just the Motion" with the Thule; the MC7205 captured every nuance. On the title track, the disc's unsettling highlight, the explosive opening chords didn't have the same gut-wrenching punch with the Thule as they did with the McIntosh, and Richard Thompson's vocals were eviscerated. Moreover, the scorched-earth guitar lead that closes out the song sounded hollow through the Thule. But giving it the Mac treatment lent the same guitar lead a nails-on-a-chalkboard urgency and made Thompson's raw-nerve vocals sound more poignant.

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TEST RESULTS

It is almost a truism that a skilled engineer of solid-state circuits should be able to design an amp with ruler-flat frequency response, and the designer of the McIntosh MC7205 has certainly succeeded here. And so consistent is this amp's frequency response, as measured by True Technologies, that it's impossible to pick out the individual curves for the five channels.

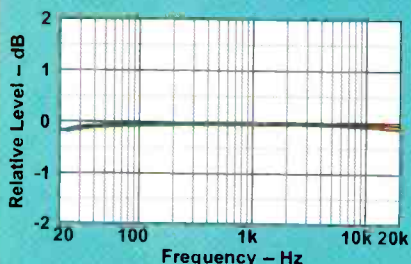


Fig. 1—Frequency response.

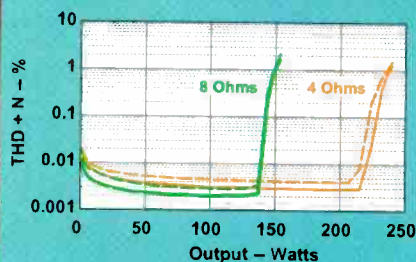


Fig. 2—THD + N vs. output at 1 kHz, best (solid curves) and worst channels.

McIntosh has rated the MC7205 fairly conservatively, as Figs. 2 and 3 make clear. Figure 2 shows total harmonic distortion plus noise (THD + N) versus power for the Mac's best and worst channels. Into 8 ohms, the MC7205 keeps THD nicely below the specified 0.005% up to its maximum output (a little more than 136 watts per channel)—except at the lowest frequencies and power levels, where THD + N in the worst channel (the left front)

Following this vicarious, afternoon-long descent into matrimonial misery, it was time for something more upbeat, and The Mavericks' buoyant *Trampoline* (MCA Nashville) was just the ticket. Through the MC7205, the silky, sultry voice of Raul Malo on "Dance the Night Away" perfectly embodied the tentative swagger of a

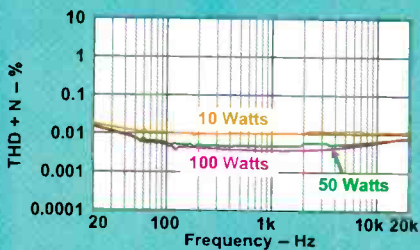
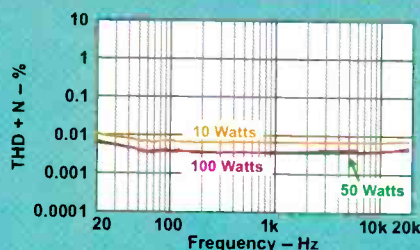


Fig. 3—THD + N vs. frequency, 8-ohm load (A) and 4-ohm load (B).

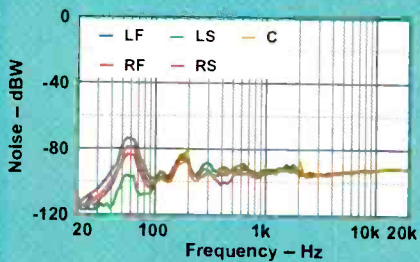


Fig. 4—Noise spectra.

slightly exceeds 0.01% (still very good and probably more noise than distortion). With a 4-ohm load, the amp cranks out at least 212 watts from each of its channels except one, where THD runs a tad higher (0.007%) at maximum (206 watts) and minimum output.

Figure 3 reveals the MC7205's tendency to surpass its rated specifications except at very low frequencies and modest output levels. Into 8-ohm loads (Fig. 3A) and at

spurned lover hitting the town with a vengeance. The tinkling piano in the background sounded authentic but properly subdued, the percussion was distinct, and the high-pitched mariachi-style horns were just a little hot. With the Adcom, Malo's voice was shriller, the piano stuck out inappropriately, and the horns bleated. The

output levels of 50 and 100 watts per channel, the curves hover around 0.004% over much of the spectrum; THD + N exceeds 0.005% only below 30 Hz at 10 watts out. The highest distortion generated by the Mac is an inconsequential 0.01% at 20 Hz at 10 watts. With 4-ohm loads (Fig. 3B) and again at an output of 50 and 100 watts per channel, there is a slight increase in THD + N at 20 kHz (0.008%) and below 100 Hz, where it gradually rises to 0.01% at 40 Hz and edges close to 0.02% at 20 Hz, commendable performance nonetheless. At the modest power level of 10 watts into 4 ohms, where noise represents a larger portion of the output signal, the MC7205 notches a still-negligible 0.01%.

Measurements of the MC7205's noise versus frequency (Fig. 4) indicate that across much of the audible band, all five channels are very quiet; noise is at least 90 dB down from 200 Hz to 20 kHz. That old gremlin, AC line-frequency hum, rears its head at 60 Hz in all channels, the worst case being the left front at -73 dBW—marginally audible, I grant you, but you'll never hear it with music. Although there's a trivial blip at 120 Hz and a larger one at 180 Hz, both are 80 dB down and no cause for worry.

For the record, interchannel crosstalk (not shown) was -55 dB or better over most of the spectrum, increasing to -50 dB at 18 kHz. Could be a mite better, I suppose, but putting five discrete amplifiers into one box does impose some limitations.

Overall, the MC7205 lives up to its impressive technical heritage (as well it should; after all, we're talking \$500 short of five grand here). Hey, Mac, nicely engineered.—Alan Lofft

track sounded lifeless on the Thule. The opening of the bluesy "Tell Me Why" had solid oomph with the McIntosh amp driving it, and transients were smooth. Malo's wailing voice came through extremely clearly and was well separated from the rest of the mix. With the Adcom providing the power, it seemed as if there were a thin film-

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covering Malo's vocals, and there was less impact on the tough transients in the opening. "Fool #1" is a dreamy, sophisticated ballad that showcases Malo's Orbison-like vocals. When I listened to the song through the McIntosh, I felt as though I could have been sitting in a swank lounge, martini in hand, rather than in my detritus-strewn living room with my cat attacking my pen as I took notes. Malo's voice wasn't quite the velvet caress that it should have been, but it was pretty close. The instruments—piano, acoustic guitar, vibes, and strings—were not far off the mark, either. The Adcom mustered a very competitive presentation, though the strings seemed a bit unnatural. With the Thule amp, the strings sounded canned and Malo's voice had a nasally tone.

A taxing test of dynamics is *Trampoline's* "Save a Prayer," a coolly campy track that recalls Vegas-era Elvis. A vigorous acoustic guitar kick-starts things after a melodramatic intro; it sounded realistic through the McIntosh. Malo's gospel-tinged vocals were convincing, as was the James Burton-style guitar lead about 2 minutes into the song. The soundstage seemed constricted and the instruments blended together on both the Adcom and Thule amps. With the Thule, in particular, the horns hissed, and the Burtonesque guitar sounded as though it were being played on a jukebox.

Two more discs I listened to extensively with the McIntosh MC7205 were Mobile Fidelity Sound Labs' Ultradisc version of Keith Richards' *Talk Is Cheap* and Harry Connick, Jr.'s *She* (Columbia). On *Talk*, Bootsy Collins' bass on "Big Enough" bubbled through the mix unlike I'd ever heard it do before, and the way the blasts from the Memphis Horns jumped out of the speakers on "Make No Mistake" was startlingly real. Connick's homage to the music of his hometown of New Orleans on *She* is loaded with killer drumbeats and amplifier-taxing transients, and the McIntosh handled almost all of them with aplomb.

The McIntosh MC7205 overcame nearly every challenge I threw at it with authority, and it sounded far better than the two amps I compared it to (with which I previously had had no major gripes). The Mac has found a home as my new reference amplifier, and it has slaked my thirst for pure audio power. **A**

KLIPSCH, continued from page 52

performance of the Klipsch CF-3 speaker I reviewed in the July 1995 issue, which was quite harsh on vocals. The CF-3, however, used a true compression driver rather than a horn-loaded dome tweeter and had quite rough treble response.) The guitar and bass on the Janis Ian track sounded very lively and dynamic, with smooth, solid bass response. The RP-3s also did a very nice job on the horns in *The Age of Swing, Volume 1* by the BBC Big Band (one of my favorites, from Bainbridge). They preserved the bite, blat, and clean intensity of the trumpets on track 7 quite faithfully. And the acoustic guitars on track 1 of *Gypsy Passion, New Flamenco* (a very nice audiophile sampler on the Narada label) came through with ease and clarity and solid stereo imaging. Particularly satisfying was the RP-3s' performance on solo piano, where the sharp key hits of the concert grand were reproduced with much gusto and realism, and they seemed equally at home with orchestral music.

I listened briefly to the RB-5 bookshelf speakers set up alongside the RP-3s. Except for the low end, it was quite hard to tell the systems apart on direct A/B! Aside from the RB-5's slight low-frequency rolloff, their tonal balance and overall characteristics were extremely close. The RB-5s performed significantly better than the RP-3s on the pink-noise stand-up/sit-down test, however, with the RP-3s producing quite noticeable upper-midrange tonal changes on stand-up. The RB-5 would make an excellent high-efficiency satellite for use with a good subwoofer.

The Klipsch Reference Series loudspeakers proved to be very solid performers in both my stereo listening room and my home theater. Their copper-colored metal-cone woofers and horn-loaded tweeters have a very distinctive look that should fit well in a high-tech environment. The RP-3 tower's bass amp and side-mounted subwoofer provide much-needed control of the system's low-frequency output, making it easier to match a variety of rooms. In many setups, a stand-alone subwoofer will not be required. And the Reference Series' competitive pricing is an added plus. Definitely recommended. **A**

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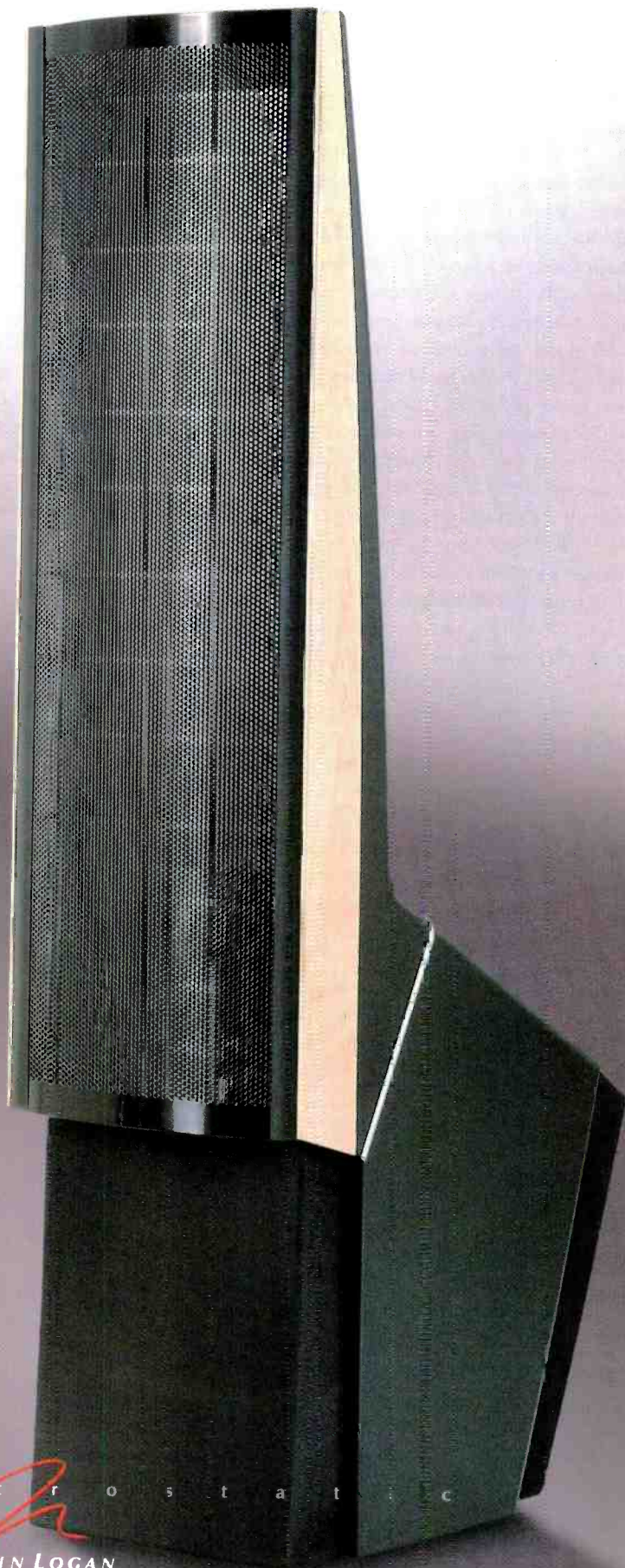
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Tact Audio RCS 2.2

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Photos: Michael Groen

It isn't often I get to review a component with the potential to spark revolutionary change in the audio world, but the Tact RCS 2.2 may. Although it might look like just another piece of high-end electronics (actually, it's identical to the NAD 2.2, which Tact makes for NAD), this particular box contains the equivalent of several audio components: an analog and digital preamp, a digital room-measurement and room-correction processor, a digital equalizer, and an electronic crossover. It comes with a calibrated microphone, software, and a remote control. However, you do need a Windows-based PC for setup and calibration.

Considered as a preamp, the RCS 2.2 has a 252-step level and balance control and

will switch between one analog stereo input (RCA coaxial or balanced XLR) and three digital inputs (RCA coaxial, balanced XLR, and Toslink optical). There are conventional analog RCA and balanced XLR outputs

TACT AUDIO

Rated Distortion: 0.003% THD + noise at 1 kHz.

Dimensions: 17¼ in. W x 4 in. H x 14½ in. D (43.8 cm x 10.2 cm x 36.8 cm).

Weight: 19 lbs. (8.6 kg).

Price: \$4,900.

Company Address: 201 Gates Rd., Unit G, Little Ferry, N.J. 07643; 201/440-9300; www.tactaudio.com.

and separate RCA and balanced XLR stereo subwoofer outputs. Hence the RCS 2.2 can serve as the preamp in a simple audio system with one analog and several digital sources. However, you can also insert it between a preamp and power amp or, to correct only selected sources, install it ahead of the preamp.

The Tact 2.2 provides full A/D and D/A conversion and has a specified signal-to-noise ratio and dynamic range of 104 dB. It uses a 20-bit, 64-times-oversampling delta-sigma A/D converter and a 20-bit sign-magnitude delta-sigma D/A converter.

The 2.2 can perform Fast Fourier Transform (FFT) room-response measurements with what Tact claims is greater accuracy and less noise than any dedicated instrument extant. Its automatic equalization circuitry corrects room anomalies and frequency response errors in the main speakers and a subwoofer. It will also function with bi-amped setups and perform time compensation of the main and surround channels to within 6 millimeters. You can store different automatic room-correction settings or manually corrected curves in the twelve memories.

The automatic equalization circuitry works by first performing a room impulse-response measurement. The filter algorithms in the RCS 2.2 then invert the room response to yield a mirror image of the room's unwanted contribution. The inverted signal flattens the audio system's in-room response to match a target curve chosen from a library in the RCS 2.2 or an EQ curve you have manually defined.

Tact claims this approach to digital room correction is far more accurate than using traditional graphic or parametric EQ and even surpasses the performance of so-called digital or computer-controlled systems. The company states that such devices offer comparatively limited room-correction aptitude and power. Further, many of them impose time-domain artifacts or introduce

distortion products that negate the benefits conferred by the equalization.

The RCS 2.2 can serve as an extremely versatile electronic crossover, with filter slopes on tap as steep as 60 dB per octave and selectable crossover frequencies. The Tact will automatically align low- and high-pass filters to achieve a smooth transition between a woofer and subwoofer. Its very steep crossover slopes are said to lower midband distortion products in subwoofer systems, sometimes by as much as 15 to 20 dB. And because the excursion of the woofers in the main speakers is typically reduced by 50% to 70%, there is said to be a comparable reduction in Doppler distortion. Tact asserts that the 2.2 can provide up to 6 dB more output capability with small speakers because the crossover slopes are so steep. A further benefit claimed for steep filter slopes is a half-octave reduction in the optimum crossover frequency.

Tact Audio claims that because the RCS 2.2 corrects the frequency response in the main speakers and in the subwoofer and then does time compensation, it is possible to achieve the best blend between the main speakers and the subwoofer. Even if the subwoofer is placed as far as 20 feet behind the satellites, it will still be correctly time-compensated, says the company.

The RCS 2.2 is said to improve stereo imaging. In a normal listening room, the imbalance between left and right speakers

can be as great as 20 dB at some frequencies from 30 to 500 Hz, caused mainly by room modes and reflections. This produces a blurring of the image and is particularly noticeable on male vocals. The RCS 2.2 is said to eliminate this blurring. Tact also claims that the RCS 2.2 minimizes the impact of most early reflections and improves the perception of soundstage depth and width. Whole layers of garbage are said to be expunged from the reproduced sound, to the extent that the listening room's influence seems to have been eliminated.

Despite its complex mix of functions, the RCS 2.2 is simple to operate.

Finally, Tact contends that the adjustable response curves stored in the RCS 2.2's twelve memories allow you to get better sound for home theater and stereo music because it's almost impossible for a single set of sonic characteristics to be equally suited to both applications.

Despite its complex operational mix, the RCS 2.2 is surprisingly simple to use. Four 66-MHz Motorola DSP engines power the 2.2's various functions, which lets it run highly automated, user-friendly software.

(The software applies a proprietary correction algorithm whose resolution is said to vary from 0.6 Hz at low frequencies to 300 Hz at the very highest frequencies.) If you can do Windows, you can operate the RCS 2.2. On a modern IBM-type PC, you can perform some functions simply by pointing and

clicking and adjust the rest through a graphic interface that gives step-by-step instructions on your PC's screen.

Ease of operation is one thing; the real test of the RCS 2.2 is what it sounds like.

To be frank, it's good but not miraculous. Auditioned as a preamplifier or D/A converter, the 2.2 lacked the neutrality of the best processors and preamps. When I used it without any equalization, there was a slight loss of harmonic sweetness and detail and a slight touch of hardness. Some high-end reference components handled dynamic contrasts and deep bass more effectively, though the sound of the Tact was never less than very good in these respects. Because slight degradation was noticeable whether or not the A/D converter was employed and was present on all inputs and outputs, I have to assume it was introduced elsewhere in the circuitry.

These anomalies are small but will likely be apparent on any fine audio system. In A/B listening comparisons of the RCS 2.2 with Krell, Mark Levinson, Pass Labs, and Theta Digital preamps and D/A converters, my sons picked up the RCS 2.2's blemishes immediately.

The software is relatively easy to operate and the system is highly automated, yet in no sense is the RCS 2.2 a plug-and-play processor that instantly delivers best results. However, the Tact's automation does enable it to instantly help rooms or speakers beset with significant acoustical problems. So long as you use common sense in operating the 2.2, you can point and click your way into correcting gross sonic problems that no amount of conventional EQ, room treatment, or experimentation with speaker placement is likely to fix.

To test its automated room-correction and time-compensation abilities, I deliberately used the Tact RCS 2.2 with second-rate speakers in a boomy-sounding room of my house and in a dry-sounding one. I got immediate benefits in both. Granted, the RCS 2.2 cannot transform a bad or mediocre speaker system or speaker/room combination. But it does deliver on many of Tact's claims and can come awfully close to making a sow's ear into something approximating a silk purse.

The RCS 2.2 corrected for bass boom and bass suckouts. It eliminated frequency response spikes and peaks and improved imaging and clarity when the speakers were poorly placed or improperly time-compensated. The sound was generally clearer and

A calibrated measurement microphone and setup software are supplied with Tact Audio's RCS 2.2.



Pioneer



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more transparent, although the 2.2 sometimes equalized a speaker to the point where it couldn't handle the boosted frequencies and distorted.

Be aware that removing the euphonic colorations from some mediocre speakers is not always a blessing. Nevertheless, the Tact RCS 2.2 is likely to be a godsend to any audiophile who has major room anomalies or speaker placement difficulties. But if you already have a fine audio system and a good listening room and you try to use the RCS 2.2 to make your system sound even better, you must accept the colorations that it introduces. When I used really good components and excellent speakers—such as B&W's Nautilus 801, Dunlavy's SC-V, Quad's ESL-63, and Thiel's CS7.2—I didn't find that the Tact's room-correction abilities worked miracles in my listening rooms. I often preferred a combination of other D/A converters and preamps, without room equalization functions, to the 2.2. I made these comparisons in relatively dead, although untreated, listening rooms. I used a third-octave real-time analyzer to get relatively flat frequency response. I aligned the speakers with a laser to ensure they all had the same toe-in relative to the listening position and measured how far each speaker was from that spot to take maximum ad-

vantage of its intrinsic time compensation. Simply put, however, digital room EQ and time compensation did not always improve the sound. The bass from the RCS 2.2 was different but not particularly cleaner and tighter.

In my testing, I happened to discover a glaring problem in Tact Audio's setup instructions. The owner's manual for the RCS 2.2 contains no hints about where to place the measurement microphone, and small changes in microphone positioning can produce large changes in the 2.2's response measurements, equalization, and sound quality. If you are anywhere near a room boundary, with concomitant standing waves in the bass region,

the low-frequency correction the 2.2 produces may be audibly wrong. You may find that a correction made for one listening position at one volume level may sound fine

The Tact RCS 2.2 is good at correcting serious room and speaker problems.

but be quite inappropriate for other listening positions and other levels. The instructions explain how to use automatic averaging to take measurements from a variety of different microphone locations, but there are no suggestions as to which locations might produce the most accurate correction. I had to experiment at length to get the best subjective results and then had to check my results with an RTA to ensure that the equalization imposed by the 2.2 was accurate, not simply euphonic.

Finding the best approach to averaging the results from the measurement microphone proved to be an artistic exercise that changed slightly with each of the three listening rooms and audio systems I used. I found that placing the microphone near the

main listening seat and then averaging the results worked better than spreading out the mike positions to try to optimize the equalization for a wide listening area.

Another thing the instructions don't make clear is how to set the RCS 2.2 to minimize the effect of room reflections. This requires a fairly simple set of manual adjustments that affect delay. However, you can't just click on the automatic setup routine and expect to get great results. A call to the company was more helpful than the minimal guidance in the manual.

Although instructions are provided, I was somewhat annoyed to discover that I had to manually set deep-bass curves of subwoofers and speakers to account for their output limits. The standard equalization curve that the RCS 2.2's software automatically applies may simply be too much and thus overdrive a woofer, or it may not take full advantage of a bass driver's lowest frequencies. In other words, you need to tailor the RCS 2.2 to your particular speakers' behavior, not use nominal settings based on a driver's size.

Some of the "target curves" for midrange and treble built into the Tact's automated equalization and room-correction software produce a slope in the midrange followed by a rolloff in the treble. Some compensation of this kind is vital, because setting the RCS 2.2 to produce flat upper-octave response at the listening position results in overly bright and hard-edged sound. Although the 2.2 does not equalize speakers to yield flat room response, it does apply an EQ curve that Tact believes supplies the best subjective response at the listening position. But you may well find a slightly different set of equalization adjustments is desirable. The 2.2 makes such adjustments remarkably easy if you alter the frequency response of the target curves; however, the manual gives little guidance on how to make them. It takes time and experimentation editing the target curves to learn what to do.

Incidentally, Tact Audio's Web site has some good information that is not in the manual plus some information I did not find helpful. The Web page advises against using the RCS 2.2 in highly treated rooms and says that it works best when speakers

are not toed in toward the listener and when they are fairly widely separated—all true. The Web page also advises that the speakers can be moved closer to the wall behind them and that the RCS 2.2 will:

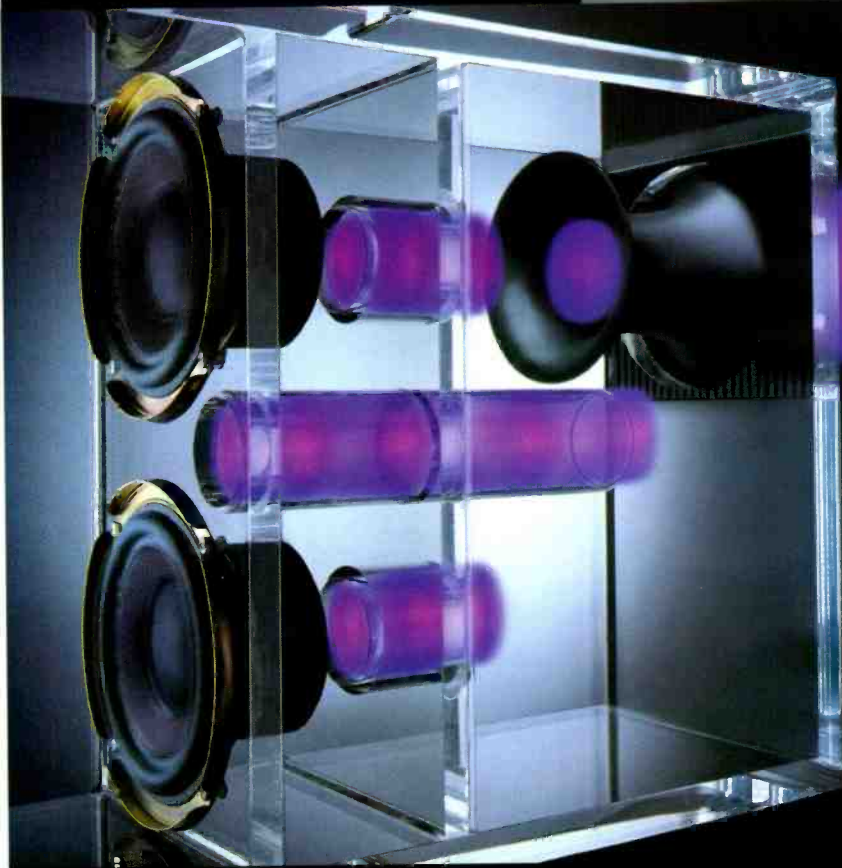
... couple the speaker better to the room and give a lift in the bass region. When this lift is cut back with the RCS, you will have the benefit of overall higher headroom and less distortion—simply because any given amount of power sent to the speaker will result in higher output. But even more important: The room amplification due to the speaker placement will come quicker, giving a better impulse response. In most cases the overall improvement once the RCS is engaged will be staggering.

Well, I felt that the sound I got from acting on this advice wasn't particularly staggering. At times, it even reduced soundstage depth.

The RCS 2.2 is truly a new type of audio component and is far more interactive than most. It is important that you understand its advantages and drawbacks. Though its sound quality wasn't excellent, it was very good. It did a good job correcting serious room and speaker problems and will likely be a real lifesaver for problem systems. And though it may be difficult to fine-tune the RCS 2.2's operation, the Tact people are some of the nicest I have worked with in getting technical advice. Some of the difficulties I had may simply have resulted from the 2.2's innovative characteristics. It does so much that is new and exciting that it's unreasonable to expect the first iteration to be perfect ergonomically or behaviorally. In fact, Tact has a less expensive, second-generation model on the way that I will review in a future issue.

You probably won't face the setup problems I encountered. Dealers who sell the Tact RCS 2.2 will learn very quickly how to set it up and should be able to communicate that expertise to you, serving as a continuing source of advice after installation. This is clearly a case where good dealer service is going to be more important than a discount. **A**

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KEN KESSLER

Wilson Audio WATT/Puppy 6 Speaker System



Photos: Michael Groen

Most audio products top out at Mk II or maybe Mk III. Why? Because it's almost a given that we have short attention spans and must be treated to a continual flood of novelties. Long gone are the days when a company could keep a model in its line, virtually unchanged, for a decade or more. But the WATT/Puppy's sheer greatness gives this four-piece speaker combo staying power, and Wilson Audio Specialties is almost forced to upgrade it

every three or four years just to satisfy customer curiosity. If you want an analogy with a non-audio classic, it would be the Porsche 911, a car that refuses to die.

The WATT/Puppy combo is relatively young, however, so it has a way to go before it qualifies as a fixture in the hi-fi firmament. Amusingly, it started out as a one-off near-field monitor for David Wilson's personal use, when he was overseeing the recording of releases for his own label. But as word leaked out into the high-end com-

munity that he had made something special, something less costly and more domestically acceptable than the mighty WAMM, Wilson's friends and colleagues all but forced him into making the WATT a production loudspeaker. He relented, launching the WATT (Wilson Audio Tiny Tot) in January 1986, at the Consumer Electronics Show in Las Vegas.

The WATT was an instant hit, despite its professional monitor voicing that flew in the face of euphony. No one could argue with this approach, however, because the speaker had been developed as a studio tool. It was exactly what Wilson required for close listening: unforgiving, nakedly transparent, wickedly detailed. It boasted a hot seat so clearly defined that it became a symbol of hermitic listening. And it was bass-shy, despite the addition of an ugly bolt-on "beard"—a panel that extended the baffle downward to increase low-end output.

To satisfy the demand for improved bass, Wilson Audio introduced a precisely matched subwoofer, the Puppy, at CES in 1988. The WATT/Puppy combination rapidly became a high-end reference system. To this day, it is copied so slavishly that some of its competitors should be ashamed of themselves. Does a truncated pyramid sit-

WILSON AUDIO

Rated Frequency Response: 23 Hz to 22 kHz, ± 3 dB.

Rated Nominal Impedance: 4 ohms.

Rated Sensitivity: 92 dB at 1 watt/1 meter.

Recommended Minimum Amplifier Power: 7 watts/channel.

Overall Dimensions: 40 in. H x 12 in. W x 18½ in. D (101.6 cm x 30.5 cm x 47 cm).

Weight: Overall, 324 lbs. (147.2 kg); WATT 6, approximately 65 lbs. (29.5 kg) each; Puppy 6, approximately 97 lbs. (44.1 kg) each.

Prices: Four-piece system, \$19,900; WATT 6, \$9,300 per pair; Puppy 6, \$10,600 per pair.

Company Address: 2233 Mountain Vista Lane, Provo, Utah 84606; 801/377-2233; www.wilsonaudio.com.

TEST RESULTS

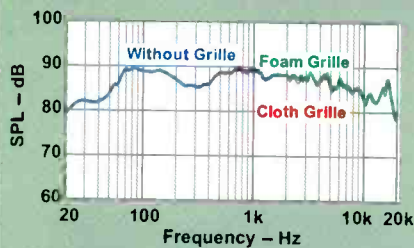


Fig. 1—Frequency response.

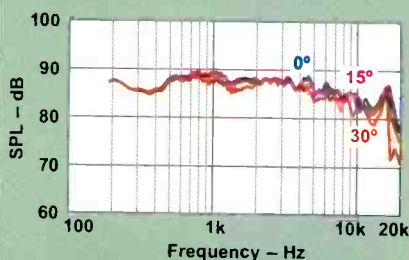


Fig. 2—Horizontal off-axis responses.

Wilson Audio's WATT/Puppy 6 isn't an easy speaker to test, both because it's heavy and because its two pieces can be adjusted in a dauntingly large number of ways, even if most of the relevant adjustments are minute. The system's frequency response in Fig. 1 is fairly flat, but it took True Technologies hours of adjustment to achieve it. (The peak at about 17 kHz, probably a tweeter resonance, is unlikely to be heard because of its high frequency and fairly high Q.) Note how remarkably small a difference either type of grille makes.

The horizontal off-axis responses (Fig. 2) are presented for only one side of the speaker, as the other side yielded the same results. These curves are very close together and all very similar to those in Fig. 1.

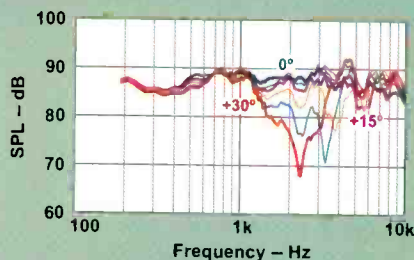


Fig. 3—Response above axis (A) and below (B).

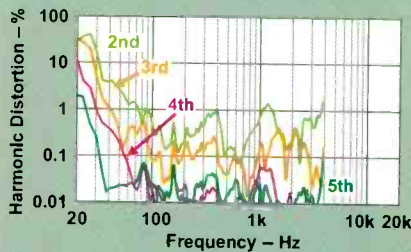
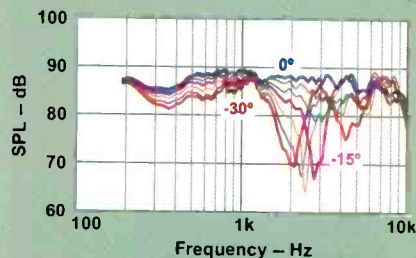


Fig. 4—Harmonic distortion.

Not so, however, the vertical off-axis responses. Comparing response above axis (Fig. 3A) and below it (Fig. 3B) indicates that a lot of the WATT's energy is directed at the ceiling. The crossover, apparently a low-order type, spreads a lot of high-frequency energy above and below the axis; to avoid room reflections, it might be better to have this energy taper off gradually as angle increases.



Fig. 5—Impedance magnitude (A) and phase (B).

Where the Wilson WATT/Puppy 6 turns in solid performance is in its low distortion, measured at 100 dB SPL (Fig. 4), and its well-controlled impedance (Fig. 5). The impedance magnitude (Fig. 5A) is remarkably flat, suggesting the presence of some very good compensation networks. Calling this a 4-ohm speaker is a bit of a stretch, as its impedance dips to 2 ohms (the IEC standard allows a minimum impedance of at least 80% of the rated value). However, the impedance variation is almost negligible, ranging from 2 to 7.2 ohms in the bass (and, although you can't see it in the graph, to 8.7 ohms at 20 kHz). The impedance phase curve (Fig. 5B) is also unusually smooth. The WATT/Puppy 6 should therefore not be very difficult to drive.—Ivan Berger

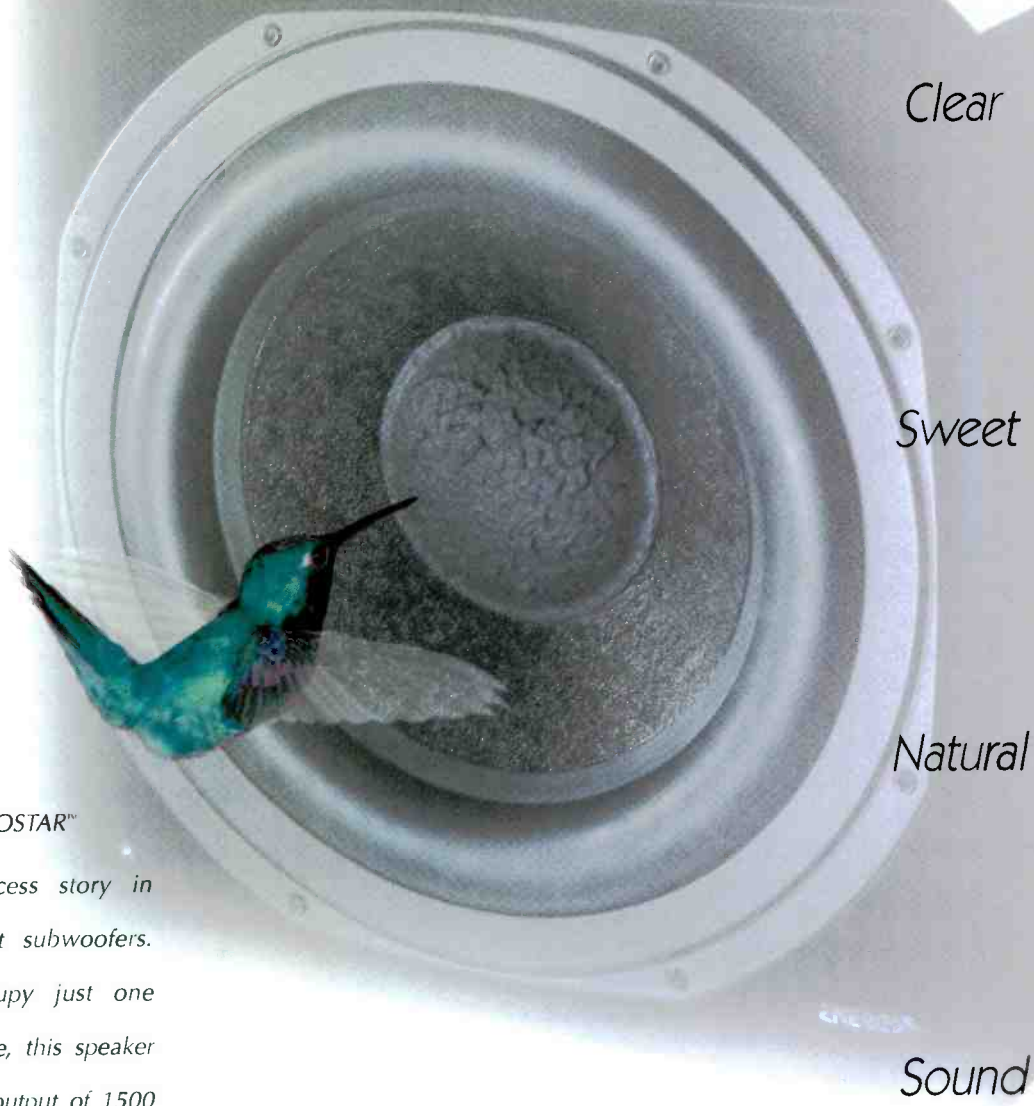
ting on top of a slim woofer enclosure sound familiar? I won't name the most famous ripoff artists, for it would humiliate them too much—especially those who dismissed Dave Wilson as an *arriviste*. But they know who they are. And they should be sending royalties to Provo.

Prior to the arrival of the "6," WATT/Puppy owners could, for a nominal fee, upgrade their systems to the next version. In

the main, the changes—such as refinements in the crossovers and improved drivers—could be fitted in the field. In the last incarnation, because Wilson Audio modified the enclosures, upgrades had to be made at the factory. With the 6, the changes are so extensive that older WATTs and Puppies cannot be converted.

Wilson Audio should not be criticized for this. I mean, will Porsche turn a 1999

Boxster into a 2000 Boxster S for a nominal fee? I think not. And a Porsche costs way more than a pair of WATT/Puppies. What Wilson does—as does every other audio manufacturer with modular or upgradable models—is anathema in the world of luxury consumables. We should be grateful that the company let the WATT/Puppy upgrade path run for a dozen years instead of trying to milk the replacement market.



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What Wilson Audio has retained are the drivers, the 1-inch inverted titanium dome tweeter and 7-inch polymer cone in each WATT and the two 8-inch polymer woofers in each Puppy. Here's what makes the new WATT/Puppy 6, er, new:

- It is slightly larger, though you'd notice it only if you positioned the 6 alongside a WATT/Puppy 5.1 or earlier version. The larger Puppy 6 cabinet allows the system's rated frequency response to extend down to 23 Hz with the same drivers as the 5.1. (Room volume and boundary interaction, of course, will affect the response.)

- Its new enclosure materials, first developed for the Wilson MAXX, are said to reduce the old Puppy's cabinet resonance by half. A new bottom plate in the WATT is made of "enhanced" materials to reduce cabinet resonance; the plate also provides easy access to the crossover for servicing (and eventual upgrading).

- Its design benefits from Phase Delay Correction (PDC), an enclosure positioning technique whereby the WATT can be tilted on top of the Puppy via alignment spikes and a decoupling plate to improve time coherence. PDC, which Wilson Audio has used in the MAXX, WAMM, and SLAMM, provides greater flexibility in tuning the system to your room. Proper installation by a Wilson dealer will result in such precise setup, aimed at the primary listening position, that you'll want to mark the floors and keep a record of the WATT's tilt angle should you ever need to move the speakers, say, for spring cleaning.

- The new binding posts, designed by Wilson Audio, are easier to use than the WBT-made terminals on the WATT/Puppy 5.1. The company claims improved "overall evenness" at crossover frequencies.

- All WATT/Puppy 6 systems have a gloss finish, which had been an option on the earlier systems, whose standard finish was a laminate. Also new are some wild colors; shades of metallic burgundy, forest green, and a champagne-y bronze are among the best-looking.

- An edge on the Puppy's top surface now "traps" the WATT, preventing the "Wilson WATT shuffle" so familiar to owners who wondered how such a heavy speaker could shift out of alignment. Further, a

massive spike at the back, between WATT and Puppy, also helps keep the former locked in place.

- Wilson now offers a cloth grille on a rigid frame (made from X-1 material) for those who can't stomach the cheesy and ugly reticulated foam grille. David Wilson, however, is quick to point out that the foam "sounds better."

At this point, I should mention pricing. The four-piece WATT/Puppy 6 sells for \$19,900. If you deduct \$1,100 for the 5.1's premium gloss finish, then the increase is only \$1,300. And that \$1,300 pays for a better-built, better-looking, better-sounding

This speaker combo is like having the listening tool of my dreams suddenly materialize.

system. The 6 is so far superior to its predecessor that I have to wonder how Wilson did it. Given that the WATT/Puppy 5.1 was launched about five years ago, inflation alone would account for the increase *without the improvements*.

Having used WATT/Puppies through most of the '90s, I've been privileged to chart the changes and watch this system evolve from what was purely a listening tool with no concessions to home audio into something far more user-friendly. The difference between the sound of early WATT/Puppies and conventional speakers was akin to the difference between what you hear on raw master tapes and what comes off of a CD or an LP. It's best described as warts 'n' all, aggressive, in-your-face. The progression from the original WATT/Puppy to the 6 has been steady, and Wilson has managed to retain all of the system's analytical properties while eliminating concomitant listener-fatigue-inducing edge. I know this sounds like a contradiction of all that is valued in audio—a reduction of distortion, zero coloration, and total accuracy *über alles*—but there's a fine line between the raw-and-undiluted and the pleasurable. To my ears, every WATT/Pup-

py upgrade has meant a larger hot seat, a sweeter top end, a less aggressive sound, and a higher pleasure quotient.

The WATT/Puppy 6 is nicer, easier to use, and more domestically acceptable in every way. For starters, it *is* better-looking, though hardly a threat to, say, Martin-Logan. It is still one of the most sensitive systems in its class, with a spec of 92 dB for 1 watt. And it is ridiculously compact, considering it's capable of filling a room to ear-bursting levels: 40 inches tall, with a footprint just 12 inches wide and 18½ inches deep. But the small size doesn't mean you should squeeze the WATT/Puppy into a small room, for it thrives where there's at least 3 feet of space to its side and behind it. I was even leery of using this combo in my main listening room, which is 12 x 18 feet, but a setup magician had the Wilsons optimized within 90 minutes, remarking that they "loved" the room.

As the WATT connects to the Puppy by a "tail" made by Transparent, I used Transparent Ultra speaker wire and interconnects throughout. The Wilsons were driven by Musical Fidelity's sublime Nu-Vista pre-amp and Nu-Vista 300 amp for high-power usage and Unison Research's single-ended Smart 845 for low-power. Among the program sources were a Linn LP-12 Anniversary turntable with an Ekos arm and Arkiv phono cartridge and Krell KAV-300cd and Marantz CD12/DA12 CD players. Although I'd heard the 6 at a couple of hi-fi shows and at the factory, I wasn't prepared for the full impact of the changes.

It's like this: I'm a midrange kinda guy, who cherishes vocals above all else. I want to hear the laughter in Louis Prima's voice, I want to wallow in that guttural sluttiness Bonnie Raitt can spit out when she's in full-tilt boogie mode, I want to shake in my boots when Aretha shouts "You better think," and I want to smell the vino when Dino sings, "There'll be grinning and mandolin-ing." Moreover, I want three dimensions. I want seamlessness and consistency. I want speed and impact. And I want it in a speaker slightly smaller than a walk-in fridge.

Life being full of compromises, I satisfy these needs with a mix of speakers, generally turning to Quad electrostatics for open-



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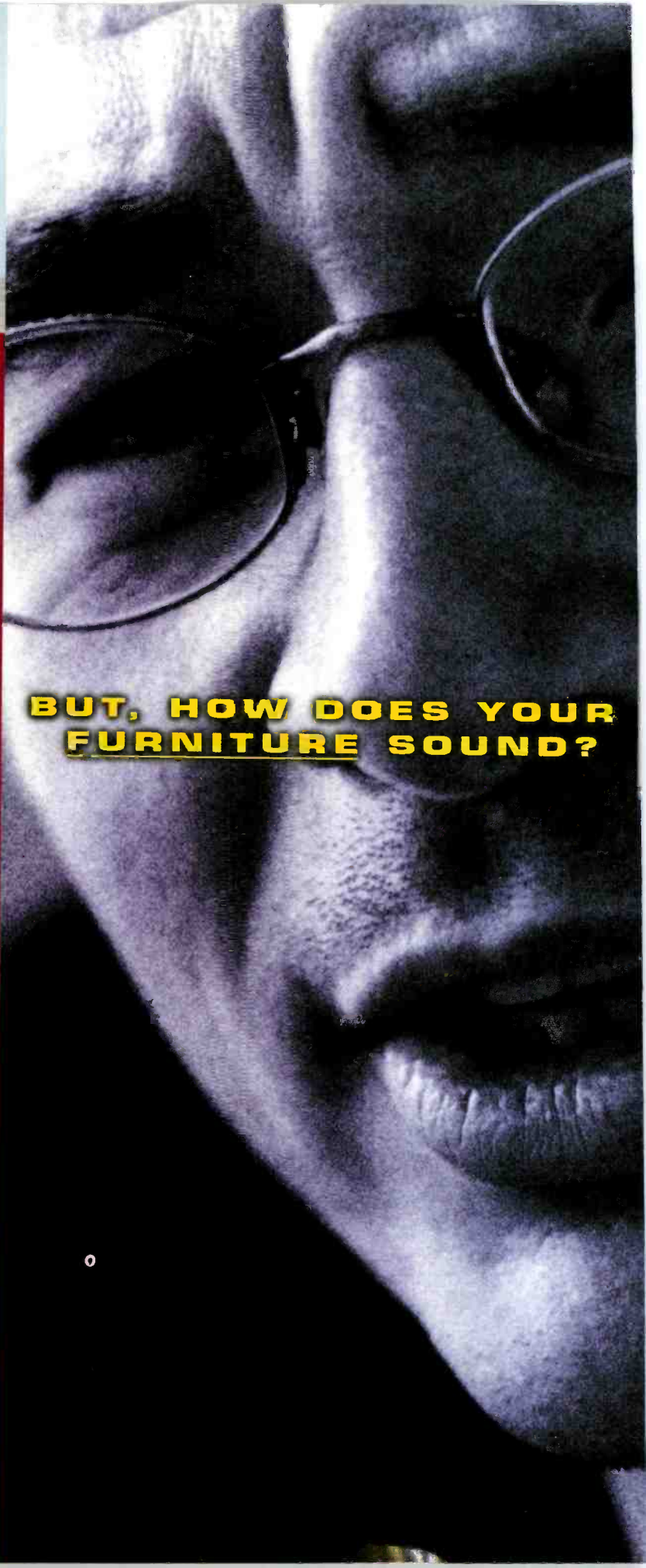
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All WATT/Puppy 6 systems have a gloss finish and new, easy-to-use binding posts.



The Puppy 6 cabinet is larger, allowing bass response to extend down to 23 Hz.

ness, Martin-Logans for delicacy, and Sonus Faber Guarneris for pure finesse, class, and refinement. But to find both the graceful and the kick-ass in one package, to enjoy both the overall seduction of the sound itself and the minuscule nuances required of all reviewers, is like having the listening tool of your dreams suddenly materialize.

I can't put it any better than did a visitor, who—like many—has always respected the WATT/Puppy without actually liking it, let alone loving it. First, he said he was amazed that the hot seat had gotten even larger, almost a contradiction for a speaker designed to be set up to the millimeter. Second, he was amazed that the hyper-crispness of the earlier vintages had vanished, replaced with a silkiness that bordered on the lewd. I concur.

To describe a WATT/Puppy system as “warm” or “rich” seems as weird as calling a rap artist “genteel.” But, lo and behold, with the WATT/Puppy 6, Wilson Audio has shifted the system's *raison d'être* even fur-

ther toward sheer musicality than it did with the System 5—and that version represented a bigger leap toward “listenability” than any other in the speaker's history. The sound is bigger than before, which I suspect is a direct result of the greater precision with which the speakers can be aligned, and the scale is accompanied by truly breathtaking stage depth. Better still, the WATT/Puppy 6 possesses a greater sense of ease (or maybe an absence of strain), regardless of which amplifier I use to drive it—300 watts from the Nu-Vista or 30 watts from a single 845 tube. But perhaps the greatest selling point of the WATT/Puppy 6, what marks it as a speaker for the 21st century, is its extended, fast, crisp, and chunky bass. This is an asset prized above all others in today's market.

And does the Wilson system deliver those vocal charms I so crave? In spades. In fact, I suggest that dealers demonstrate it with the DCC version of Bonnie Raitt's *Nick of Time*

if they prefer to seduce rather than cajole. Start with “Have a Heart,” and watch the listener melt.

In the WATT/Puppy 6, we have a high-end speaker for all sorts of music lovers. It's quite a departure from the earlier incarnations, which were aimed toward purists, designers, and reviewers. The new system is as at home with tweaky tubes as it is with A/V, handling the fragility of The Corrs' voices and the industrial thrashing of Nine Inch Nails equally well. I suspect this is the most balanced and *practical* speaker Wilson has yet produced (not least because the WAMM 7.1 costs six figures and needs a room that could serve as a conference center).

There's an upside for those who can't afford Wilson Audio's WATT/Puppy 6: the anticipated flood of still-awesome WATT/Puppy 5.1s on the secondhand market. But the WATT/Puppy 6? It's no accident that this combo has come of age as it reaches its Bar Mitzvah. **A**



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PAUL TATARA

Hewlett-Packard CD-Writer Music CD-R/RW Burner

In the same way that some guys are Buick men or Scotch drinkers, I've always been a compilation tape maker. I'd estimate that I've made 27,243 tapes since my junior year in high school, which breaks down to a cool 1,433.8 tapes per year, or 3.92 tapes per day for 19 years. I've made 'em all, and made 'em several times over—live Springsteen, studio Springsteen, electric Neil Young, acoustic Neil Young, surf guitar, be-bop saxophone, Elvis Costello B-sides, early Beatles, late Beatles, loud Velvet Underground, quiet Velvet Underground, solo Lennon vs. solo McCartney, Dylan vs. Sinatra (a failed experiment), Monk vs. Miles, Hank Williams vs. Mothra. It boggles the mind.

Photo: Michael Groen

By now, making tapes to generate a particular vibe is a worldwide phenomenon (see Nick Hornby's novel *High Fidelity* for the British details), so the introduction of the CD burner is bound to split people into factions. Some folks, especially those whose idea of a good time is to dig through dusty bins for old-fashioned vinyl, may prefer the low-tech portability of an audio cassette; it's somehow comforting to slip the finished product in your back pocket or to be able to lose it under the front seat of your car ten minutes after you've recorded it. On the other hand, there's a certain space-age allure to a shiny CD full of whatever ridiculous conglomeration of music you care to put on it.

Remember when you played your very first game of Pong over at the bowling alley? How startled you were to actually *manipulate the images on a TV screen* with a mere flick of your wrist? That's kinda how it feels when you burn your first CD. Losing your self-recorded digital virginity is a gas. But today's CD burners are surely the *blip-blip-blip* that'll give way to Ms. Pac Man, blood-spewing decapitations, and caterwauling banshees. Remember, some pathetic shmuck got excited when he invented the 8-track tape.

A shiny CD, full of whatever music you've decided to put on it, has a certain space-age allure.

Nowadays, two kinds of CD burners are on the market. Free-standing CD recorders hook right up to your CD player, just like a tape machine. That's fine if all you're into is dubbing music, but the drawback is that you have to shell out for slightly more expensive blank discs. (The music industry, always on the lookout for revenue poachers, gets a cut when you make letter-perfect copies of its product this way.) The other type of burner is an addition to your computer that's also capable of backing up your hard drive and storing MP3 files you've downloaded off the Internet. Burners really are nifty little gadgets, and one of the niftiest is CD-Writer Music, from the friendly folks at Hewlett-Packard.

HEWLETT-PACKARD

Transfer Rate: Writing, up to four-times normal speed (600 kilobytes/second) to CD-R or CD-RW; reading, up to six-times normal speed (900 kilobytes/second).

Dimensions: 2½ in. H x 7 in. W x 11 in. D (6.4 cm x 17.8 cm x 27.9 cm).

Weight: 4.6 lbs. (2.1 kg).

Estimated Selling Price: \$299.

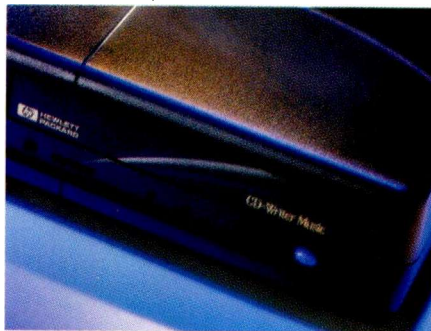
Company Address: 3000 Hanover St., Palo Alto, Cal. 94304; 800/826-4111; www.hpcdwriter.com.

CD-Writer Music is a small, unassuming device. Surprisingly, there's no power switch; it's designed to stay on all the time. The only button is a little purple job that summons forth the CD tray. Once you hook the HP up and load the appropriate software into your PC (no Mac version yet), you're ready to go. And the connection process is enough to make you giddy, as a single cable runs from the burner to a USB port on your PC. You don't even need to turn your computer off when you attach it.

It's beyond me, though, why Hewlett-Packard bundles Sonic Foundry's Music Jukebox, a customized version of Sonic Foundry's Siren program, with CD-Writer Music. It doesn't let you copy CDs except by saving them as Windows Media Audio (WMA) files on your hard drive and then dubbing to CD from there—a two-step process. Unlike other CD-burning software, Music Jukebox works only with home audio blanks, which are more expensive than computer blanks because the price includes a royalty. (Even so, don't try to sell the finished product, you little weasel, or you'll end up in the pokey.) And it won't let you burn CDs from anything but music.

Having to use other software didn't bother me, as most CD burners come with software "lite" that cries out for replacement. I opted to use Adaptec's \$99 Easy CD Creator Deluxe. (Shelling out for it was eased by the fact that CD-Writer Music is about \$100 less than its competitors, whose software you'd probably replace too.) Easy CD Creator is an appropriately named product if ever there was one and probably the most popular CD burning software out there. It also lets you use CD-Writer Music with computer blanks (currently about a dollar less than audio CD-Rs), even for music. And besides audio, it enables the HP drive to store up to 650 megabytes of PC files, digital photographs, and video on one CD. (Previously, you'd have needed more than 450 floppies to manage that little maneuver.) A handful of clicks on your screen is all it takes to transfer a CD to a blank disc. The setup is extremely drag-and-clickish, and figuring out how to use the Adaptec package is nowhere near as confusing as figuring out the supplied software. (Neither is figuring out a proton accelerator, for that matter.)

Recording an entire CD consists of loading the source disc into your existing CD-ROM drive and the blank disc in the HP. Making a compilation requires a little more concentration. If you don't keep the various discs in order, you'll get mixed up. Easy CD Creator asks you to load them as "disc #1" or "disc #6" a couple times over, so you'd better be on your toes the first few times



CD-Writer Music does what it should do, and when it's done doing it, you're happy with what it's done.

you do it. Once you get the hang of it, though, it's not much trouble.

Once I got CD-Writer Music up and running, it was time to put it to work and copy some CDs. This gave me the chance to share some music with my big sister, Dianne. Our tastes in music were poles apart when we were growing up. I wasn't about to sit still for Rick Wakeman's *Journey to the Center of the Earth* or The Moody Blues' *Every Good Boy Deserves Favour*. (Dianne's always had an alarming affinity for portentous spoken-word passages.) And I was far more impressed by Jethro Bodine than by Jethro Tull. Now that we're "mature," Dianne and I can at least agree on artists like Richard Thompson and Van Morrison, and I thought I'd encourage further sibling coalescence by burning her a copy of Stan Getz's buttery-smooth *Best of the West Coast Sessions*. She oughtta like that, I figured, and the snippet of innocuous studio chatter preceding "Suddenly It's Spring" might satisfy her inexplicable craving for monologs. So I loaded the Getz disc into my

CD-ROM, put a blank in CD-Writer Music, and about 15 minutes later, my sister had herself a spiffy reproduction of *Best of the West Coast Sessions*. As they say on those late-night TV commercials, "It's that easy." And it really is.

There was a very slight drop-off in sound quality on the recorded discs, but it's almost not worth mentioning. There's just a little less crispness to the newly burned CDs; you have to keep your ears peeled to even notice it. It's nothing like the degradation that you hear when transferring a disc to audio tape. We're still talking CD-quality sound here. It just isn't as sparkly around the edges in some instances.

HP's CD-Writer music is one of the first burners to use four-times-speed technology with the simple-as-pie USB connector. Those are hugely convenient bonuses. The hookup, as I've said, is a breeze. And, as with all CD burners, the recording process leaves the old sit-there-and-listen-to-it tape machine in the dust. Once you master your choice of recording software, you'll be cranking out CDs like a pro.

CD-Writer Music also comes with a label maker, by the way, if you're laced too tight to just whip out a Sharpie and jot down titles the old-fashioned way. With the NEATO labeler (love that name), you can print labels and self-fashioned tray liners straight from your PC. It's a thoughtful inclusion, I guess, but a little artsy-craftsy if what you're really interested in is listening to groovy tunes. You're on your own if you wanna personalize a Mylar balloon.

I've heard horror stories about burners that are forever rejecting blank discs during the recording process or that turn out copies that simply fall silent in the middle of playback. But I've already burned a slew of CD-Rs on CD-Writer Music, complete albums as well as compilations, and they've come off without a single hitch. The HP is the very definition of reliability. It does what it's supposed to do, and when it's done doing it, you're happy with the product. You can't complain about that. Just find an alternative to the bundled recording software if you don't want to end up in a straitjacket. As for me, I intend to use CD-Writer Music to burn 3.92 compilation CDs a day for the *next* 19 years. **A**

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It is no wonder that Home Theater magazine concluded: "If you're in the market for a full-featured controller for your system, look no further than the amazing value you get with the Theater Grand." — Jeff Cherun, Home Theater, February, 1999

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Stereophile Guide to Home Theater, Vol.3 No.3



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ANTHONY H. CORDESMAN

Parasound HCA-2205A Five-Channel Amp & AVC-2500 A/V Tuner/Preamp

Parasound's AVC-2500 A/V tuner/preamp and HCA-2205A five-channel amp offer straightforward engineering and good performance in every respect. And their price tags won't make you gasp. In fact, these are both very affordable high-end products.

Using them is a pleasure, but listening with these components is not an emotional epiphany, it isn't a journey, and it doesn't reveal anything about the state of the universe. All you'll get from the Parasounds is excellent stereo sound and very high-quality surround.



Photos: Michael Groen

Let me begin with the AVC-2500, which contains a surround processor, a dual-zone preamplifier, a D/A converter, and an AM/FM tuner with 20 presets. Its design project was led by Matti Ojala, one of the most respected engineers around, and its circuitry features three Motorola 56009 24-bit processors, discrete analog line stages, and four-layer, military-spec boards. For surround, it has Dolby Digital, DTS, Dolby Pro Logic, Home THX Ultra processing, a music mode that adds surround ambience to any source, and a "party" mode that downmixes the signal to stereo and then feeds it to the main and surround speakers. There are none of the "hall," "cathedral," "jazz club," and other modes so beloved by the tasteless and aesthetically impaired.

Although its bass management system is less flexible than some I've seen, the AVC-2500's setup makes it stand out from other A/V preamp/processors. All you need do is unpack the calibrated mike, put it in your listening position, and press a few buttons on the remote control. The 2500 then adjusts its channel levels and delays; there's no need for a sound level meter or a tape measure, nor will you have to rely on delay-time charts and guesswork. (For the record, the 2500's automatic settings proved as accu-

PARASOUND

AMP

Rated Power: 220 watts/channel into 8 ohms or 300 watts/channel into 4 ohms, 20 Hz to 20 kHz, at 0.03% THD, all channels driven.

Dimensions: 19 in. W x 7⁵/₈ in. H (with feet) x 19¹/₂ in. D (48.3 cm x 19.4 cm x 49.5 cm).

Weight: 85 lbs. (38.6 kg).

Price: \$2,495.

TUNER/PREAMP

Dimensions: 17¹/₄ in. W x 5⁷/₈ in. H (with feet) x 13 in. D (43.8 cm x 14.9 cm x 33 cm).

Weight: 16 lbs. (7.3 kg).

Price: \$3,295.

Company Address: 950 Battery St., San Francisco, Cal. 94111; 415/397-7100; www.parasound.com.

rate as those I made by using a professional sound level meter, a tape measure, and detailed delay charts.)

The AVC-2500 has six analog and eight digital audio inputs, analog and digital (coax and Toslink) audio tape outputs, one analog A/V record out, six A/V inputs with composite- and S-video jacks, and two component-video inputs. It has two video monitor outputs, one with on-screen display and one without. The digital audio inputs comprise one AES/EBU (balanced), four coaxial, and two Toslink jacks plus a multipin connector for an optional RF demodulator (\$180) for laserdisc players with Dolby Digital outputs. No matter what their original formats, all digital signals are available from the Toslink and coax tape outputs; this simplifies, for example, dubbing from a CD player with coax output to the optical input of a MiniDisc recorder. Further, a 5.1-channel analog bypass input enables the 2500 to accept surround signals from DVD-Audio or SACD players that have multichannel analog outputs but no digital outputs—or from decoders for future surround formats. That feature, and the ability to receive new software via its RS-232 port, give the 2500 a touch of upgradability, increasingly important in this era of format wars.

Although the AVC-2500 has “only” 12 input sources, each can be programmed. You can, among other things, program a source to use analog input or to draw from the coax, Toslink, or AES/EBU inputs and,

if it's an A/V source, select the appropriate video inputs (composite, component, or S-video). Then you can assign the appropriate processing mode and rename the source to match the component feeding it. (If the name you want is not in the preamp's built-in library, you can enter it.)

The ergonomics of the AVC-2500's backlit learning remote aren't bad, but it took me a lot of time to teach it the control codes for the rest of my system's components, and I could never remember which button did what for my non-Parasound equipment. The unintuitive labeling of the remote's buttons wasn't particularly helpful, and I had to make charts (using worksheets in the owner's manual) to remind me how to control my other equipment this way.

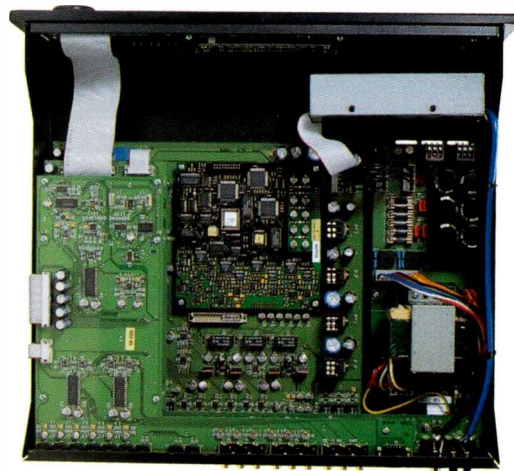
Setting up and adjusting the AVC-2500 with this remote was fairly easy. (Even so, I had to pay careful attention to the manual, which gave me less graphic help than I'd have liked; I couldn't just use the remote and guess.)

Operation was easy, too—even trimming levels to suit a particular recording or soundtrack was a breeze. The labels for the remote's source selectors are generic, such as “Video 1” or “Audio 1,” and you can't rename the buttons to “TV” or “DVD” to match the names you've programmed into the preamp itself. You and your family will probably learn the proper buttons fairly quickly, but visitors will have to guess. I'd give the control interface a C+ or B-.

While we're on the subject of remote control, I should mention the AVC-2500's other facilities for external control. I've already mentioned the RS-232 port (becoming *de rigueur* for complex home installations nowadays). It also has stereo and TV monitor outputs for a second zone, audio and DC trigger outputs (to turn on amplifiers, raise and lower a projection screen, and so on), and infrared repeater inputs for each of its two zones.

There's less to say about the features of the HCA-2205A five-channel amplifier, of course. It's a nicely styled and very well built black box that looks similar to virtually every other five-channel amp in its class. It has indicators for power, standby/operate, current overload, and thermal over-

load. On the rear are Tiffany-style RCA input jacks and high-quality, gold-plated, five-way speaker binding posts. (Parasound provides color-coded, gold-plated brass banana plugs, a nice touch). It also has audio and 12-volt DC triggering, so it can be turned on by the AVC-2500 and other A/V preamp/processors. I don't know why it has gain controls (which are on the back), as

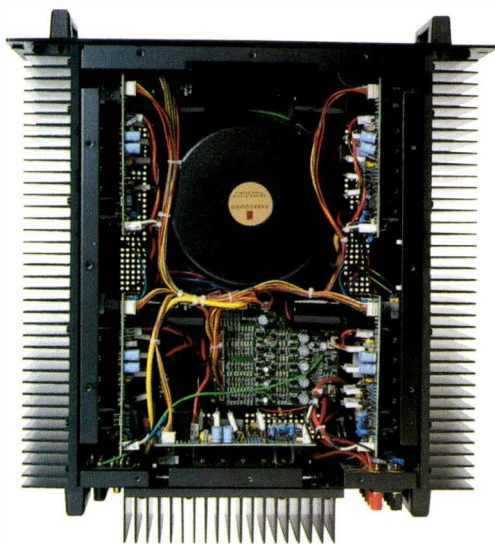


every A/V preamp I know of performs all the necessary level adjustments.

It is the interior of the HCA-2205A that counts, however. For this aspect of the design, Parasound turned to John Curl, another great audio engineer. The 2205A has high-bias Class-A/AB operation, which means its output stage is fed extra-high current even at extremely low volume levels. With this enriched idling current, the output transistors operate in Class A to a higher power level than they otherwise would before transitioning to Class AB; this reduces high-, odd-order harmonic distortion products.

The HCA-2205A's output stages contain 40 beta-matched, 15-ampere, 60-MHz bipolar transistors. Junction field-effect transistors (J-FETs) are used for the input stages and metal-oxide field-effect transistors (MOS-FETs) for the driver stages, because Curl feels they act and sound more like tubes than other solid-state devices. According to him, they “serve up clarity, warmth, and richness that's far superior to the brittle and disembodied sound of ordinary transistors and integrated circuits.”

Parasound says the HCA-2205A is “the largest Home THX Ultra-certified amplifier



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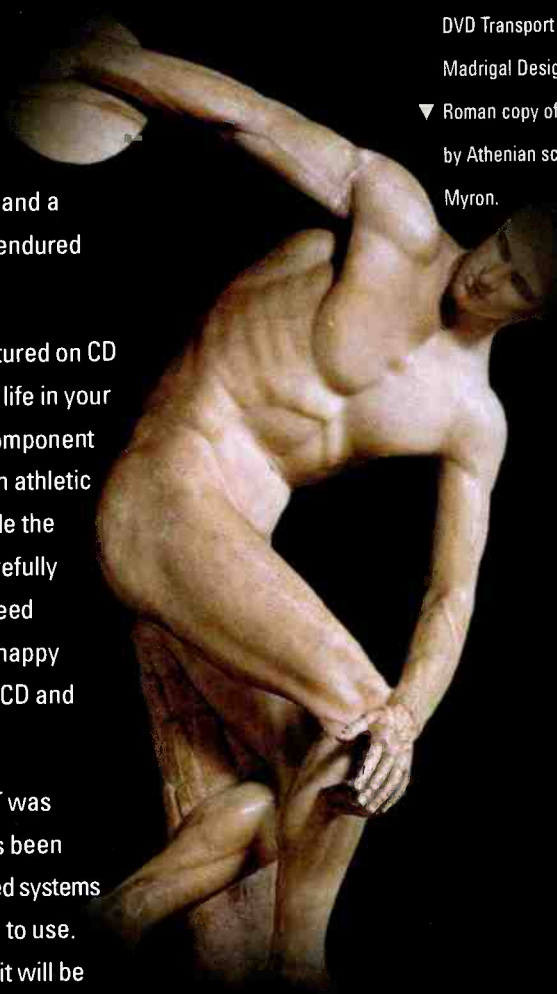
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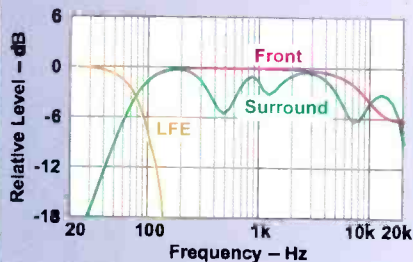
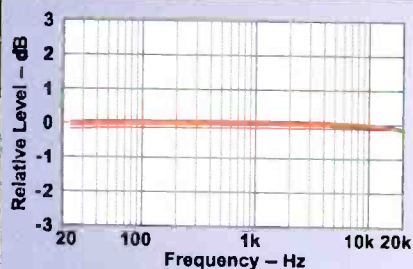


Fig. 1—Frequency response of AVC-2500 preamp without THX processing (A) and with it (B); note scale difference.

The Parasound AVC-2500 preamp's frequency response without THX processing (Fig. 1A) is outstanding; True Technologies found that the worst channel is flat within +0, -0.15 dB and that all channels match within 0.25 dB. Switching in THX filtering and setting bass management for "Small" speakers rolls off the frequency extremes, as it's supposed to; the odd-looking squiggles in the surround-channel response (Fig. 1B) result from the THX timbre-matching EQ.

The AVC-2500's noise curve was almost as smooth as the non-THX frequency response; for the worst channel, it sloped gradually from about -110 dB in the bottom octave to about -96 dB at 20 kHz, with barely a dB of extra noise at 60 and 120 Hz. A-weighted noise was -88 dB in the subwoofer channel and -91 dB in the others. Very impressive. Worst-case crosstalk diminished from about -90 dB at 20 Hz to about -105 dB at 40 Hz before gradually rising to -58 dB at 20 kHz.

Not too surprisingly, the preamp's distortion is a bit higher for analog input signals than for digital signals (Fig. 2), but even for analog it goes no higher than 0.14% and quickly trails off to around 0.005% or less from 100 Hz on up. The 0.14% reading at 20 Hz is a bit above average for a preamp, but since speakers produce so much distortion at that frequency, you'll never notice it. The

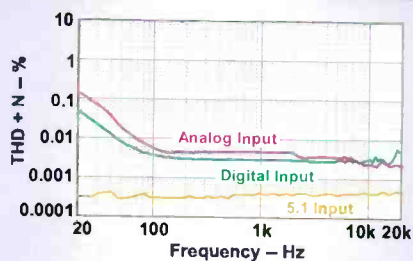


Fig. 2—THD + N vs. frequency, AVC-2500 preamp.

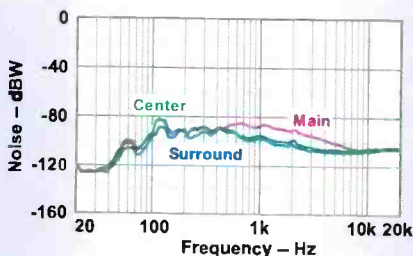


Fig. 3—Noise analysis, HCA-2205A amp.

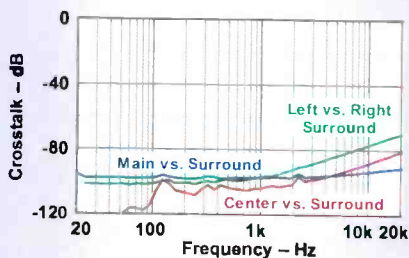


Fig. 4—Crosstalk vs. frequency, HCA-2205A amp.

curve for the 5.1-channel input, which bypasses just about everything in the preamp (even the gain control), is so low—mostly around 0.0003%—the graph's vertical scale had to be extended downward so you could see it. As True Technologies observes, it's "about as close to a straight wire as you get—because that's essentially what it is."

The AVC-2500's DAC was linear within about ± 1 dB from 0 to -100 dBFS. Deviation increased to 4.8 dB at -108 dBFS and nearly 11 dB at -115 dBFS.

The HCA-2205A amplifier performed very well in all respects—an impressive showing, considering the substantial power it delivers. Frequency response was even flatter than the preamp's, +0, -0.08 dB for the worst channel, and the channels matched even more closely, within 0.05 dB. Noise (Fig. 3) was very low for such a big amp; although you can see hum peaks at 60 and 120 Hz, they're so low that they're inaudible. A-weighted noise was -76.3 dBW in the worst

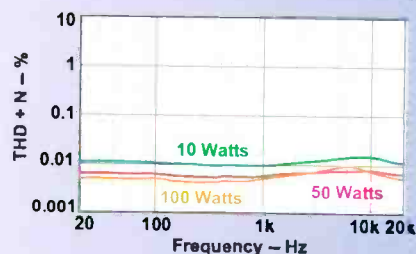
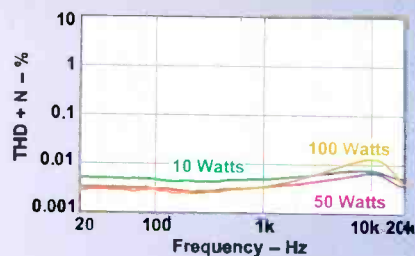


Fig. 5—THD + N vs. frequency into 8 ohms (A) and 4 ohms (B), HCA-2205A amp.

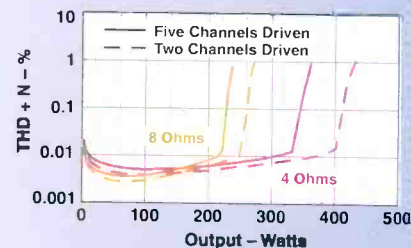


Fig. 6—THD + N vs. output, HCA-2205A amp.

channel, around -86 dBW in all the others. Crosstalk (Fig. 4) was also outstanding, above -80 dB in only one channel pair, and then only from 6.6 kHz up. At 10 to 100 watts per channel, distortion was quite low (Fig. 5), even in the worst channel.

In an amp like this, power output per channel varies not only with load impedance but also with the number of channels driven. When all five channels are driven, the power per channel at the rated distortion level of 0.03% (Fig. 6) is a bit above the rated 220 watts into 8 ohms and about 330 watts into 4 ohms; with only two channels driven, available power at rated distortion rises to about 250 watts into 8 ohms and 400 watts into 4. At 0.1% THD, power into 8 ohms becomes 225 watts per channel with everything driven and 260 watts per channel in stereo; at 4 ohms, the readings are 340 and 410 watts per channel.—Ivan Berger

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Robert Deutsch on the Velodyne HGS10
Stereophile Guide to Home Theater,
September 1998



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H A Harman International Company



**AVC-2500's
calibration
mike**

**I was immersed
in the sound,
and the feeling
of life and presence
was exceptional.**

on the market without a noisy cooling fan." I'm pleased by the hush, but I'm not impressed by the certification; I've found virtually all high-end power amps that aren't THX certified just as good as those that are. What is significant is that there are no coupling capacitors or inductors in the 2205A's signal path, its power supply has a 2,000-volt/ampere toroidal transformer with independent secondary windings for each channel, and there are independent power supplies for each channel, for a total of 150,000 microfarads of filter capacitance. Power is rated at 220 watts per channel into 8 ohms, all channels driven, with a rated peak current capacity of 60 amperes per channel and dynamic headroom greater than 1.5 dB.

I was particularly impressed by the quality and consistency of the Parasound amp's and preamp's sound. It was open and highly detailed, with excellent dynamic contrasts, very good bass power, and plenty of soundstage information. Low-level information came across beautifully in soft music passages and highly nuanced movie soundtracks. With really good material, I was immersed in the sound, and the feeling of life and presence was exceptional.

The AVC-2500's D/A converter is very clean, comparable to some of the best mid-

priced stand-alone converters. The D/A converters in reference-quality components, such as Krell's KPS-25s preamp/CD player, have even deeper bass and provide more low-end power and detail. You can get better bass resolution from the converters in the Krell, from those in Meridian's 861 A/V preamp, or from stand-alone D/A converters like the Mark Levinson No. 360S and Theta Digital DS Pro Gen V. But they cost considerably more than the Parasound, and all but the Meridian are only stereo, at that. The AVC-2500 may not be the absolute state of the art, but it has truly deep and dynamic bass and extended highs.

I was surprised that two components from different designers had such consistent sound quality as these Parasounds did. Someone at the company must have listened to the products very carefully to ensure that consistency. The AVC-2500 and HCA-2205A are exceptionally clean and transparent, but they also have a touch more upper-midrange and treble energy than much of their competition. This gives them a lot of apparent detail, a bit more dynamic energy, excellent imaging, and good life and air. However, these components are not the perfect match for speakers having excess output in the upper midrange and treble. The AVC-2500 and HCA-2205A also reproduce any hardness in the source material all too well. This led me to use the 2500's THX setting and its re-equalization filtering on most movie soundtracks. For stereo music, the preamplifier offers no tone controls, equalizers, or filters, which was sometimes a problem when I would play hard, bright, or too closely miked recordings.

The AVC-2500 and HCA-2205A have a lot of deep-bass energy. The 2205A did an excellent job of controlling the bass except with some older Apogee and Infinity speakers whose impedances are very low. In fact, its bass is tighter and faster than that of many subwoofers. This amp will probably provide much more realistic bass if you use good full-range speakers and have no subwoofer to mask the system's quality—unless you have a sub like the Vandersteen V2W or 2Wq, the sub from Polk's Signature Reference Theatre system, or any of REL's subwoofers.

Because of the Parasounds' quality, I suggest you spring for high-quality video cables and decent interconnects and speaker cables. Avoid anything that gives the sound a slightly hard edge or excessive treble. My reference Kimber Kables worked fine, as did some moderately priced Monster, Goertz, and AudioQuest cables. Some older Wireworld cables tended to make the sound a bit bright. The compatibility of interconnects and cables is not a big deal, but it should be considered if you listen to a lot of close-miked recordings and classical music.

The AVC-2500 did not pass video signals quite as well as the most expensive A/V preamps, though it was a very good performer with composite- and S-video signals. (I couldn't judge its performance with component-video signals, because I get inconsistent results no matter what equipment I use.) One way I test the video in an A/V preamp/processor is to put the unit I'm evaluating in the video loop of my Krell, Meridian, or Theta preamp/processor and compare the picture with the test unit switched in and out. The 2500 did very well here. The only changes in resolution that I could detect on a 40-inch direct-view TV or a 6-foot projection screen were slight. The 2500 also did a very good job on all of the tests on the Imaging Science Foundation's *Video Essentials* DVD. At normal viewing distances, I doubt you will be able to see any difference between this processor's video and that of most expensive processors unless you use the most expensive direct-view monitors or projection systems. The 2500 delivers very good video performance for the money.

"Very good performance for the money" is, in fact, how I'd sum up both the AVC-2500 and HCA-2205A. They aren't exotic in the sense of costing \$20,000 each, using single-ended triode circuitry, or having cabinets with tropical wood side panels. There were no problems to lend drama to this review, and the Parasounds left my inner life and emotions alone. So I'm forced to tell you the straightforward truth: If you are looking for high quality from high-end products that approach the performance of far more expensive equipment, Parasound's AVC-2500 and HCA-2205A are some of the best components around. **A**

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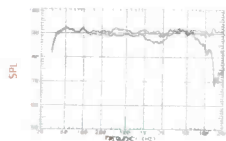


MACH MC

MACH MC.1

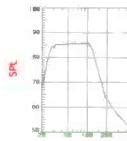
MACH SOLO

MACH 17



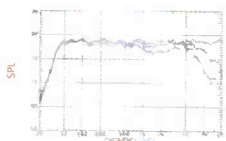
On axis @ 1M & 2.83V, 30 degs, 60 degs

MACH 17



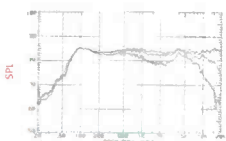
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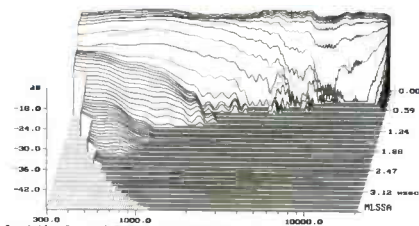
On axis @ 1M & 2.83V, 30 degs, 60 degs

MACH SOLO



On axis @ 1M & 2.83V, 30 degs, 60 degs

MACH MC



-25.04 48.5208 Hz (B1), 0.000 msec (1)

MACH MC DECAY PLOT

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PAUL TATARA

Yamaha RP-U100

PC Receiver



Photos: Michael Groen

It's been a long time since radio has played a role in my daily life. But back in high school, I used to listen to Casey Kasem on Sunday afternoons and actually *care* what songs were in the Top 40. Who knows why I was so worked up about it; I sure don't remember getting any royalty checks when "Hot Child in the City" cracked the charts. Of course, these days I simply run out and buy the music that I want to hear—no more hanging around for three months, waiting for an Alabama DJ to lose his mind and play Southside Johnny & The Asbury Jukes. And I

can't say that I miss committing the latest car dealership commercials to memory, via multiple unwanted listenings. Overall, it's been a nice vacation. For the past 18 years I've done most of my radio listening in the waiting room at the dentist's office.

Those days are coming to an end, though. Now that I'm married, I'm much more indebted to Mr. Marconi. Jill and I have basically the same tastes in rock 'n' roll, so our CDs get a major workout. But she's a fan of big band and swing music, while I lean more toward be-bop and whatever it was that Coltrane was playing near

the end. Since I don't have any Bing Crosby or Glenn Miller in my collection, we often play the radio on lazy weekend mornings. (Here in New York, you can actually find good music on the airwaves if you know where to look.) However, for the past year and a half we've been listening to a little plastic mono job that Jill used to have in the kitchen when she lived out in Brooklyn. Coated in dust and bacon grease, it has one itty-bitty speaker that makes the music sound like it's being pumped from a Dixie Cup with a string attached.

That's why, even with its drawbacks, I'm still happy with Yamaha's RP-U100. It's been so long since I've had a proper stereo receiver around the house, it almost feels like a novelty to hear those car commercials again. The RP-U100 itself is something of a novelty, though: It's a 30-watt/channel stereo receiver, but there's a handy USB connector that enables it to share your personal computer's facilities in various ways. For example, you can stream digital audio straight from your computer to play MP3 files and CD-ROM games at levels that'll easily clear the room of grownups and other rodents. You can also hook up a CD player or a tape machine to the unit and play it through your PC.

With its snazzy, brushed-silver look, the RP-U100 is a classy-looking device. It stands about 11¼ inches tall—as opposed to lying down, like most receivers do—and is only 4¾ inches wide. If you've got the space on your desk, it should fit very nicely right next to your monitor. There are four source buttons at the top of the front panel (PC, AUX 1, AUX 2, and tuner, with a

YAMAHA

Rated Power: 30 watts per channel, both channels driven, into 8 ohms.

Rated THD: 0.08%, 20 Hz to 20 kHz.

Dimensions: 4¾ in. W x 11½ in. H x 14¾ in. D (12.1 cm x 29.5 cm x 37.8 cm).

Weight: 12 lbs. (5.5 kg).

Price: \$499.

Company Address: 6660 Orange-thorpe Ave., Buena Park, Cal. 90620; 800/492-6242; www.yamaha.com.

choice of analog or optical digital for AUX 1) and a digital readout that gives you the lowdown on what source you're using, what station you're listening to, what the volume level is, and so forth. It's all there and is easy to read. The controls for Yamaha's Digital Sound Field Processing and a massive volume dial are beneath the source buttons. Because of the USB connection, you can also preset up to 208 radio stations on your hard drive, gathering them in groups of up to eight and naming each group whatever you'd like (such as "Jill's" for the big band stations and "Paul's" for the jazz.) Admittedly, that's a little anal, but it helps create the illusion that you have control of your environment.

The receiver comes with AM and FM antennas, but Yamaha suggests you buy an outdoor FM antenna unless you live in an area that has especially good reception. The rear panel is laid out clearly, and hookup is exceedingly simple. The speaker connectors are the lock-down variety, so you don't have to wrestle with wires falling out while you try to screw them into place; there's also a jack for hooking up a subwoofer if you're looking for more extended low-bass response. The software loads up in seconds. You can have the whole thing out of the box and ready to go in less than 30 minutes.

Yamaha stresses that the RP-U100 uses its Virtual 3D technology to simulate surround sound while hooked up to only two speakers. "Virtual 3D," like the equally fishy-sounding "near beer" and "cybersex," is the kind of term I'm always leery of. I've hooked a pair of Paradigm Atoms up to the RP-U100 and placed them to either side of my computer, as per Yamaha's instructions. Though the effect is warm and rather enveloping, I wouldn't go so far as to compare it to true surround sound. The problem may very well be that there's a large open area directly behind the chair I use at my comput-

er. The simulated surround effect might (remember, I said "might") work better if there were a solid wall behind me.

All of the RP-U100's functions can be controlled from a readout that you retrieve by clicking on a desktop icon. Along with giving you immediate access to the basic tuner functions, this allows you to manipulate such settings as "D-Range" and "Virtual Rear Speaker Position." Stumbling along in a hit-or-miss fashion should eventually get the sound more or less where you want it—and help pull the supposed 3D effect into better fo-

If you're always at your PC and want to have music playing, you couldn't hope for a better device.

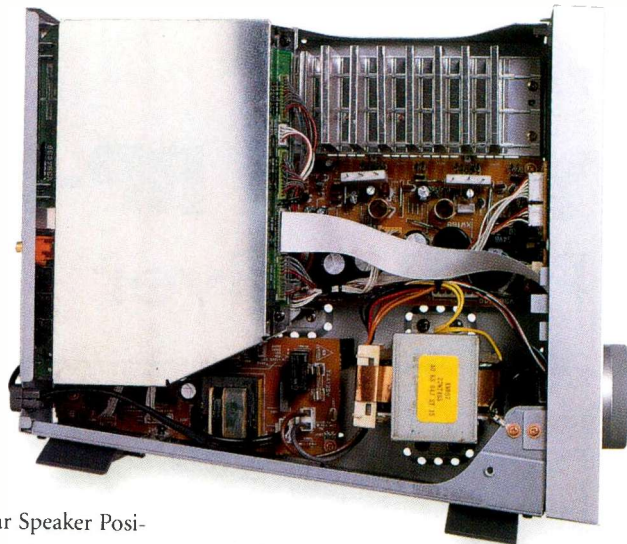
cus—but it's still a vague facsimile of the real thing. Much more helpful is the U100's simple-but-effective equalizer. You can alter treble, bass, and midrange through a series of easy drag-and-clicks (more USB magic), and it works like a charm.

The digital signal processing feature is a bit iffy but not necessarily detrimental. Yamaha measured various elements that shape the sound fields in typical concert halls and opera houses around the world. When you activate the Digital Sound Field Processing, the RP-U100 attempts to re-create the ambience of the original venue. The setting choices are "Jazz," "Hall," "Live," "Game," "Church," and "Movie." They all basically

sound like various reverb effects, something available on A/V receivers for years.

As I type this I'm listening to Pharoah Sanders' brilliant "The Creator Has a Master Plan" on a local jazz station (pretty impressive when you consider how a nearby PC can screw up reception on many tuners). When the RP-U100's DSP is set to "Jazz," it sounds like I'm just listening to the radio. No problem there; it's a good, crisp stereo signal, and I'm groovin'. Switch it over to "Church," however, and it sounds like Gary U.S. Bonds' famously low-tech recording of "Quarter to Three." There's so much echo you'd think Sanders and his cohorts were playing in an empty vat at a brewery. The "Hall" setting sounds the same way but with much less reverberation. The settings are serviceable and the controls give you the opportunity to fiddle with them, but this sort of thing has never appealed to me. I'm not here to severely doctor a recording in a manner that wasn't intended by the artist. If you're the type who can't leave well enough alone, though, go ahead and get wiggy.

But, at a mere 30 watts per channel, is the RP-U100 worth the rather steep \$499 Yamaha is asking for it? Well, that depends on what you're looking for. The best thing about the U100 is its sheer convenience. It's just about perfect for an office; if you're constantly at your PC and like to have music playing to soothe your jangled nerves, you couldn't hope for a better device. To repeat: All it takes is a click, and you've got the control panel (including a muting button for when the phone rings) right there on



The RP-U100's rear panel carries a useful array of jacks.



your screen. And you can plug in headphones, in case your coworkers get annoyed by your music or your boss is a jerk (which he almost certainly is).

The MP3 playback feature speaks for itself. You'll get the best possible sound out of a rather sonically limited format. On the other hand, the ability to amplify CD-ROM

sound is nice but not what you would call a necessity. As a matter of fact, I can imagine parents reaching for the wire cutters after about 20 minutes of their kids cranking up a *Quake* or *Doom* tournament. Rock 'n' roll is one thing, but shotgunning snarling beasts at top volume can put a strain on family harmony. **A**

TEST RESULTS

The RP-U100's frequency response (Fig. 1) is not the flattest around, but its deviations (a treble rise of less than 0.25 dB and a bass rolloff of less than 2 dB at 20 Hz) aren't terribly significant. The amplifier section gets a bit past its rated continuous power level of 30 watts/channel before clipping sets in (Fig. 2)—but that's at 1 kHz. In the bass, distortion approached 1% at rated power, which is why Fig. 3 shows THD + N versus frequency only at 10 and 25 watts. Instead of rising at high frequencies, the usual case, the Yamaha's distortion drops in the upper treble; this may account for the fact that changing from a 22- to an 80-kHz measurement filter made little difference. Although distortion is a little high relative to that of more expensive receivers, it's probably not enough so to be audible under most circumstances.

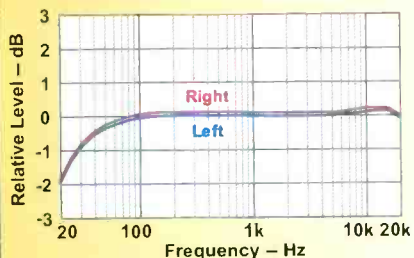


Fig. 1—Frequency response.

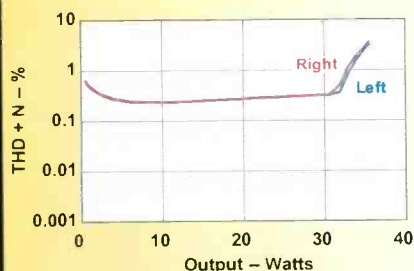


Fig. 2—THD + N vs. output, 8 ohms.

The analog inputs are a bit noisy, especially in the treble (Fig. 4); the digital inputs are quieter. A-weighted noise was -52 dBW for the former and -74 dBW for the latter. Crosstalk was rather high in the bass, reaching -26 dB at 20 Hz via analog input and -42 dB at that frequency with digital. In the treble, where it makes more of a difference, it varied from about -70 dB at 1 kHz to nearly -60 dB at 20 kHz, regardless of the input used.

Output from the RP-U100's DAC goes only to the speaker outputs, not to the analog line jacks, so DAC linearity had to be measured via the speaker terminals. As a result, True Technologies measured significant deviation at levels above -3 dBFS, probably caused by increased distortion in the analog circuitry. From -3 down to -95 dBFS, deviation was within +0.26, -1 dB.—Ivan Berger

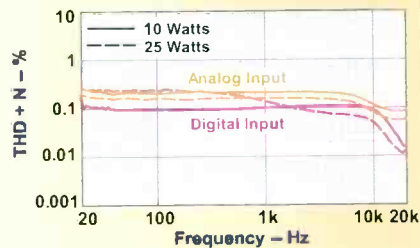


Fig. 3—THD + N vs. frequency, 8 ohms; see text.

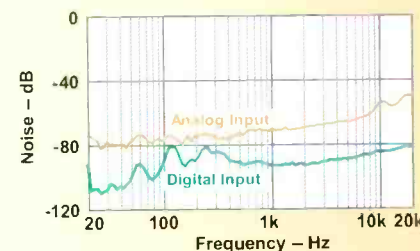


Fig. 4—Noise analysis.

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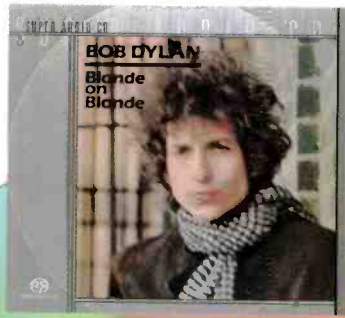
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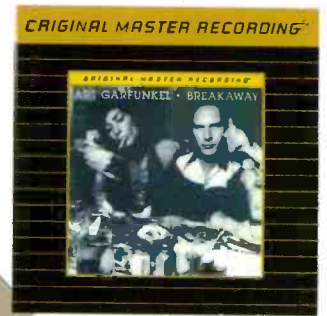




MIGHTY SAM MCCLAIN
Soul Survivor



BOB DYLAN
Blonde on Blonde



ART GARFUNKEL
Breakaway



BRUNO WALTER
Beethoven: Symphony No. 6



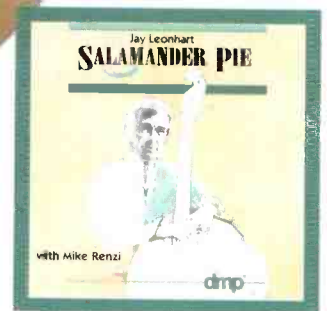
VLADIMIR HOROWITZ
Chopin: Sonata No. 2



OSCAR, RAY & MILT
The Very Tall Band



CHARLES MINGUS
Ah Um



JAY LEONHART
Salamander Pie



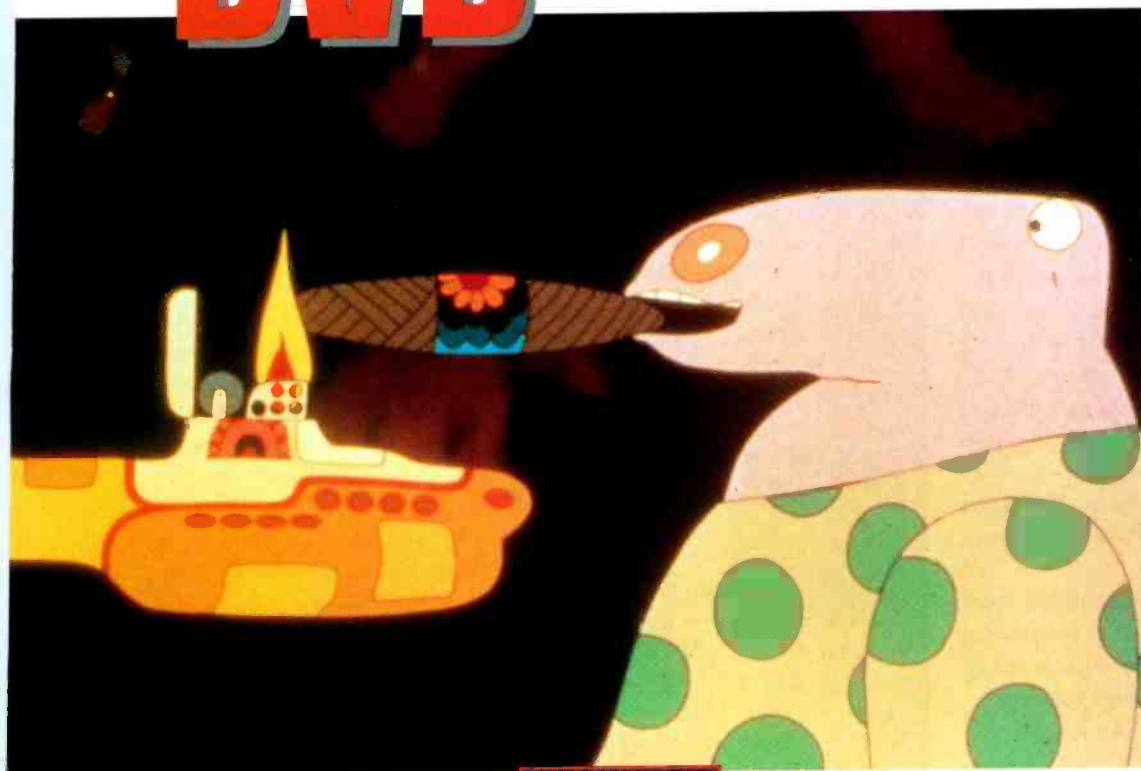
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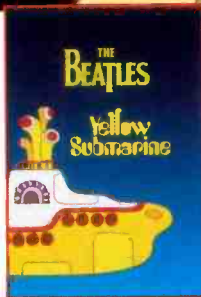




SIXTIES SUB RESURFACES

Yellow Submarine 1968; G rating; one-sided, dual-layer (1.66:1 aspect ratio); Dolby Digital 5.1 and two-channel mono; English and French subtitles; includes commentary track, documentary, storyboard comparison sequences, original pencil drawings, behind-the-scenes photos, interviews, music-only track (5.1), and theatrical trailer. MGM, 90 minutes (feature run time), \$29.98

Yellow Submarine is considered by many to be an important cultural landmark of the '60s. Both it and *Star Trek* (episodes of which are also reviewed this month) are among the 15 events of that decade commemorated by stamps offered in the U.S. Postal Service's Celebrate the Century series. *Yellow Submarine* was launched when Al Brodax, who had produced 40 episodes of The Beatles' animated TV series, approached the Fab Four's manager, Brian Epstein, with the idea of doing an animated feature film. The



already popular song "Yellow Submarine" became the starting point; it also incorporated "Eleanor Rigby," "Lucy in the Sky with Diamonds," "With a Little Help from My Friends," and "Sgt. Pepper's Lonely Hearts Club Band." The boys came up with four new songs for the movie: "It's All Too Much," "Only a Northern Song," "Altogether Now," and "Hey Bulldog," the last written for a sequence that had been cut from the film but has been reinstated on this DVD. Although The Beatles sang and performed the songs in the film, it's worth noting that actors did the dialog for John, Paul, George, and Ringo.

After legal wrangling put it on hold for 11 years, *Yellow Submarine* has now been completely restored. The colors are once again bright and vibrant, and the op and pop art

fully convey the spirit of the psychedelic era. Some cinema purists might complain that the sound has been remixed in 5.1; for them, MGM has provided the original monaural soundtrack as well. For my money, the new surround mix is fabulous, providing sound that keeps up with the ahead-of-its-time animation.

Extras include an unrestored period documentary and trailer and some very interesting comparisons between storyboards and finished scenes. The interviews with the film's original crew

members and the actors shed a lot of light on the production.

Though it epitomizes the look and sound of its turbulent era, *Yellow Submarine's* optimistic tone feels quite at home today. That makes it timeless.

Rad Bennett



Monterey Jazz Festival: 40 Legendary Years 1998; no rating; color and black-and-white; one-sided (1.66:1 aspect ratio); Dolby Digital stereo. WARNER HOME VIDEO, 80 minutes, \$24.98

The Monterey Jazz Festival is one of the longest running in this country's history, and it is still going strong. This documentary chronicles its history through recently shot talking-head commentaries (from artists such as Dave Brubeck and Clark Terry) and an amazing collection of film clips. The clips are edited mostly as jump cuts and can be confusing, since none of the great performers are identified. If you don't recognize them, you might really miss something.

Clint Eastwood, a festival board member and executive producer of this entertaining yet scarcely thorough production, is among those interviewed. A halfhearted effort at completeness is made by including brief biographies of a dozen or so musicians, but considering the amount of astounding footage shot through the years, this short program is like holding candy in front of a child and then taking it away.

Picture and sound quality vary with the source material but are generally quite good. My favorite moment is when Dizzy Gillespie slipped out on stage behind vocalist Carmen McRae and surprised her with a little counterpoint. R.B.

Charles Mingus: Triumph of the Underdog 1997; no rating; color and black-and-white; one-sided (1.33:1 aspect ratio); Dolby Digital two-channel mono and stereo. SHANACHIE, 78 minutes, \$24.98

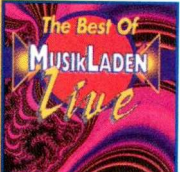
After you've watched this powerful biography of Charles Mingus, you're apt to agree with conductor/composer Gunther Schuller, who says on camera that Mingus was not just a talented bass player, bandleader, and jazz personality but also one of the greatest 20th-century composers. As *Triumph of the Underdog* points out, Mingus's early influences varied widely, from Viennese composer Arnold Schoenberg to Duke Ellington.

MUSIKLADEN

The Best of MusikLaden Live: Hall & Oates/Ike and Tina Turner/Black Sabbath 1998; no rating; color; three separate DVDs, each one-sided (1.33:1 aspect ratio); Dolby Digital 5.1. PIONEER ARTISTS, 45/30/20 minutes, \$19.98 each

G

ermany was fortunate to have a monthly television show like this from the 1960s to the '80s, first called *Beat Club*, then renamed *Musikladen*. The show was loved by rock performers as well as fans, since *Musikladen* put no limit on song or performance length. Musicians could, and did, jam. This is greatly evident in the Hall & Oates set, which contains extended versions of some of the duo's most popular hits. Spontaneity seems the order of the day on this exciting set, which has good-quality, tightly edited video and satisfactory remixed audio. I highly recommend it.



The other two discs, though presenting Ike and Tina Turner and Black Sabbath at the height of their careers, feature gimmicky and painfully primitive psychedelic effects and are so short that the program seems over before it gets going. The Black Sabbath adds up to a buck a minute, and I'm not sure anything other than a Beatles reunion, with John imported from the beyond, would be worth that. Be selective: Go for Hall & Oates, and rent the others. R.B.

This superbly crafted biography covers Mingus's early career and the period when he stopped performing and was thrown out of his apartment. It then moves on to his re-emergence. Fortunately, it does not close with his death from Lou Gehrig's disease but with a tribute to his immense legacy, as Schuller leads a stellar group of musicians at New York's Town Hall in excerpts from a full performance of his two-hour composition "Epitaph."

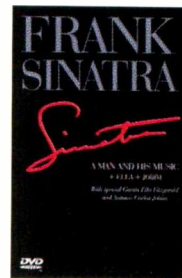


The historic clips of Mingus are a treat, and the producers have used enough electronic labels to identify all the players. The location sound is better than one might expect. This DVD is a must-see for any lover of great music. R.B.

Sinatra: A Man and His Music; A Man and His Music (with Count Basie); A Man and His Music, Part II (with Nancy Sinatra); A Man and His Music + Ella + Jobim; Ol' Blue Eyes Is Back; Sinatra; Sinatra in Concert at Royal Festival Hall; The Main Event; and Francis Albert Sinatra Does His Thing (with Diahann Carroll and The 5th Dimension) 1965 to 1981; no rating; color; one-sided (1.33:1 aspect ratio); mono PCM. WARNER REPRIS, 50 minutes each, \$24.98 each

These nine DVDs contain most of the television specials that Frank Sinatra did between 1965 and 1981. Two can be easily dismissed: *The Main Event* (1974), which finds the Chairman of the Board in very shaky voice, and *Sinatra: A Man and His Music* (1981), in which one can admire—but not necessarily enjoy—Sinatra in his 60s and still doing his thing. The other seven discs, though, capture Sinatra's genius and contain some of the finest singing anywhere. The best programs are the ones with guest artists. His pairings with Ella Fitzgerald and Antonio Carlos Jobim are legendary. Diahann Carroll proves an elegant addition to the 1968 special, *Francis Albert Sinatra Does His Thing*, and Gene Kelly and Sinatra are completely at ease in song-and-dance routines that pay tribute to their days at MGM in *Ol' Blue Eyes Is Back*.

Sources say that the master tapes for these releases were in very bad shape. If true, then someone did an excellent restoration job, as the video looks generally good. Only in the Kelly/Sinatra numbers did I notice what appear to be digital artifacts, but they are, in fact, problems with the half-inch analog video master. The sound, in PCM two-channel mono, has good frequency range and fairly wide dynamic range. Both closed-captioned subtitles and electronic lyrics are offered as extras. R.B.



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CD Recordings

BECK

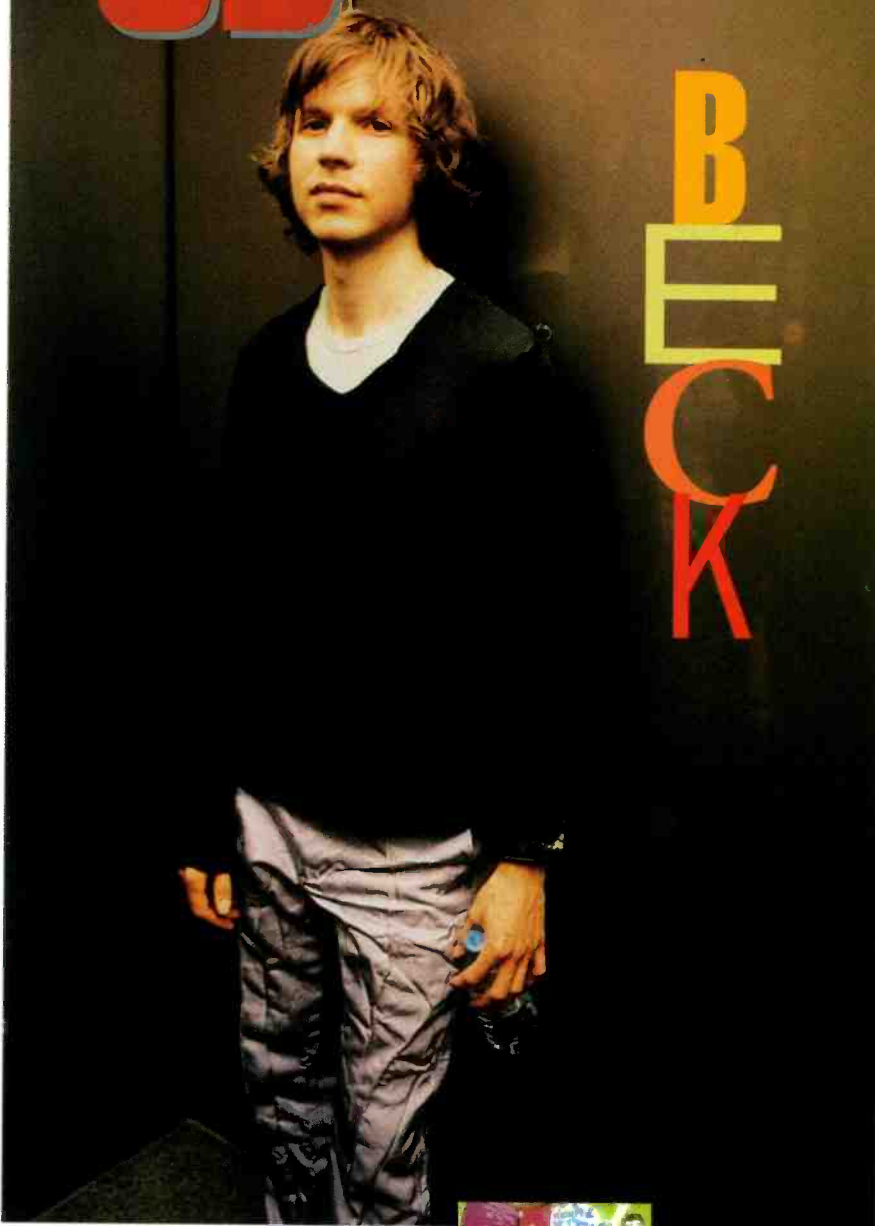


Photo: ©Charlie Gross

BLASÉ COOL

Midnite Vultures, Beck
DGC, 58:24

Is it possible that a dorky “Loser” like Beck can transform himself into the superfunky life of the party just by having a great record collection and an uncanny knack at tearing it all apart? Well, uh, yes. On his newest release, *Midnite Vultures*, those are Memphis



with a gritty Sly Stone freakout on “Nicotine & Gravy.”

“Debra,” the hilarious closing cut, opens with the line “I met you at J.C. Penney” in a mocking voice invoking the jet-set Mick Jagger and his ’70s disco falsetto. At one point, Beck quotes Axl Rose alongside blues legend Blind Willie Johnson.

Stax horns punching up the opening cut, “Sexx Laws,” and a T. Rex glam-rock vocal pose matched up

Call Beck the Great Equalizer. He can’t turn water into wine, but he can turn solid music into psychedelic soup. Loopy, electronic beeps and burps shock the aural terrain throughout. “Get Real Paid” could be a cynical corporate Internet commercial, with its techno effects and blasé catchphrase utterances (“We like the girls in the cellophane shirts”). “Beautiful Way” sounds like a country ballad from a kid who never owned a horse but was a wiz at Atari games. Consider Beck the King of the Cut-out Bin Blues Singers. *Rob O’Connor*

HANGIN’ WITH:

Early on, Rudy Van Gelder held recording sessions in his parents’ modified living room in Hackensack, N.J. The legendary engineer has now completed 24-bit analog-to-digital transfers of 30 classic Blue Note recordings at his deluxe facility in nearby Englewood Cliffs. Writer James Rozzi recently caught up with him.

How busy have you been lately?
Very busy!

Up until now, you’ve never been given the opportunity to remaster the vintage ’50s and ’60s Blue Note recordings you did with Alfred Lion. How did the RVG Edition Blue Notes come about?

Toshiba-EMI, the Japanese arm of Blue Note, commissioned a quantity of specific titles. While this occurred, highly advanced analog-to-digital converters—capable of 24-bit resolution—were just becoming available. These are machines with enough storage capacity, in the gigabyte range, to hold a whole album.

But CDs are still only delivering 16 bits. . . .

A delivery medium with 24-bit capability is destined to complete the picture.

The Blue Note reissues on CD, prior to the RVGs, were an attempt to replicate the sound of the original LPs. Some disgruntled audiophiles feel that your remastering process is an attempt to make the classic Blue Notes sound as though they were recorded today. Can you comment?

I’m restoring these sessions to the sound heard at the time they were recorded, what the musicians heard on one speaker and what Alfred Lion heard in the control room on one speaker. This is the first time for an approach such as this. With regard to stereo, my intent has never been to make the

Mr. Jelly Lord—Standard Time, Vol. Six
Wynton Marsalis
COLUMBIA, 61:55

The hardest-working man in jazz is putting in major overtime. By the time you read this, Wynton Marsalis will have released 12 ambitious CDs, all part of his *Swinging into the 21st* series, in less than a year. In this series, he skirts the old and



new, respecting his elders and keeping their—and his—music alive.

Mr. Jelly Lord isn't exactly an incredible simulation of Jelly Roll Morton's music; it's more like a resounding update. Tempos are slower, swinging between delicious restraint and the wild abandon of the originals. The music pours out of a big band of Marsalis regulars and New Orleans players. Though their sophistication brings a modern edge to the proceedings, they can swagger too. Check out the nasty little plunger duel as Wycliffe Gordon trades licks with Marsalis in "Jungle Blues." Or listen to the way Michael White's glorious clarinet sashays around "Big Lip Blues." Marsalis and pianist Eric Reed cap off the album with a searing duet on "Tom Cat Blues." They recorded this track on a wax cylinder in Thomas Edison's lab in West Orange, N.J., so it sounds as if Jelly Roll's music has jumped right out of some bizarre technological bottle.

Steve Guttenberg

Between the Bridges, Sloan
MURDER RECORDS, 45:58

Is Halifax, Nova Scotia, isolated enough for you? Too often bands from major cities inadvertently homogenize their sound to fit into the current scene. Sloan has never had that problem, living hours from any cultural hub.

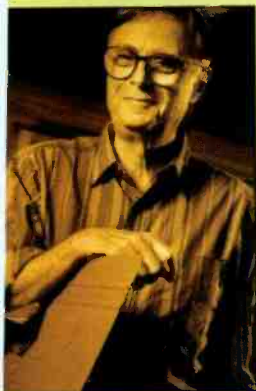


Even its recent relocation to Toronto is hardly a hipster move. Instead, Sloan has mined its record collections and memorized the magic riffs of '70s rock and the expansive melodies of '60s pop to write songs that owe nothing to clichéd trends.

Between the Bridges, Sloan's fifth album, offers the pure pop many people now insist upon. Mixed by Chris Shaw (Weezer, Public Enemy), this album's sound is arguably more expansive: harmonies walking into walls of guitar and keyboards and tracks segueing into one another like a car pileup.

Who says they don't write 'em like this anymore?
Rob O'Connor

RUDY VAN GELDER



recordings have the sound of today. I have tried to convey the original impact of the solos and the blend of the ensembles. Stereo was never an issue.

How about the complaints of inconsistencies in sound from CD to CD?

As stereo was developing at the time,

there would have to be inconsistencies. And every session was different. Every album is different; the music is different. So, the sound was highly variable, and the condition of the tapes was also highly variable.

From now on, others who remaster any Blue Note reissues can use your RVG Editions as a reference. It's bound to affect the way they will sound. How do you feel about that?

It's already happening. That's show business.

You must have enjoyed this remastering gig. This has been the greatest job in the world! People have been doing transfers of my Blue Note recordings since 1986, and I'm finally getting my chance.

Has this allowed time for your normal, busy schedule of recording sessions?

Because of the size of the project, I've put other sessions aside for the past two years and concentrated almost solely on this. What a great opportunity, hearing all of the old Hank Mobleys, the Art Blakeys, the Horace Silvers. They sent me all the tapes! Can you imagine? That's some kind of heaven. It doesn't get any better than that.

Photo: ©Robert Lewis

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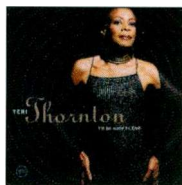
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I'll Be Easy To Find, Teri Thornton
VERVE, 52:23

After turning heads with several albums in the early '60s, Teri Thornton fell into inexplicable obscurity. But now this full-voiced contralto is back with a vengeance, singing standards ("I Believe in You," "Ain't Necessarily So," and "I'll Be Seeing You") and well-designed originals over a tightly orchestrated band of New York heavyweights.



Winning the 1998 Thelonious Monk International Jazz Vocals Competition seems reason enough for Thornton to have signed with prestigious Verve Records. But considering the vocalists on Verve's roster, such as veterans Abbey Lincoln and the late Betty Carter, Thornton fits in easily. Though the Monk competition is presumably intended to expose new and budding talent, Thornton hardly fits that bill. The lady has been around for a while and, as several belting blues tracks on *I'll Be Easy To Find* indicate, has certainly paid her dues.

In this day and age of cool, wispy vocalists, Teri Thornton's gutsy comeback release is very much appreciated. Yes, it's about time.

James Rozzi

Flamingo and Teenage Head,
The Flamin Groovies
BUDDHA, 58:50 and 60:28

Praise Buddha! These classic albums are back in print! This is the Fast, Loud, Out-of-Control School of rock, embarrassingly out of fashion in 1970, especially on The Flamin Groovies home turf of San Francisco. To their immense credit and our good fortune, the boys didn't care. After their first album on Epic flopped, they didn't move to L.A. and become soft-rock cocaine cowboys or ditch the wacky sense of humor and grind out heavy Satanic riffs like those Brit bands. Thanks to MC-5 and The Stooges, The Groovies got louder, faster, and more out of control.



Shanti Project Collection,
Various Artists
BADMAN RECORDING CO., 57:48



Over the past few years a sizable number of bands have been slowing and quieting down. The five acts presented here—Red House Painters, Low, Idaho, Hayden, and Misc—approach the mellowing factor from their own particular vantage points. Each has contributed a few spare tracks to this album, which will benefit the Shanti Project of San Francisco, an AIDS outreach program.

Red House Painters are the strongest contributors. Two unusual covers, Gen-



esis's "Follow You, Follow Me" and Neil Young's obscure "Midnight by the Bay," are given workovers. Mark Kozelek's voice remains one of rock music's most affecting, and the interplay between acoustic and electric guitars makes for a satisfying maelstrom.

The rest is a mixed bag. Low prefers the ethereal, providing what could be the soundtrack to the work of Edgar Allan Poe. Hayden suffers from whiny self-pity but redeems the almost parodic sentiments with attractive melodies. Idaho, sadly, seems derivative and uninspired. Misc is an ambient recording piece from the project's producer that neatly rounds out this collection.

Rob O'Connor

Flamingo jumps out of your speakers, grabs you by the ears, and says, wake up and have some fun, fool! Dueling lead-guitar solos, a drummer who needed only a snare to get the job done, and the great vocals of Roy Loney highlight the album. *Teenage Head* revs it even higher, with full-tilt Little Richard, Randy Newman, and Robert Johnson covers added for spice. It makes what The Stones were doing at the time look like guesswork. Got the vinyls? Put them against your thigh and bust 'em in half. These are wonderful transfers.

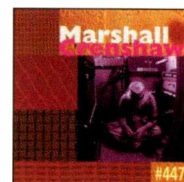
Mal Alcalá

#447, Marshall Crenshaw
RAZOR & TIE, 39:49

Go ahead. Dismiss Marshall Crenshaw's latest album, #447, as a failed attempt at trying something a little different. I mean, the guy's churned out satisfying guitar-oriented pop since 1982, so what does he go and do now? Add some fiddle, mandolin, stand-up bass, Dobro, and—jeez—jazzy instrumentals to the mix. In other words, he's *messin' with the formula*. But it works.

Crenshaw gives us a little bit of everything on #447—some old-time rock, Nashville acoustic, a little bit of tango, and a couple of his standard gems for good measure. A nice surprise is two instrumentals originally heard in a documentary about Yogi Berra,

"Eydie's Tune" and "You Said What." In both tracks, which evoke Les Paul, Crenshaw successfully infuses his pop chord progressions into the jazz realm.



With #447, the sum is greater than its parts; Crenshaw has picked and placed his songs perfectly, and when the last tune fades out, you'll appreciate just how far he's progressed in 17 years. And all of you tube-heads, take note: Crenshaw recorded much of this album using tube equipment.

Scott Van Camp

No. 4, Stone Temple Pilots
ATLANTIC, 42:24

With all the bad news surrounding Stone Temple Pilots, it's pretty easy to write the band off as a nearly-was—full of promise but lacking the fortitude to move forward. Not so fast, buddy. Somewhere in the time it took for the court system to nab Scott Weiland, he found time to write some songs and lay down the vocal tracks for the great new *No. 4*, a blistering album the likes of which we haven't heard since Nirvana's *Nevermind*.

Produced by Brendan O'Brien, *No. 4* bristles with stinging performances and hi-octane grooves. Gone are the psychedel-

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ic meanderings of *Purple* and *Tiny Songs*, replaced by caterwauling, arrow-straight rockers ("Down," "No Way Out," and "Heaven & Hot Rods"). Backing Weiland,



the DeLeo brothers (Dean and Robert) and drummer Eric Kretz plow through their arrangements with all the ripsnorting rage of a

bull on the streets of Pamplona—suitable expression indeed, considering the pain and frustration since the band's last release. While there are a few mellow interludes (the chiming "Sour Girl" and the Doors-ish "Atlanta"), this is largely killer rock 'n' roll and real justification that STP, regardless of its narcotic misadventures, is a band that deserves our hope.

Bob Gulla

The Kennedy Experience, Nigel Kennedy
SONY CLASSICAL, 55:17

Reinterpreting the music of Jimi Hendrix for a jazz unit is not a new idea. Witness Gil Evans, who did a memorable job of it back in the early '70s. At the time, the word was that Hendrix and Evans had spoken seriously about collaborating, but after Jimi died, Evans soldiered on and did the project himself.

Now British violin phenom Nigel Kennedy has taken his shot. And you know what? I like this album better. Evans' charts were very dense and busy, almost cluttered; Kennedy's arrangements, while complex, are sleek and streamlined.

The Experience that Kennedy has convened for this project augments his violin with two cellos, two guitars, and single flute, bass, and oboe—an all-acoustic combo. The first three selections are long: a 14-minute exploration into "Third Stone from the Sun," a 12-minute meditation on the gently sweet "Little Wing," and my favorite song from the Evans project, "1983... (A Merman I Should Turn To Be)," which lasts 15 minutes. Each of these, plus a 6-minute "Drifting," reveals what Kennedy calls "personal and unexpected emotional realms." "Fire" and "Purple Haze" complete the set with—well—fire and flash and fun.

The Kennedy Experience is a delight and a far better album than I expected. The



performances and arrangements are inspired, the recording technically sound and full. Even without electric instruments, there is genuine electricity here. Strong recommendation.

Michael Tearson

Good Boys When They're Asleep,
Faces

WARNER ARCHIVES/RHINO, 79:25

Before the marketplace ruled the music, there were many instances when the reverse was true. Faces was a group at the intersection of great art and commerce, redefining classic British rock at a time when many peers had fallen by the wayside and the rest were steeped in "art rock." The original band from which they sprang, The Small Faces, contained the great prototype lead singer Steve Marriott (of Humble Pie), but Kenney Jones, Ian McLagan, and Ronnie Lane were twice blessed with the arrival of Rod Stewart—third blessed if you count the fact that he came as a package deal with the consistently underrated Ron Wood, a great (albeit self-effacing) guitarist and foil. The music these five made inspired many to pick up their instruments, listen to American R&B, and form bands. Unfortunately, Stewart also had his own record deal, and that, combined with the lure of L.A., had a detrimental effect on his ability to lead the group. Faces went kaput in the mid-'70s, but while they were here we had us a real good time.

This quasi-greatest-hits album attempts to pack the high points of the band's five-year recording career onto one disc. Rod had more hits, but Faces albums better captured the spirit of the moment despite (or perhaps because of) a plethora of bum notes. The few non-LP singles and B-sides here are quite welcome (as is the one previously unreleased song, "Open to Ideas"), but one wishes for much more of this stuff.

It's unfortunate that Wood couldn't carry more of this adventurous spirit to the band he would later join (The Rolling Stones). There are always lots of would-haves and should-haves when talking about the history of Faces, and for good reason—no one really thought it would all disappear so quickly.

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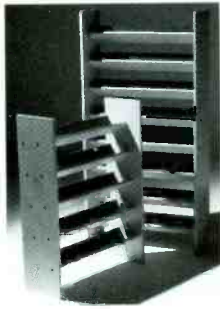
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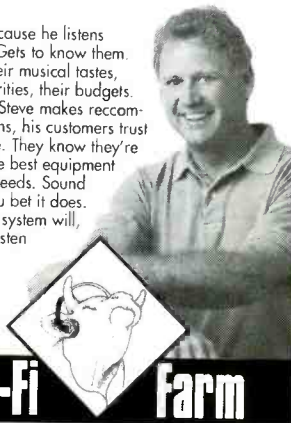
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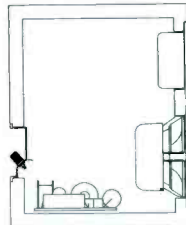
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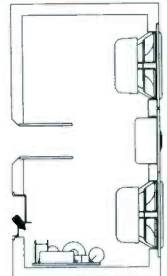


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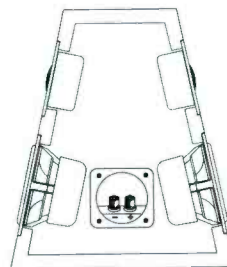


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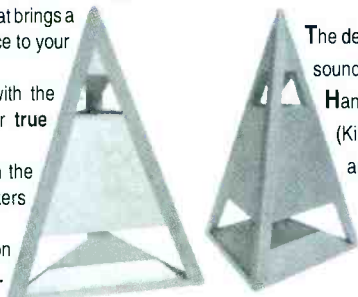
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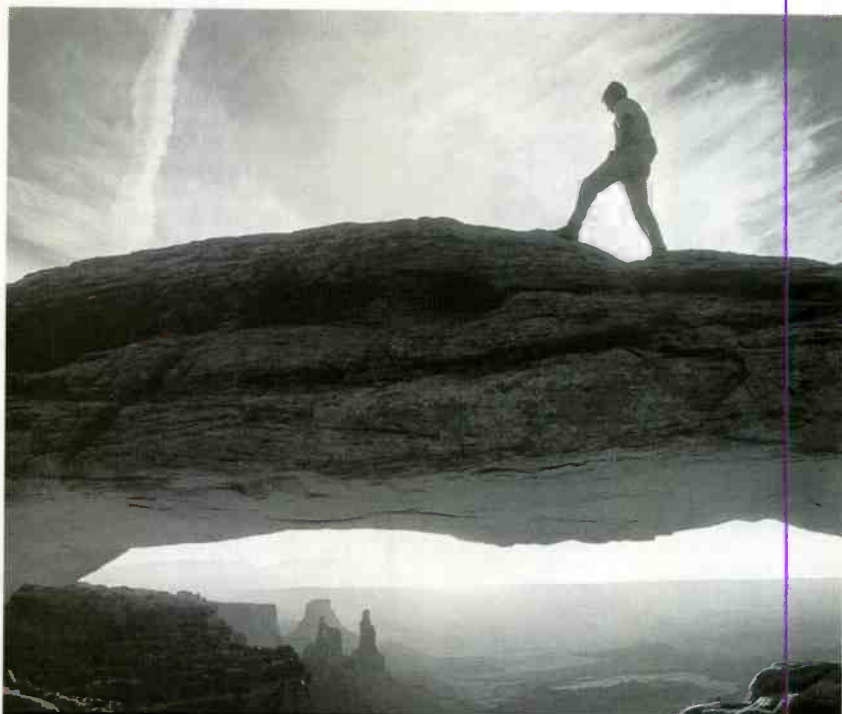
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Two-Channel Tango

From time to time, we get a letter (or two or three) complaining about the amount of coverage we devote to home theater and other manifestations of multichannel sound. Some of them are based on the idea that multichannel sound means only film sound. To that I reply, simply, not so! If you want to hear how much going a few channels beyond two can do for music, make it your business to listen on a "home theater" system to one or two of the best DTS CDs or a couple of the many musically oriented DVD-Video releases with multichannel soundtracks (the superb James Taylor concert recording reviewed by Alan Lofft in our January 1999 issue, for example).

Others contend that they are interested only in a "pure" representation of music, the underlying assumption being that two-channel stereo somehow is while multichannel

B&K Components. John is a friendly, down-to-earth guy whose company is what I would call meat-and-potatoes high end. It builds components designed to perform to a very high standard without getting into the gilding and overbuilding that tend to add more snob appeal than value. The main point of his call was to show off B&K's beefy new 7260 six-channel and 7250 five-channel power amplifiers. He had another new product, however—a two-channel tuner/preamp with remote control called the PT-3, priced at \$589. It looks to be a very sweet piece, with all the usual goodies, plus some novelties for a component of this sort: full-range and high-passed stereo outputs, a full-range mono output, a subwoofer output, and an RS-232 port that can be used to control the PT-3 from a personal computer.

If you're interested in the PT-3, the best news may be that it came about because dealers asked for it. That suggests

audio retailers are coming to see traditional two-channel stereo as an underserved market that they can profit from if they have more of the right products to sell. If so, I think they're right. Not that two-channel is about to experience some sort of enormous



isn't. Unfortunately, there is nothing particularly pure or natural about two-channel stereo. Although it can, in skilled hands, deliver a nice bit of fakery, we should not forget that there are no pan-pots in the rain forest. I'm not suggesting that five- or seven- or however-many-channel recording and reproduction are not also fakery; they just have the potential for much greater realism.

The one argument to which I am sympathetic is purely pragmatic. Some correspondents note that they have large libraries of mono and stereo recordings, nowhere to put more speakers, and no interest in surround sound for video. They do, however, want to get the best sound they can from those recordings and typically are dismayed at the extent to which the audio industry seems to have deserted them. They long for the preamps and receivers of yesteryear. And they have a point. In that big range between the cheapest receivers and esoteric stereo preamplifiers, the two-channel pickings are much slimmer than they used to be.

Although two-channel enthusiasts are never again going to have the breadth of choice they did a decade ago, things may be looking up for them. Which brings me to what provoked this whole meditation, a visit from John Beyer of

resurgence that rolls back all the trends of the last decade—just that the audio industry overshot a little on the home theater side and may now be coming back into better balance. Speaking as a hard-core multichannel enthusiast, I think that's a good thing.

All of us here at *Audio* wish all of our readers a happy new year and the world at large a splendid turn into the new millennium. Amazing how things change in just a thousand years.

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