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## INTERVIEW

### MOZAIC'S

### MICHAEL CUSCUNA

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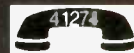
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The Cover Equipment: JVC AX-V1050 audio/video amplifier  
The Cover Photographer: Carl Zapp

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# TAPE GUIDE

HERMAN BURSTEIN

## Hi-Fi VCRs for Audio Recording

*Q. I am eager to purchase a Hi-Fi videocassette recorder, mainly to exploit its superior audio quality when dubbing vinyl discs. Are there any drawbacks when using a Hi-Fi VCR exclusively as an audio recorder?—Gregory Battaglia, Syosset, N.Y.*

A. Basically, readers seem to find they are very successful in getting high-quality audio reproduction with Hi-Fi VCRs. Most appear to be using VHS machines. The chief problem they report is that of audible dropouts; even so, it is a minor problem and has diminished with tapes manufactured in recent years to the point of being hardly, if at all, noticeable.

The extent of dropouts depends on the quality of the VCR, the quality of tape, and the tape speed selected. But there is a difference of opinion whether high or low speed makes for fewer audible dropouts. One reader claims that low speed is better, because the speed of the heads relative to that of the tape is then slightly greater; the reasoning is that the tape and the heads move in the same direction, so that at low tape speed the heads are moving faster relative to the tape. Thus, I can only suggest that you test for yourself whether slow or fast speed serves you best, quite possibly taking into account that using the slowest speed (called EP or SLP) gives you three times as much recording time per tape as standard play (SP). In terms of fidelity, I gather that one does about as well at slow speed as at fast.

## Microphones, Inputs, and Sensitivities

*Q. I wonder if I could use the phono inputs of my receiver as microphone inputs in order to feed my tape deck, which has no mike inputs. The phono input sensitivity and impedance ratings of my receiver are 2.5 mV and 50 kilohms, respectively, while its tape outputs are rated as 150 mV and 2.2 kilohms. Specifications for my tape deck state, "Rec/Line In maximum input sensitivity: 50 mV (47 kilohms)." Does this mean that my deck's so-called line inputs are really low-level inputs and are already suitable for use with dynamic and capacitor microphones? Further, if the maximum input sensitivity of my tape deck is really 50*


*mV, what are the dangers of feeding it a 150-mV output from my receiver?*

The output specification of my deck says, "Play/Line Out standard output level: 450 mV (0 VU); suitable load impedance over 47 kilohms." My receiver's tape input sensitivity and impedance are rated as 150 mV and 50 kilohms; no overload point is given. Are these specifications compatible? Finally, what does VU stand for?—David P. Marshall, Irvine, Cal.

A. You cannot use the phono input of your receiver for a low-impedance mike, such as a dynamic or capacitor type. Although gain would probably be sufficient, there is the problem of RIAA phono equalization at this input, consisting of very substantial bass boost and considerable treble cut. The result would be a great departure from flat response.

I doubt very much that you will obtain sufficient gain for a low-impedance mike if it is fed into the Rec/Line In jack of your tape deck. The output of such a mike is typically 5 mV or less. What the receiver specification intends to say is that as little as 50 mV can drive the deck to full recording level. Thus, the 150 mV at the tape output jack of your receiver can fully drive the deck. If more than 50 mV is fed to the deck, it is unlikely that the deck or tape will be overloaded, because proper setting of the deck's record level control will reduce the signal sufficiently to prevent overload.

Inasmuch as your deck can produce as much as 450 mV at its output, and the receiver's tape input requires only 150 mV to drive the receiver to full power, the situation appears satisfactory. The setting of the receiver's volume control will prevent the receiver from being overloaded.

VU stands for "volume units," which are dB above a reference. In a cassette deck, 0 dB customarily represents either a recorded level of 250 nWb/m (nanowebers per meter) on the tape, which is the DIN standard, or 200 nWb/m, which is Dolby level. 

**If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 1633 Broadway, New York, N.Y. 10019. All letters are answered. Please enclose a stamped, self-addressed envelope.**

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**AUDIO**, August 1991, Volume 75, Number 8.  
AUDIO (ISSN 0004-752X, Dewey Decimal Number 621.381 or 778.5) is published monthly by Hachette Magazines, Inc., a wholly owned subsidiary of Hachette Publications, Inc., at 1633 Broadway, New York, N.Y. 10019. Printed in U.S.A. at Dyersburg, Tenn. Distributed by Warner Publisher Services Inc. Second class postage paid at New York, N.Y. 10001 and additional mailing offices. Subscriptions in the U.S.: \$21.94 for one year, \$39.94 for two years, \$53.94 for three years; other countries, add \$6.00 per year. **AUDIO**® is a registered trademark of Hachette Magazines, Inc. ©1991, Hachette Magazines, Inc. All rights reserved. The Editor assumes no responsibility for safety or return of manuscripts, photographs, or artwork. The Publisher, at his sole discretion, reserves the right to reject any ad copy he deems inappropriate. **Subscription Service:** Forms 3579 and all subscription correspondence must be addressed to AUDIO, P.O. Box 52548, Boulder, Colo. 80321-2548. Please allow at least eight weeks for the change of address to become effective. Include both your old and your new address and enclose, if possible, an address label from a recent issue. If you have a subscription problem, please write to the above address or call (800) 274-8808; in Canada or other foreign countries, (303) 447-9330. Canadian GST Number 126018209.

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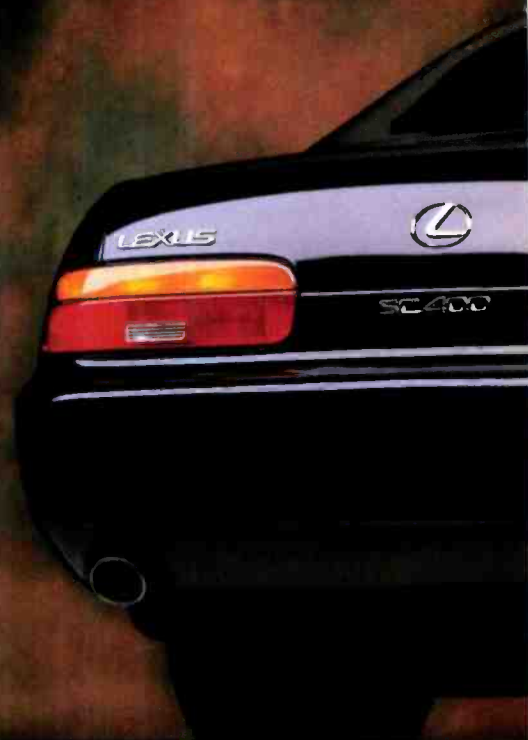
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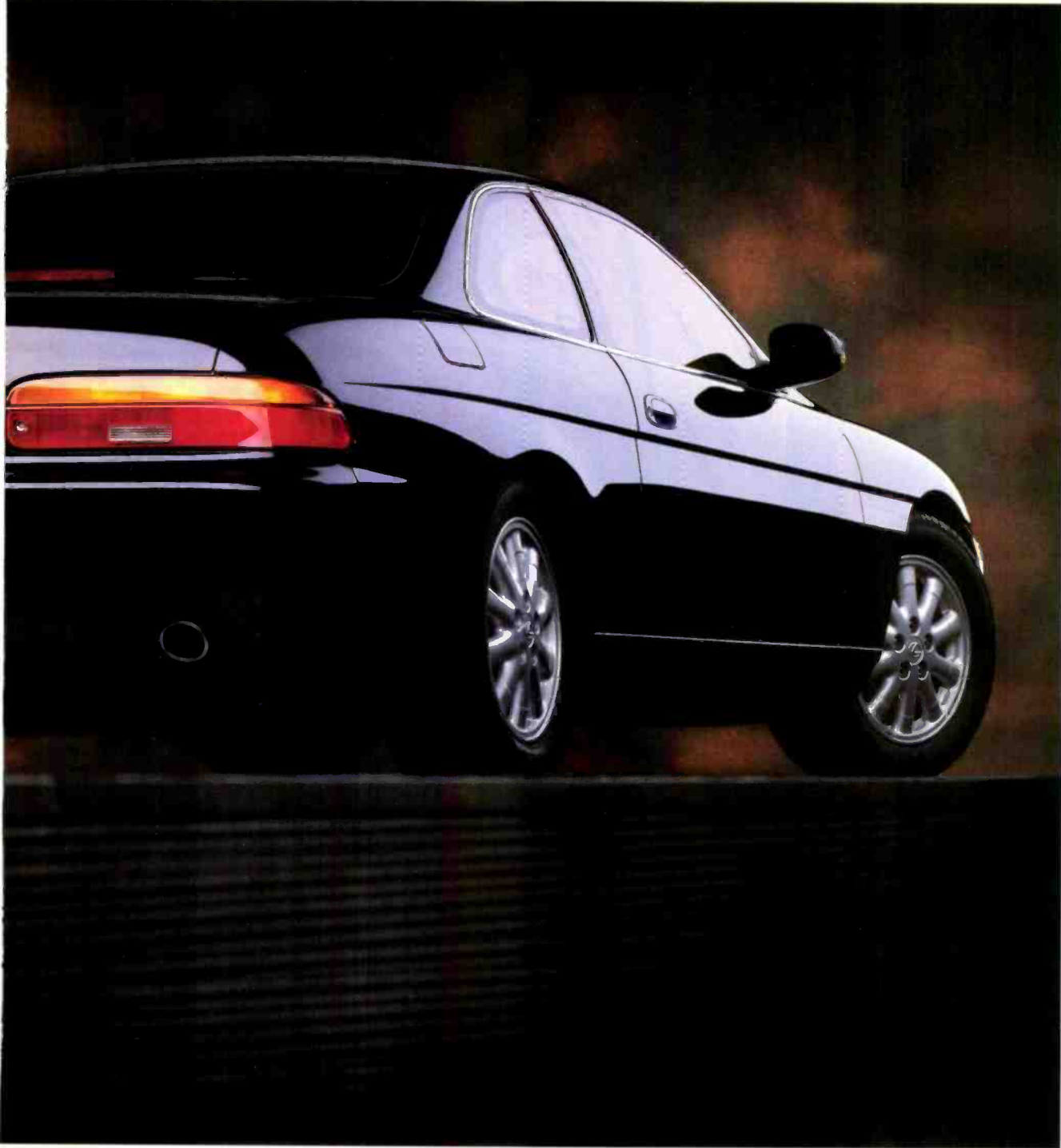
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## BEWITCHED, BINAURAL &amp; BEWILDERED



**B**ack in the '50s, the heyday of hi-fi's ebullient youth, you might have been reminded of a certain classic literary device: The *misplaced epithet*. The right adjective applied to the wrong noun, or vice versa. In ancient poetry this was supposed to add impact and create beauty. As applied to 1950s audio, it led mainly to confusion. I mean, that word *binaural*. It means *two-eared*.

In the excitement of a new discovery—two-channel sound—we blithely ignored sense as we linguistically attached pairs of ears to an astonishing array of audio gear, with never a qualm as to logic. "Binaural" had a good sound to it; there was sales appeal in it and expectations for wonders to come. And that is why, for a few short years, there wasn't a new audio product that didn't have ears on it. Binaural was the buzzword.

Stereo? No such word existed, though the more knowledgeable among us knew perfectly well that the longer term *stereophonic* was both correct and well established. Too fussy! Too many syllables.

It was binaural everything, for some five or six years, in what I can only call the "binaural" era of our history. Who can remember? I can. A binaural disc? We had it. Two furry ears growing out of a vinyl platter? Binaural speakers—

my purple imagination sees them sprouting ears on each side like the wings of an angel. There were binaural demos, one after the other (prototype) for an avid press. A *two-eared* demo? Logic could retreat no further.

This "binaural" era, 40 years back, is now forgotten, but actually it was important, the first phase of what we now call stereo and, ultimately, all the multi-channel sound we have since produced. As many know, the idea of more than one channel, contributing new elements of space and realism, goes back to the 1930s (in France, by sheer accident, the 1890s), and there were actual modern-type stereo discs hereabouts—behind the scenes—in 1931. Some of us remember, and have heard, Stokowski's experiments. Nevertheless, the "binaural" era burst with a bang, on an audio world that really thought it was brand-new.

It was, first of all, a time of intense engineering development, this slightly zany period. A very serious business, adapting consumer audio to multi-track, and I count that time as crucial for our later history. But don't think that we went around with long, serious faces. Far from it. Such enthusiasm you cannot imagine. It came, of course, from public relations (where else?), which perhaps explains the slightly addled use of "binaural." What

the sales forces instantly recognized was that two is better than one but not by any means for the *price* of one. The public balked; they screamed and yelled. But they came to listen, and, as the cowboy films put it, we were off in a cloud of dust.

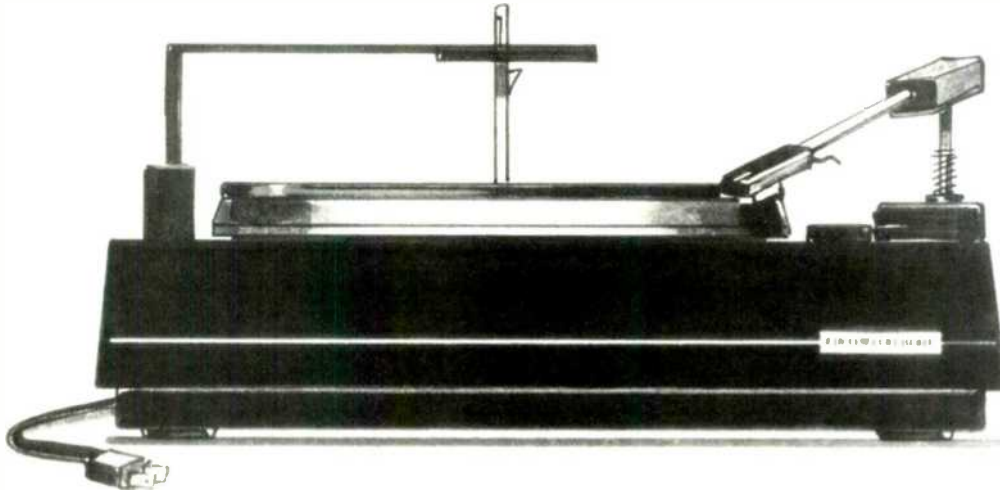
The happy scramble caught everybody in its excitement, which indeed was very real. We all talked "binaural" until we were at least pink in the face, if not blue. There were demos everywhere, in hi-fi stores, hotel suites, and, especially, in just about every possible room at the big hi-fi shows. And shortly—too shortly—a flood of (prototype) products to catch the public's ears, not to mention its purses (in pairs, of course). We even had "binaural" live, and I do not mean ears on people.

I remember with amusement an annual banquet of the Audio Engineering Society, that august professional body, for which, in the spirit of the day, the speaker's rostrum was equipped not with one but with *two* microphones, 7 or 8 inches apart (Altec condensers, each a slim black bottle with a tube in the base). Very elegant and appropriate, but alas, every time a speaker turned his head a few inches, his voice jumped a hundred feet across the ballroom. Disruptive. (Up at the rostrum, they didn't even notice.) Even at AES, the "binaural" technique was not yet exactly in hand.

*Two-eared*. That was the misplaced adjectival epithet! Misplaced ears, right and left. It was anything but poetry, but we didn't mind. We had no time to worry about logical niceties. And yet, there were those who stolidly kept to correct nomenclature, most remarkably the record companies, both big and small. I have a shelf of their first reel-to-reel tape products, all from the '50s, and I have yet to find a tape called "binaural." Every one is circumspectly described as stereophonic.

So we had discs with ears, but not tapes. No matter! Once underway, publicity is hard to stop. All too soon we discovered that even our older equipment, and all our thousands of older records, had sprouted ears—one ear per item. *Monaural*. This had a certain logic, I suppose, though the later *monophonic* (to match stereophonic) is a lot better, to my logical way of thinking.

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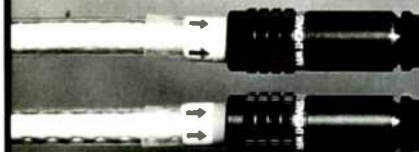
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People came to hear this  
"binaural," and, as cowboy  
films put it, we were off  
in a cloud of dust.

Emory Cook's binaural disc was definitely furry-eared, and he a distinguished engineer in the recording area! Maybe it was his sales manager. His binaural record player had a double arm on which were mounted two ears in the form of pickups. They played separate bands on the LP-style disc, and the timing was definitely not long-playing, as you can figure for yourself if you have never seen one. It was a well-meaning but clumsy attempt in a vital direction, and it did focus attention on the need, the extreme need, for a practical, cheap, mass-produced, two-channel disc.

When that record arrived and was for sale, in the spring of 1958, it was no longer "binaural." It came with the new short term, "stereo." "Binaural" vanished overnight. End of an era.

And what a hectic era! "Binaural" was only a part of it. The near-infant hi-fi biz jumped headlong into every new development that came along, throwing caution to the winds, at least for the time being. A new sensation almost every week, and we rushed from pillar to post to keep up. The RJ, the littlest speaker box (we bought the driver units separately in those times), was the original bookshelf model, with tricky front loading and a bullfrog boom. That was one innovation in which I joyously entangled myself. It was superseded by the more radical AR with the well-known acoustic suspension system a complete speaker unit.

In the opposite direction, the vast, corner Klipschorn wowed us (also the McProud corner speaker from the then editor of this magazine) with fanatical basement relatives made of concrete that could serve as bomb shelters when needed. The once-fabulous GE Variable Reluctance cartridge seemed absolutely minuscule compared to all before it and dominated our LP record playing. All this furor went on and on, but "binaural," two-channel sound, was the biggest boost of all, after the 1948 LP. And, of course, magnetic tape.

The real reason for the "binaural" era and its excitement was surely tape. At last, it made two-channel sound practical for big business. We then thought that the disc, even in its splendid LP lengths, was doomed by tape. Not so, just as TV did not kill radio, though the maiming was severe. We hoped there

might be a real, workable "binaural" disc someday, but few believed it would arrive before tape took over. And so the record companies explored tape as though their lives depended on it.

It is astonishing to see on my surviving shelf how many record labels, large and small, plunged into the expensive and clumsy prerecorded tape on reels, first in mono and then, as soon as possible, straight into "binaural"—correctly called stereophonic. High-speed mass production of tape did not arrive for years, with the mature cassette, but in the '50s nothing was going to stop this pathetically small, almost hand-tooled, new area of hi-fi sound. Even using the half-track format (with numerous home machines becoming available for the playback), the tape record was out of reach for most collectors. The stereophonic version was over eight times more expensive than the equivalent LP, or so I figure it.

At the beginning, for obvious reasons, these first tapes had to be mono. First, not enough two-channel master material, but plenty available in the older single-channel tape and of hi-fi quality. Second, no home equipment for the two-channel playback. Brand-new equipment had first to reach our homes in "binaural" form, a very big order.

I'm interested to see how actively RCA, in particular, barged into tape records for the home, a painfully limited area for their kind of big production. Tape was the future, not disc—so they must have believed. In short order, they put forth single-channel tapes by the dozen, reel to reel, half-track at 7½ ips. Almost simultaneously, they launched the first two-track stereophonic tapes, for what must have been an infinitesimal market. Like the mono line, these were nicely boxed with notes. Who ever got to hear them? To that end, RCA also launched a home stereophonic tape player system, surely one of the first. I have part of it left today—two slightly preposterous little boxes, shiny veneer, on long spindly slanted legs, both containing small speakers. One of them was equipped with a built-in player, the other with empty storage space.

My earliest tape records were from around 1955 to 1956, both in mono and stereophonic. The timings are conspicuously absent, for good rea-

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# The Best Audio Tape



▶▶ No one has a longer or more distinguished history of leadership and innovation in metal tape than TDK. So when we introduced the MA-R back in 1979, it instantly became the benchmark all other metal tapes would be measured against.

Since that time, however, the evolution of digital recording sources has progressed far beyond what anyone ever expected. Beyond what even the most advanced metal tapes in the world are capable of reproducing.

Which is why we created the new MA-XG. A tape which is not only the best audio tape in TDK's history.

But the best tape in recorded history.

## DIGITAL MUSIC DEMANDS PERFECTION IN A CASSETTE.

Music from digital sources is dynamic to say the least. It can go from absolute silence to maximum loudness instantaneously. And for an audio cassette to reproduce its

power and dynamic range accurately and free from distortion, the audio tape has to have extremely high output capability or what is known as MOL (Maximum Output Level).

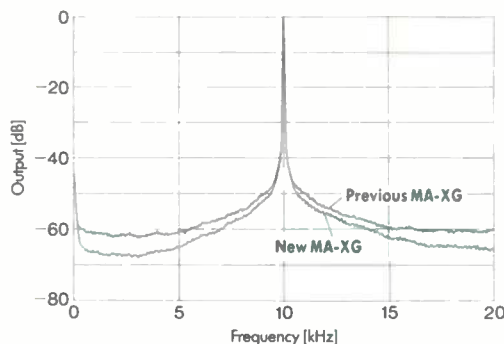
But digital music can also go from maximum loudness to absolute silence instantaneously. And the lack of background hiss makes the clarity of the pianissimos and the transparency of the passages that linger and fade striking. To convincingly reproduce this kind of delicacy requires a tape with extremely low bias noise. Otherwise, music signals which are softer than the tape noise will be masked and inaudible.

The perfect recording tape then, for CDs and other digital sources, is one with the highest possible output and the lowest possible noise. The kind of tape it was almost impossible to design. Almost.



## THE WORLD'S BEST DUAL-LAYER PURE METAL TAPE.

Rather than settle for a tape which compromises output for low noise, or low noise for output, TDK opted for a tape that compromised nothing. So the MA-XG combines two separately "tuned" layers of ultrafine Finavinx magnetic particles. The bottom layer utilizes a unique high-density Finavinx particle designed for *highest possible output*. The upper layer consists of *low*



MODULATION NOISE SPECTRUM

# In Recorded History.

noise ultrafine Finavinx particles arranged in a high-density coating with the help of TDK's proprietary particle orientation technology.

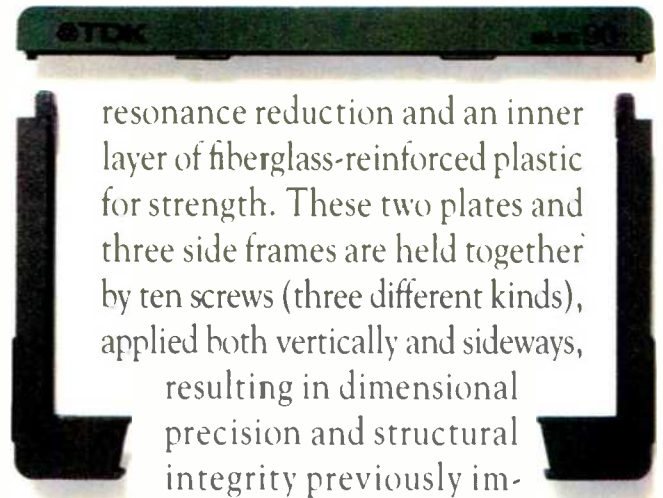
What this unique design results in is a metal tape with the highest output (+7.5 dB at 315 Hz) and the lowest noise (-59 dB) of any analog cassette. Or more simply put, the ultimate "digital ready" tape.

## A MECHANISM AS SOPHISTICATED AS THE TAPE.

You don't even have to listen to the MA-XG to know how advanced its design is. Just hold it in your hand. Its extra heavy-weight RS-III mechanism



utilizes an unprecedented super-rigid five-piece construction which provides the ultimate defense against vibration and the sound-smearing effects of modulation noise as shown on the modulation noise chart. The unified dual-layer molded face plates consist of a non-rigid plastic outer layer for



resonance reduction and an inner layer of fiberglass-reinforced plastic for strength. These two plates and three side frames are held together by ten screws (three different kinds), applied both vertically and sideways, resulting in dimensional precision and structural integrity previously impossible to achieve. It even employs a system of internal sound stabilizer weights and super high-precision guide pieces to ensure maximum vibration attenuation and the highest degree of azimuth accuracy.

## AUDIO MAGAZINE AGREES MA-XG IS THE BEST EVER.

That the TDK MA-XG is the ultimate recording tape is not just our opinion. It's a belief shared by the ultimate authority: *Audio* magazine. After an exhaustive test of 88 audio cassettes (the results of which were published in the March 1990 issue), *Audio* found the MA-XG to be not only the best of any metal (Type IV) tape, but the best of any tape. Period.

So, if you're going to record digital music, make sure you record it on the new MA-XG. Because the best music in recorded history shouldn't lose anything in the translation. ◀◀



 **TDK**<sup>®</sup>  
As Serious As You Can Get.

Tape was surely the reason for the "binaural" era, and we thought that the disc, even in its splendid LP form, was doomed.

son. In their stereo form, as we would call them today, the reel of two-track quarter-inch tape ran a maximum of a half hour, the length of one LP side. That's only a half of a present-day C-60 cassette or one-third of a C-90.


But the sound! It was new, it was good, and it began to sell. The "binau-

ral" era rolled merrily on, and in a remarkably short time all the big recording labels were out with handsome boxes of stereophonic tape. There they are, lined up incredibly for yards on the shelves in my present studio, looking brand-new once the dust is shuffled off. Columbia, Capitol, Mercury Living

Presence, Westminster, Livingston, Boston, Concert Hall Society, and more, from 1956 right on through 1958, and as far as the public was concerned, every bit of it "binaural."

Very curious—I note that most record companies still harbored doubts as to the best terminology, at least behind the scenes. RCA Victor, the determined leader, lists its first and later stereophonics with an "S" (e.g., ECS-5)—get it? So does Westminster, another purist label. But Boston Records, in small type, calls its stereo releases "BN." Get that? Binaural, what else? Mercury Living Presence waffles, with "BNS," presumably for binaural/stereophonic. Columbia uses "IMB," as in *The Firebird Suite*, Columbia IMB-3. All this gives us an inner glance at the audio thinking of that time, a mere 35 years ago. "Binaural" was still the linguistic king, but it was wavering. Stereo, the new short word, was getting around. I must have heard it first in 1957 or so.

My last two-channel tape in this memorable series is dated on receipt, May 1958, reviewed in this magazine in August of that year. It was Westminster's monumental *Israel in Egypt*, the Handel oratorio on two reels. Perhaps it was a noble audio last gasp. One month later, in June of '58 as I recall, the true 45°/45° stereo disc was launched at last. It was, emphatically, a stereo disc. It revived the LP for a whole new age, and removed the original tapes, two-track, from any further circulation. As they say, all in one fell swoop. Too bad! A noble breed and the four-track reel-to-reel stereo tapes that followed, much more economical and still good in quality, meant new equipment all over again in the very face of the stereo disc. These did well, but they too faded away. How could it be otherwise? It was indeed a new age. All stereo.

Binaural has come back, hesitantly, now without quotation marks. It is properly a headphone sound, though there are those who persist in devising binaural for speakers, perhaps with technological progress in mind, also perhaps for the commerce of it, in spite of the Walkman revolution Sony unleashed. But the all-out excitement of that early "binaural" is a thing we will never recover. 



## THERE ARE MANY OPINIONS ABOUT AUDIO CABLE

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- MIT has the most extensive research and development program in the audio cable industry.
- MIT holds more patents on audio cable technologies than any other cable company.
- MIT is the only cable company that can document cable performance through advanced instrumentation and testing techniques.
- MIT has the best selling premium performance audio cables.
- MIT is rated highest among cable manufacturers in customer satisfaction\*.
- MIT applies premium performance audio cable technologies to cables that sell for as little as \$1.50 per foot.
- MIT cables can be auditioned at home at no risk.

\*According to *Stereophile* survey, Vol. 12, No. 2 (Feb. 1989)

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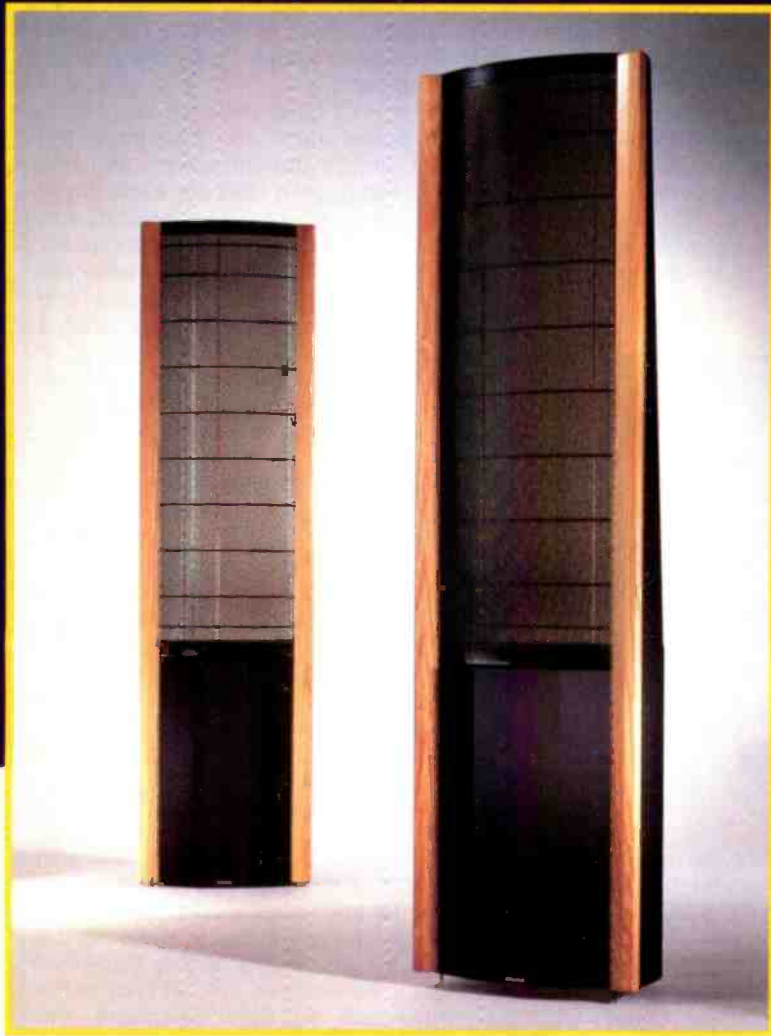
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BERT WHYTE

## COMPLETING THE PICTURE

In the July issue, I described the features and performance of my updated home theater system and the significant improvements over my previous system. I also noted that while the speakers in my original surround sound system were not matched, they were similar in tonal balance and efficiency and that these quite massive speakers provided impressive sound.

I have always had great respect for Shure Brothers' technology and expertise with phono cartridges and mikes. However, when Shure sent me information on their HTS surround sound system, I was quite surprised by the small size of the loudspeakers and a bit skeptical about the performance

I am using Shure's "gild the lily" system. This consists of the HTS 5300 decoder, five HTS 50SPA amplifiers (four bridged for 250+ watts each), three HTS 50CF speakers (for left, center, and right; each is driven by a bridged amplifier), two HTS 50SW subwoofers driven by a bridged amplifier, and four HTS 50LRS speakers driven by an HTS 50SPA amplifier. The latter four speakers fire backwards, to the rear of my viewing/listening position, into two RPG diffusers. This provides a very broad source of decorrelated sound from the surround tracks of Dolby Surround movies and TV broadcasts. Total cost of this system is \$9,485.



claims. The rationale for using small, unobtrusive loudspeakers in a surround sound system is certainly valid. They are more flexible because they are easier to place in a room, and they offer the undeniable sonic advantages of a matched set of speakers. I knew that Shure is not generally given to inflated claims and soon learned that the performance claims are based on an integrated systems concept.

The Shure HTS Theater Reference System consists of the HTS 5300 logic decoder, three HTS 50SPA signal processing amplifiers, one HTS 50CF center-front speaker, four HTS 50LRS speakers (one each for left and right plus two for surround), and an HTS 50SW subwoofer. These are dedicated, purpose-built components designed to work synergistically with each other. Total cost is \$5,990.

The heart of the system, the HTS 5300 logic decoder, has the basic features of the HTS 5200 decoder I used in my original theater system ("Scenes," February 1988) but also has many refinements and improvements. For example, Shure's patented Acra-Vector directional enhancement circuitry now provides 80% more sensing points, to derive more information about the incoming sound fields, and is able to make better choices regarding the proper degree of directional enhancement in specific situations. This circuitry permits proper enhancement of multiple, simultaneous sound sources. The HTS 5300 will accommodate oppositely placed sound sources; in basic Dolby Pro-Logic decoders, only two control signals are used, so signals from opposite directions (vectors) cannot be simultaneously en-

hanced. Additionally, the Acra-Vector circuitry detects low-level directionality more accurately. The HTS 5300's improved digital time delay operates at twice the clock rate of the previous decoder's, and an improved Acoustic Space Generator more closely simulates the effect of multiple rear loudspeakers as used in Dolby Stereo movie theaters.

The HTS 5300 provides outputs to left, center, right, and surround channels, and to the subwoofer, and has level-setting trim pots for each channel. Along with input level and balance controls, there is a visual sound-field display with LEDs indicating left, center, right, and surround signals. The decoder's remote control activates a filtered noise generator that cycles continuously through all the channels to aid in setting levels. The remote also operates master and surround volume settings.

The Shure HTS 50SPA amplifier is a high-current, high-voltage design that employs low-noise FET op-amps, high-quality small-signal capacitors and resistors, multiple computer-grade power-supply capacitors, and a low-noise, high-current, instrumentation-grade toroidal power transformer. Particular emphasis was given to designing a very rugged, high-performance power supply to cope with the very demanding, often prolonged, high-level sound that is frequently encountered in motion pictures.

The HTS 50SPA is equipped with switch-selectable mode and level controls for each channel and special signal processing circuitry. Because the HTS system uses a different speaker for the center-front channel than for the main and surround speakers, the amp's switched "Operational Mode" circuit tailors output response to the particular speaker in use. Thus, the HTS 50SPA amplifier is programmed for the exact design parameters in respect to speaker power handling, crossover equalization, and baffle effects and for the difference in efficiency between the center-front and other speakers.

Each channel of the HTS amplifier includes a dynamically variable limiter that continuously monitors the input signal and shapes the response, depending on the mode selected, to pro-

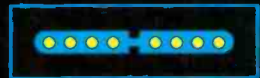
# WOW, WHAT A DIFFERENCE!

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Over the last 12 years AudioQuest has continually improved and refined its cable designs to reduce all types of cable-induced distortion — and, to do it cost-effectively. Many different constructions and grades of copper and silver are used depending on the budget.

AudioQuest *F-18* speaker cable is one of three very flat cables which use multiple-solid conductors. The sound is sweet and clean because strand interaction is eliminated, while skin-effect and resistance are kept to a minimum.



F-18\*

AudioQuest *Indigo Hyperlitz*® speaker cable uses geometry similar to our most expensive cables, yet is very affordable. The spiraled solid conductors maintain an absolutely consistent position and are far enough apart to prevent magnetic interaction. The clarity, dynamics and sense of acoustic space are incredible.

AudioQuest *Diamond Hyperlitz*® interconnect cable uses our patented construction which eliminates strand interaction and minimizes distortion caused by insulating materials. Teflon insulation, FPS™ solid long-grain silver, and resistance-welded, direct-gold plated, FPC™ plugs make this cable sound incredible. The aural invisibility of this cable is something you will have to experience for yourself.

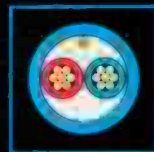
AudioQuest's absolute commitment to value doesn't mean that all AudioQuest products are inexpensive. It does mean that the expensive products are also an excellent value when used with better systems.

No matter what type of equipment you have, you can maximize your system's performance with AudioQuest cables. Contact your local AudioQuest dealer and listen for yourself. You will hear the difference!

\*All diagrams are 1/4 times actual size.



Indigo Hyperlitz\*



Diamond Hyperlitz\*

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Ensemble® II is the latest version of the subwoofer-satellite speakers *Audio magazine* said "may be the best value in the world." Unlike the Bose® system, it uses two-way satellite speakers and acoustic suspension subwoofers (with 35% more cone area). It can sound identical to our original Ensemble system.

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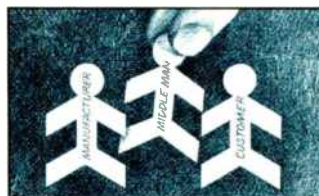
Our helpful, knowledgeable audio experts (not clerks) are on duty for advice, hook-up information or orders, 8AM-midnight, *every* day, including holidays. They don't know the meaning of the phrase "hard sell." A customer wrote "The quality of your product is matched by your attitude towards your customers."

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protect against distortion caused by over-excitation of the woofer in the speaker connected to that channel. This excursion protection circuit acts only when necessary to avoid distortion. The HTS 50SPA also has overload distortion protection, in all modes, for each channel. If an incoming signal has high-level peaks of special effects recorded above music and dialog, the amp will inaudibly and instantaneously attenuate the gain during the peak to eliminate long-term, hard signal clipping.

Frequency response is rated at 20 Hz to 20 kHz,  $\pm 0.5$  dB, in the HTS 50SPA's flat mode. In other modes, frequency response and sensitivity are tailored to complement the particular HTS speakers. Power output is 100 watts per channel into 8 ohms with less than 0.1% THD for a 1-V input. The amplifier can be bridged to 250 watts into 8 ohms.

As noted, all Shure HTS loudspeakers were designed with the signal processing capabilities of the HTS amplifiers as a significant consideration. Each speaker, including the subwoofer, has a 1-inch-thick, high-density particleboard enclosure that is heavily surface-braced, cross-braced, and damped with fiberglass. This rugged construction for such relatively small loudspeakers results in very rigid, low-resonance enclosures. All speakers, except the subwoofer, have 6½-inch woofers with cast-aluminum baskets, curved polymer diaphragms with butyl rubber surrounds, and 4½-pound double magnet systems whose shielding prevents TV interference. High-temperature copper wire is used on slotted 1½-inch voice-coils. Soft-fabric, damped, 1-inch dome tweeters, with 20-ounce double magnet systems for magnetic shielding, are used in the HTS 50LRS and HTS 50CF speakers. The tweeters feature diaphragm back damping, dome diffraction rings, and annular acoustic-foam damping to control high-frequency dispersion. Power handling is aided by Ferrofluid cooling in the magnetic gap.

The HTS 50CF center-front speaker is the sonic "anchor" in this system, for it must handle dialog, music, and much of the violent, highly dynamic special effects sounds. Its enclosure (20 in. H x 13½ in. W x 8¾ in. D) is fitted with an in-line configuration of

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**Shure's HTS amps tailor output to the sensitivity and frequency response of whichever HTS speakers they're feeding.**

two 6½-inch woofers with a 1-inch tweeter fitted between them. The drivers are offset on the front of the baffle, and the grille has acoustic foam padding to help reduce tweeter diffraction from the box's edge. Two-way, third-order/fourth-order matched crossovers with impedance equalization on the drivers are used to improve power handling. The walnut veneer cabinet is fitted with gold-plated, five-way binding posts. This two-way closed-box speaker has a specified frequency response of 55 Hz to 18 kHz, but the HTS amp rolls it off at 80 Hz when a subwoofer is used.

The HTS 50LRS two-way speakers used for left, right, and surround are closed boxes measuring 13½ in. H x 10 in. W x 8¾ in. D. Each speaker is fitted with one of the 6½-inch woofers and one of the 1-inch tweeters. The crossover is a fourth-order type with impedance equalization. Frequency response is 60 Hz to 18 kHz but is rolled off by the amp at 80 Hz in systems using subwoofers.

The HTS 50SW subwoofer is a fourth-order vented box with dimensions of 18 in. H x 23 in. W x 14 in. D. The speaker is fitted with a front-firing, 12-inch woofer with a heavy, damped felted cone and a rubber roll surround. Each driver uses a double magnet system with magnetic shielding, while internal fiberglass damping and offset driver mounting on baffle board help to control standing waves. When the amplifier is in the SW mode, frequency response is 33 to 80 Hz to match the cutoff characteristics of the other speakers in the system without introducing phase anomalies. Cone-excursion control and extreme sound levels are obtained when using the HTS amplifier in the SW mode.

All these components underscore the benefits of a wholly integrated system, and the Shure engineers have achieved some mighty impressive design goals. The HTS system provides controlled directivity over a broad frontal angle ( $\pm 30^\circ$ ) for all directional frequencies and has output capabilities in excess of 116 dB SPL continuous with low distortion!

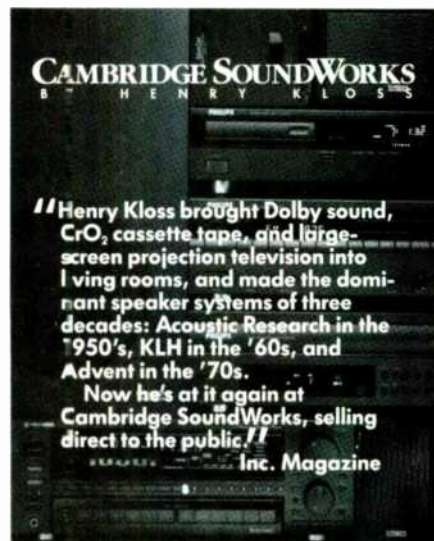
For those videophiles who are really into top-quality TV monitors or projection TV, properly transferred LaserDiscs are the way to go because of

their superior images and digital soundtracks. The player that will extract the last iota of video and audio quality from any and all LaserDiscs, in my opinion, is the Pioneer LD-S2. This \$3,500 player is in a rarefied class. The LD-S2 can be considered a "purist" design, because it plays LaserDiscs, period—no CDs. In fact, it does not even have the mechanism to successively play both sides of a LaserDisc.

Some of the innovations and refinements in the LD-S2's mechanical, optical, and electronic components echo those of purist audio gear. This player's 68-pound mass suggests stability and a minimum of vibration. Its under-chassis uses high-carbon steel, honeycomb construction, and graphite to absorb frictional energy. The new Accufocus pickup improves S/N by 6 dB, and Silent Focus reduces servo-motor sound. Digital processing of all signals provides phase characteristics no analog processing can match. Digital time-base correction eliminates jitter, as does the newly developed eccentric-jitter cancellation circuit. The Pioneer LD-S2 is dead quiet in operation too. The player's 52-dB video S/N, rock-steady video images, and utterly clean digital sound speak for themselves. (Nevertheless, I fed the LD-S2's fiber-optic output to a Wadia Digi-master 32X, a 32-times oversampling digital processor. This was icing on the cake for digital soundtracks, especially on PolyGram operas like *Tosca* and *Salome*.) It all results in a component that gives you superb playback of good LaserDiscs and one that can even cope with the tracking problems of older LaserDiscs.

For a VCR, I am now using JVC's Model HR-S5800U, an ultra-modern Super VHS unit. It has a jog/shuttle control and on-screen programming menus, and it allows precise editing. It is also the quietest VCR I have ever used—there's hardly a sound when it's running—and above all, it affords exceptionally good picture quality if fed with a good signal.

My updated surround sound theater is a revelation in how far the art has advanced in just three years. The combination of the Vidikron TGS 200 projector, the Pioneer LD-S2 LaserDisc player, and the JVC HR-S5800U VCR provides images that bring a new di-



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At Cambridge SoundWorks we manufacture speakers and music systems designed by Henry Kloss (founder of AR, KLH & Advent), and we sell them from our factory in Newton, Mass. We also sell selected audio components from brands like Philips, Pioneer and Denon. Because we sell factory-direct, you can save hundreds of dollars on components and systems. We sell nothing but "the good stuff." Our knowledgeable audio experts will help you make the right choices, without being pushy. And you can call toll-free for advice or "hook-up help" 365 days a year—even holidays. This is the simplest way to get the right deal on stereo components...and there's virtually no risk.

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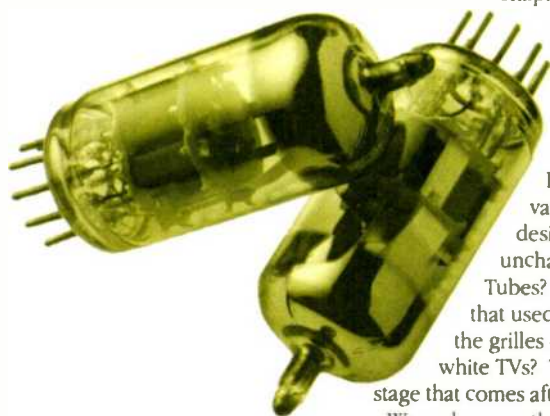
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# CAN TUBES WARM UP CD SOUND?

*How a very old technology can make a brand new compact disc player sound extraordinarily good.*



Our new SD/A-490t has a clock that "ticks" 33 million times a second, multi-stage noise shaping, pulse width modulators and enough other edge-of-the-art circuitry to finally qualify us for entry into the hallowed Compact Disc Techno-Jargon Hall of Fame.

But it also includes two vacuum tubes whose classic design has remained unchanged for over 35 years.

Tubes? Those warm glass things that used to glow cheerily through the grilles of old radios and black & white TVs? Yes. In an important circuit stage that comes after all the digital wizardry.

We and many other critical listeners believe that this anachronistic addition to an already excellent CD player design significantly enhances its sound. Read on and decide for yourself.

## THE AMPLIFIER THAT DOESN'T AMPLIFY.

Between a CD player's D/A converter and external outputs is circuitry called a buffer amplifier stage. When you hear the word amplifier, you think of something which makes a signal louder. But that's not a buffer amp's purpose. In fact, contrary to popular lore, a CD player's buffer amplifier doesn't boost the signal strength at all — the final output of a CD player's D/A converter already has sufficient voltage to directly drive a power amplifier!

Instead, the buffer amp is a *unity gain* device which 1) increases output current, and 2) in the process, acts as a sort of electronic shock absorber.

A signal emerging from a CD player's digital-to-analog conversion process has sufficient voltage but insufficient current for proper interaction with a preamplifier or power amp. By acting as a current amplifier, the buffer stage helps lower impedance to a level that's

compatible with modern components — about 50 ohms in the case of the SD/A-490t.

At the same time, the buffer stage helps isolate the relatively fragile D/A chip set from the nasty outside world of demanding analog components.

## TUBES VERSUS SOLID STATE.

All compact disc players have buffer amplifiers. But more than 98% of them use solid state devices for this stage: either integrated op-amp circuits or discrete transistors.

A handful of hard-to-find, esoteric designs in the \$1200 to \$2500 range employ one or more tubes instead. As does our readily-available \$699 SD/A-490t. For fundamental physical reasons, tubes have different transfer function characteristics than transistors. When used in ultra-expensive, audiophile preamplifiers and power amplifiers, their sound is variously described as "mellower", "warmer", "more open and natural" or simply "less harsh than solid state".

At the heart of these perceived differences are three basic facts:

1. Tubes produce *even-order* distortion (i.e. 2nd, 4th, 6th harmonics, etc.) while transistors create *odd-order* distortion, particularly 3rd harmonics which are less psychoacoustically pleasant.
2. In a buffer stage, a tube acts as a pure Class A device, which is considered the optimal amplifier configuration. Op-amps function as Class A in and Class B out, with potential crossover distortion as voltage swings from positive to negative.
3. Tubes "round off" the waveform when they clip. When over-driven, solid state devices cut off sharply, causing audible distortion.

## THE SD/A-490t'S OUTPUT SECTION

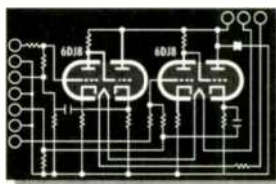
Our new CD player uses two 6DJ8 dual triodes (each literally two separate tubes in a single glass envelope) placed between the digital-to-analog converter and a motorized volume control.\*\*

Operated at less than 30% of their maximum capacity, these tubes achieve a highly linear output voltage with very low static and transient distortion while providing very high dynamic headroom.

And because they're "loafing" at 1/3 their rated current capability, the SD/A-490t's tubes are designed to last the life of the CD player without replacement or need for adjustment.

## A "LESS IS MORE" DIGITAL APPROACH FOR CLEANER ANALOG SOUND.

It would be pointless to have a tube output stage if the digital circuitry which precedes it





wasn't first rate. The SD/A-490t uses Single-Bit D/A circuitry to eliminate a form of exceedingly audible distortion inherent in most current CD player designs, and to provide better signal linearity than ever before.

If you've read current CD player brochures, you've probably stumbled across descriptions of de-gitcher circuits, laser trimming and even 22-bit converters. All these are merely fixes, applied to the same basic kind of D/A converter in an attempt to overcome built-in shortcomings.

In contrast, the SD/A-490t uses a completely new technology which avoids many of the problems that older approaches have struggled to surmount. We'd have to buy a whole section in this magazine to fully explain the differences (if you're interested, call 1-800-443-CAVR for an appropriately long and detailed brochure), but here's a short synopsis.

Traditional converters require 16 separate reference circuits, each of which must be accurate to one part in 65,536 — but, due to the realities of mass production, rarely are. If they're not "dead-on", an unpleasant form of noise called *zero-cross distortion* is produced. Because Carver's Single Bit D/A Converter transforms a 16-bit signal into a 1-bit pulse signal array, the "ladder" of 16 ultra-high-precision reference devices is not required: In effect, the SD/A-490t need only manipulate a stream of varying-width on/off pulses instead of having to accurately create 65,536 different amplitude levels at all times.

Zero-cross distortion is non-existent, and the SD/A-490t's Single Bit converter is able to decode linearity in excess of 115 dB below peak level with exceptionally low noise. You'll particularly notice the difference in the heightened purity and clarity of music during very quiet passages. Every nuance, intonation and harmonic of the original recording is there. Yet

The Carver SD/A-490t. At \$699, its suggested retail is \$500 less than the nearest competitor with tube output\*\*

"digital" harshness is noticeably absent even before it enters the SD/A-490t's mink-lined tube stage.

### AN ARRAY OF FEATURES AS RICH AS ITS SOUND.

We've designed the SD/A-490t to be both useful and easy-to-use. 21-key front panel or remote programming.

Fixed and variable output. Programming grid display. Random "shuffle" play.

Variable length fade. Automatic song selection to fit any length of tape. Even index programming for classical CD's.

Plus our proprietary Soft EQ circuitry which compensates for variables in spacial (L-R) information and midrange equalization found in many CD's mastered from analog tapes.

### BRING YOUR TWO BEST CRITICS TO A CARVER DEALER.

It's tempting to further regale you with how well we think the SD/A-490t's tubes and Single Bit circuitry improve the sound of a compact disc. But your own ears should be the final arbiter of quality.

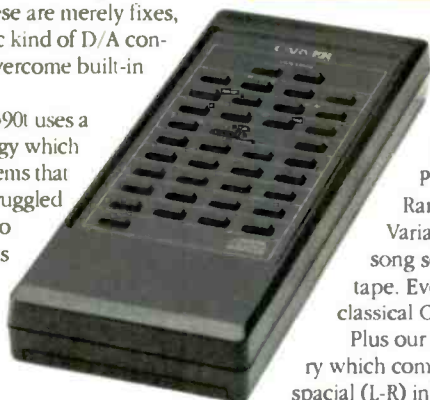
Thus you are invited to bring a few familiar compact discs down to your local Carver dealer and compare for yourself, hopefully creating your own superlatives in the process.

Suffice it to say that almost all critical listeners not only are able to hear a difference, but prefer the sound of the remarkably affordable SD/A-490t's dual triode transfer function.

\*A device which neither amplifies nor attenuates a signal is said to have unity gain. In other words, what goes in comes out unchanged. Or does it?

\*\*Remote control variable output is a wonderfully convenient feature, but it would be pointless to eliminate solid state circuitry in the buffer amp stage and then use a solid state circuit for the final gain attenuator. So the SD/A-490t changes volume the old fashioned, physical way: a nice, clean carbon potentiometer, in this case, physically rotated by a small motor.

\*\*\*Source: 1990 *Audi* Magazine Annual Equipment Directory.



### THE SD/A-490t

- Dual 6DJ8 Vacuum Tube Output Stage
- Over-sized Disc Stabilizer Transport
- 24-Track Programming with 21-key front panel & remote input
- Music Calendar Display
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*Bob Carver*

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Underscoring the benefits of total integration, Shure's HTS system has controlled directivity and clean, high output.



Shure HTS 5300 surround decoder

mension of quality to front-projection TV. Along with the visual impact of the clean, crisp, bright, well-saturated color images on the National Viewtech 100-inch screen, I also marvel at the sound quality of the Shure HTS surround sound system. It is uncanny, for here are these small loudspeakers providing very clean, smooth, and wide-range sound at playback levels limited only by your own taste. Certainly there are no technical constraints in respect to distortion at high sound levels. The synergistic action of the speaker/amplifier protection circuits keeps all sound eminently listenable, no matter what the level.

People who visit me are usually overwhelmed by the emotional intensity and involvement in this experience. Of course, much depends on the movies and the quality of their images and soundtracks; LaserDiscs with really good digital soundtracks can be awesome. A case in point is the Civil War epic, *Glory*. The realism and excite-

ment of the opening battle scene is almost scary. You are immersed in the scene, and the sounds of battle rage around you. The gut-pounding thunder and roar of cannons, as well as the sharp rattle of muskets, are almost too real through those little Shure HTS speakers. And all that sonic uproar is delivered with no apparent strain or distortion. It is the speakers' very unobtrusiveness that helps heighten the illusion of "being there" in the action. Switch to *Memphis Belle*, and as the B-17s encounter flak over Bremen, their visceral thuds rock you, along with the crews in the shuddering, jolted bomber. *Indiana Jones and the Last Cru-*

*sade, Total Recall, and Die Hard 2* all offer exciting sonic and visual experiences that make a good home theater so very worthwhile.

Needless to say, the home theater experience need not be all hyperactive blood and guts. A sharp contrast is the London LaserDisc of the great soprano Kiri Te Kanawa singing *The Songs of the Auvergne*, with that lovely part of France quite entrancing on the big screen. The Shure HTS system does full justice to the opulent beauty of Te Kanawa's voice, especially with the added realism provided by the discreetly spacious ambience in the surround channels. A

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— Sam Tellig, *STEREOPHILE*, January 1991, Vol. 14 No. 1

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Sonata Series M-200s

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— Kent Bransford, *HIFI HERETIC*

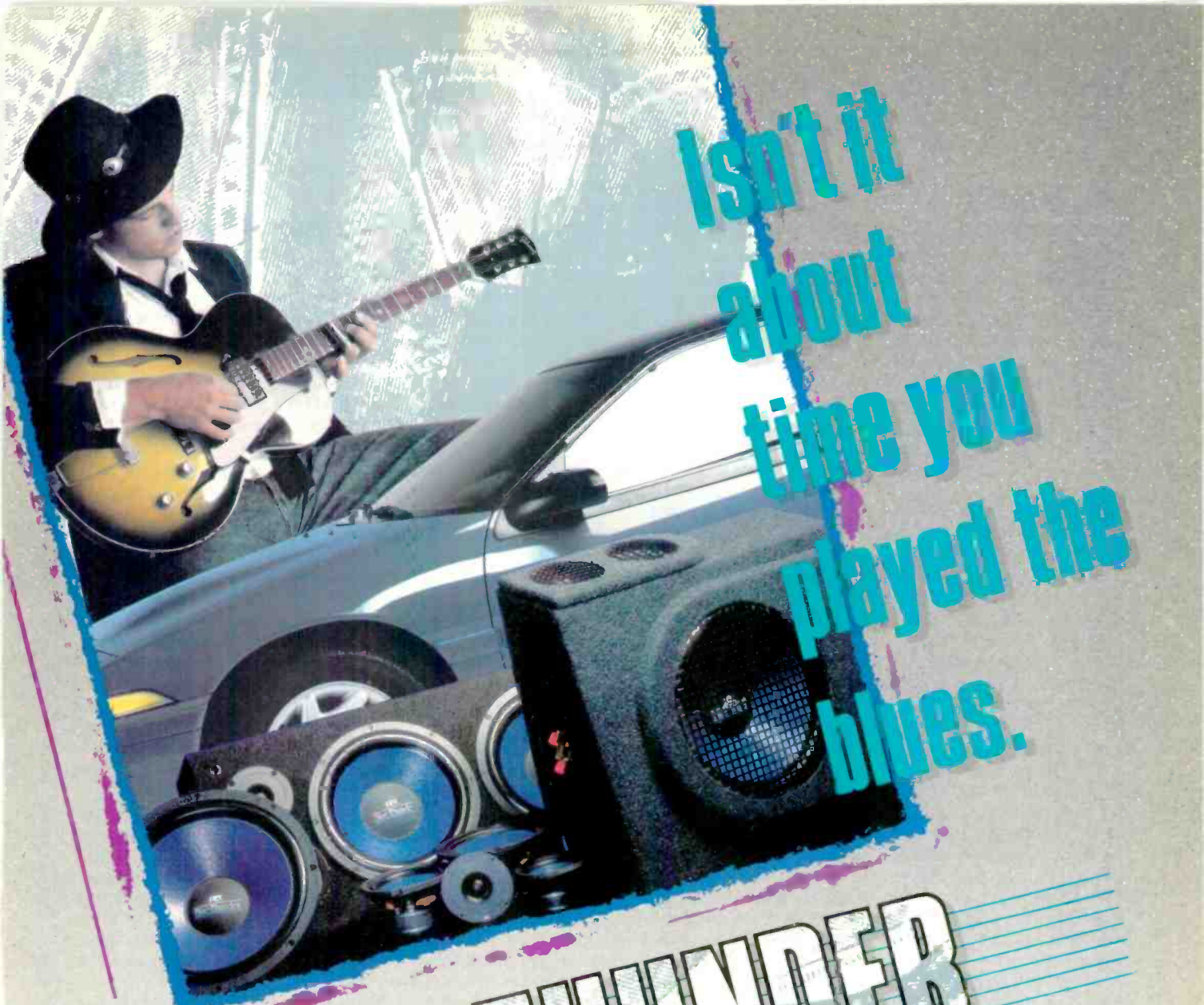


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## MONEY FOR SOMETHING

**W**hen the CD was introduced to the American market in 1983, there was little available product, and retail prices were high, to meet the demand. It was commonplace to see CDs going for \$18 or even more. The pricing was further maintained by two factors: The CDs were all imported and were produced by manufacturing processes that, during those start-up days, had relatively low yields.

In time, domestic pressing plants got up to speed, and the technology improved dramatically; CDs became plentiful, and the prices came down. Today in major record chains, we routinely see all-new classical CDs which are not "on sale" listed at \$13.99, with reissue product at around \$9.99. Some imported CDs go for as much as \$15.99 to 17.99, depending on the country of origin. By comparison, cassettes generally sell for \$3 to \$4 less than the corresponding CDs.

But somehow there is the lingering suspicion in the minds of many people that CD prices have never really returned to "normal" after the initial shortage. For their part, the record companies claim that the pricing has always been in response to the demands of an orderly supply-and-demand marketplace. Who is right?

First, let's have a look at manufacturers' suggested list prices for premium classical stereo discs from Schwann record catalogs over the 20-year period from 1965 to 1985. (Remember that 1985 was the last year during which the LP was king; even at that late date, some prominent persons in the record industry still had reservations about the long-term viability of the CD.) The range of most mainline product was \$5.98 to \$6.98 in 1965, increasing to only \$6.98 to \$7.98 in 1975, and rising to \$9.98 to \$10.98 in 1985.

The stability in pricing during the de-

cade from 1965 to 1975 is remarkable, considering the fact that a monumental petroleum crisis occurred during the early 1970s. The rise in pricing during the second decade probably reflects continuing yearly inflation in the range of 4%. If we assume a 4% inflation rate from 1985 to 1991, then this would put us right in the ballpark for the going CD prices of today. (Suggested list prices are basically fictitious; they tend to run a couple of dollars higher than the street price.)

By this accounting, today's CD prices do not seem out of line but rather are only an extension, through inflation, of list prices for LPs during the past decade.

Now, what about a comparison between CD and cassette prices? The raw manufacturing cost of a CD, including packaging and inserts, is about \$1.35 to \$1.50. A high-speed duplicated cassette runs about half that. The costs of artists' royalties and mechanical copyrights are chargeable per duplicated unit equally, but the difference in manufacturing cost is factored upward each time the product changes hands, or goes from one profit center to another. From manufacturing plant to the bins in the record store, this factor is about four. Thus, a manufacturing difference of, say, 75¢ comes to \$3 at retail, and this is the average difference in store pricing between CDs and cassettes.

How is it, then, that certain new, all-digital classical CDs can be sold for as low as \$5 or \$6? Here, the manufacturer works on a different plan:

- The artists are generally unknown and are paid a fixed fee for their services. For reissues of material by well-known artists, the fees are carefully negotiated.

- New recordings are normally made direct to stereo, thus bypassing expensive remix operations.

- Program material is generally in the public domain, requiring no mechanical royalties.

- Program material is further selected for broadest sales potential over a period of many years.

The manufacturer may not realize a profit at all on a given catalog item until up-front production costs have been completely retired. After that point, each unit sold will bring in its small contribution. Then, profit is simply a matter of how many units are sold in the long run.

If you are still not convinced that CD prices in the United States are fair, consider what they are like in other countries. In Japan, for example, the going rate for a CD is about 2,500 yen. Depending on the yen-to-dollar exchange rate, this normally varies from \$18 to \$20. The same is generally true with the stronger European currencies, so many foreign tourists and business people travelling to the United States save up and buy their CDs here.

On the debit side, there are the high costs of imported CDs which we must contend with in this country. A number of companies in the import business have lately lamented this fact as something that can only be dealt with by licensing the product and manufacturing it in this country, as opposed to importing it.

Remember that there was a time when no foreigner from an affluent country would come to America to buy LPs because of the generally poor reputation of pressings made here. It is different with CDs. Manufacturing plants worldwide adhere to the same basic standard when producing CDs as a matter of necessity, and our plants are as good as any of them. It may be small comfort to note that most of them are foreign owned—but without them, we too would be paying more than \$20 for CDs. A



It would be easy to assume that engineers, caught up in the world of objective measurement, would be uninterested in the subjective concerns of the naked ear.

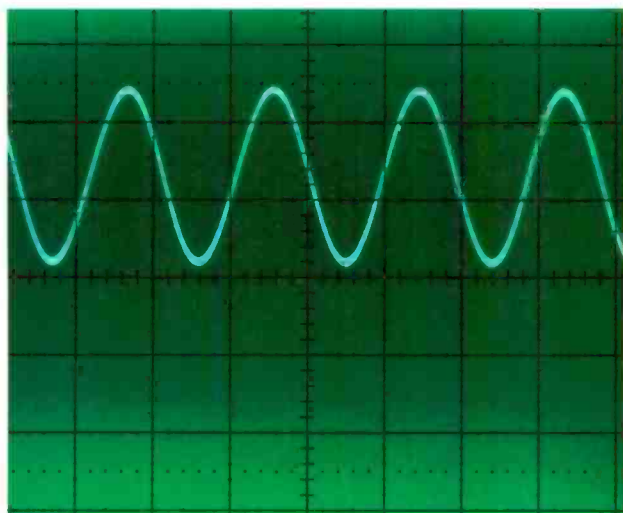
Not so with the engineers of Elite® components, fully 85% of whom are trained musicians. For most of them, in fact, music is a passion, electronics



*Filtering capacitors for the power supply are copper shielded, preventing mutual interference.*

capacitors reduce cross talk while improving imaging and transient response. The capacitors, in fact, like many other components, are "handpicked." Meaning they're not chosen by their paper specs but by ear.

The quest for perfection carries over to the Elite CT-41 Cassette Deck. Featuring the most advanced noise reduction system to be found on a cassette



{ THE GOAL WASN'T MERELY TO MAKE A BETTER SPEC. IT WAS TO MAKE A BETTER SOUND. }

their means of pursuing it. Out of this pursuit comes a new series of Elite components.

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*The Elite stable platter is the most significant innovation in CD players since their introduction.*

minimize signal loss. Complementary



*An Elite suite: CT-41 Single Cassette Deck, VSX-51 A/V Receiver, and PD-41 Stable Platter CD Player.*

player, Dolby S, its performance is further enhanced by Super Auto BLE. BLE analyzes each tape before recording, optimizing its bias, level, and equalization.

One of the most significant audio innovations in many years is incorporated in the Elite

PD-41 CD Player. It's called the stable platter. By providing a rock-steady platform for a CD disc, it improves the quality of the sound dramatically. Creating what one critic calls "a new standard of CD players."

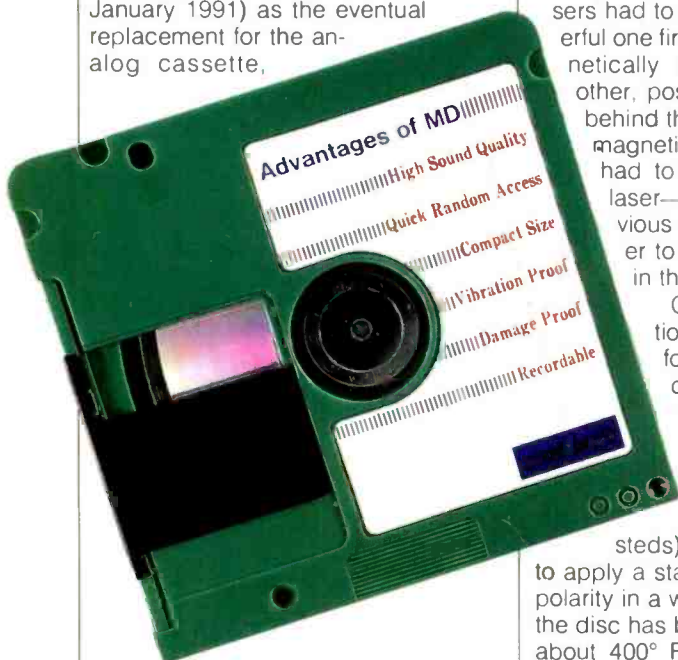
If you've ever wondered what happens when the best of the heart and mind combine, we invite you to visit an Elite dealer. Then let your ears decide.



For the name of a select Elite dealer in your area, please call 800-421-1606, ext. 802. © 1991 Pioneer Electronics (USA) Inc., Long Beach, CA \*Continuous average power output of 100 watts per channel front min., with no more than .005% THD; 18 watts per channel rear and 25 watts center min., with no more than .08% THD at 8 ohm from 20 to 20,000Hz.

## MIGHTY MINI

**S**ometime in late 1992, consumers are going to be presented with yet another recorded music format—the Mini Disc, or MD, unveiled in mid-May at a press conference hosted by Norio Ohga, President of Sony Corp. Thanks to the international date-line, Ohga made a similar presentation in Tokyo—on the same calendar date! Unlike DCC, which Philips introduced some months ago (see "Spectrum," January 1991) as the eventual replacement for the analog cassette,



Sony sees the Mini Disc as a format that will coexist with CD and DAT and believes it to be the "ideal digital record/playback format to meet portable application requirements for the mass market."

Measuring only 2½ inches in diameter (or 64 mm, if you want to be metrically precise), the MD will be able to store up to 74 minutes of music. More important, the MD system will let you both record and erase with a new type of magneto-optical (MO) disc and, using the same hardware, play prerecorded software that is pressed as conventional CDs are. The prerecorded discs are made of polycarbonate, with depressions, or pits, representing the binary zeros and ones of the digital data. The recordable discs, on the other hand, employ a new magneto-optical material (terbium ferrite cobalt) that changes the polarization of reflected laser light to represent the ones and

zeros. The new MO material allows the use of a single laser and an electromagnet to erase previously made recordings while simultaneously laying down the new information to be recorded. This is one of the four technological breakthroughs that makes the MD system possible.

Previously, there were only two record/erase methods available for magneto-optical recording. Either two lasers had to be used (the more powerful one first erasing previous magnetically recorded patterns, the other, positioned one-half rotation behind the first, applying the new magnetic pattern), or two passes had to be made by the same laser—a first pass to erase previous material and then another to record the new material in the same spiral.

Compared with conventional magnetic layers used for other magneto-optical discs, the newly developed magnetic layer used in the MD requires only about one-third the magnetic power (approximately 80 oersts). This enables the system to apply a stable reversal of magnetic polarity in a weak magnetic field when the disc has been heated by a laser to about 400° F (Fig. 1). The magnetic polarization, whose reversals encode the zeros and ones of the digital audio data being recorded, in turn affects the polarization of the light reflected from the disc in playback. Sony's new system not only allows recording with low current consumption (an essential, if the system is to work in portable Walkman-type recorders, using batteries) but does so at the speed required for recording the data in this digital format—one reversal about every 100 nS! And, the optical pickup developed for the MD system has the ability to read magneto-optical and prerecorded optical discs, as shown in Fig. 2. A 0.5-mW laser is focused on the disc. When MO discs are played, the changes in the polarization of the magnetic beam are read as "0" or "1" signals by the MO signal-readout analyzer.

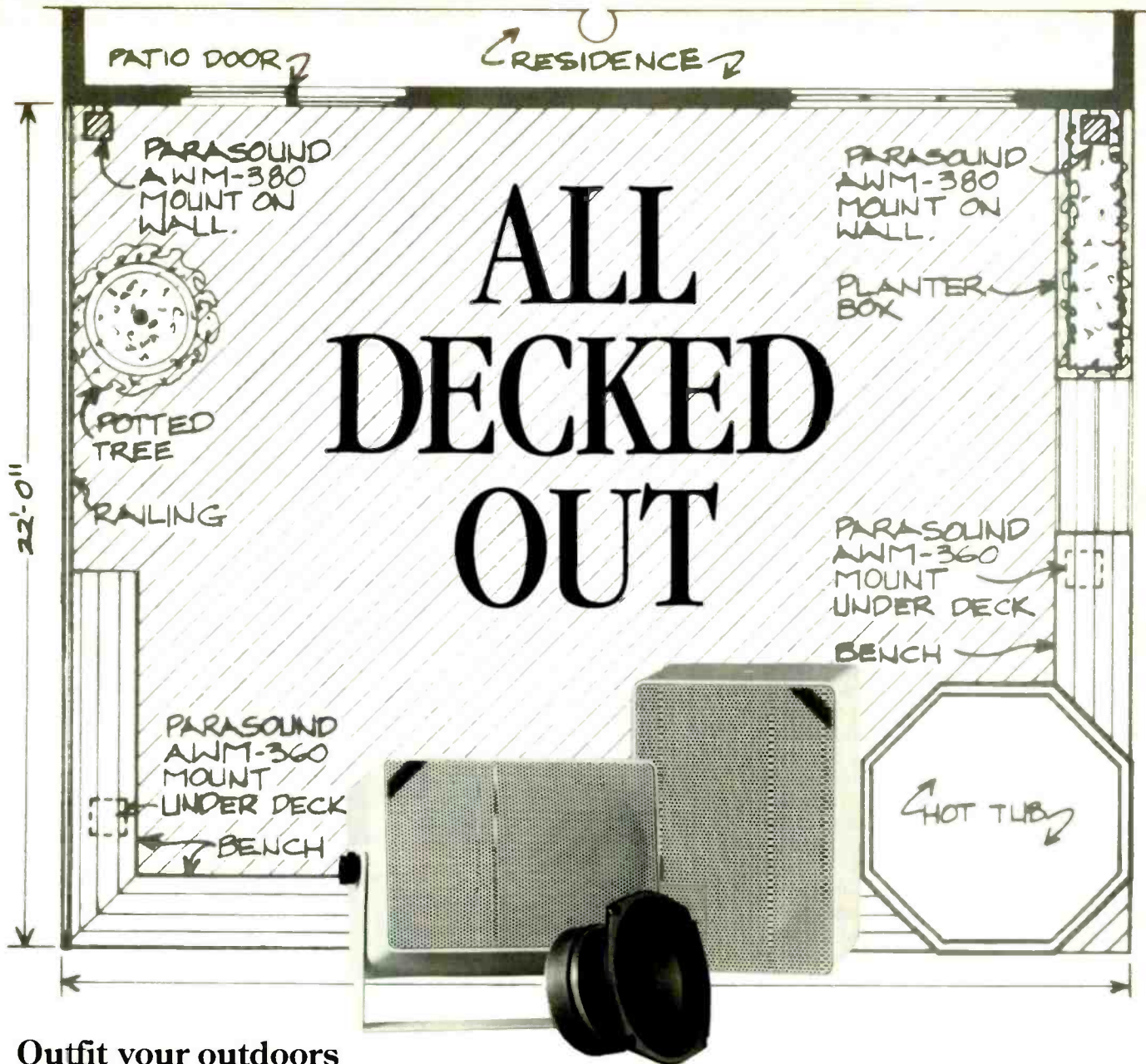
The same 0.5-mW laser is used for the playback of prerecorded optical discs containing pits similar to those of

a conventional CD. If no pit exists on the surface of the disc, a higher proportion of light is reflected back through a beam splitter and analyzer and picked up by photodiodes. If a pit is encountered, less light reaches the photodiodes. The difference in light intensity determines whether a digital "0" or "1" is being read.

Using an approach somewhat similar to that employed in Philips' DCC system, Sony has made it possible to record and play up to 74 minutes of music on the tiny disc by using a data-compression algorithm. Sony calls this system ATRAC (for Adaptive Transform Acoustic Coding). The ATRAC system was specifically optimized for use in an optical disc system, whereas PASC (Precision Adaptive Sub-band Coding), employed by Philips in their DCC format, is especially suited to the requirements of digital tape recording. ATRAC is based on two underlying acoustic principles: The threshold of hearing (we cannot hear sounds below certain levels of loudness) and the masking effect. Masking occurs when two sounds, one louder than the other, are produced simultaneously and are close to one another in frequency. Under these circumstances, the soft sound becomes difficult or impossible to hear. For purposes of data compression, then, the softer sound can be entirely eliminated without altering perceived sound quality. Furthermore, with increased amplitudes it becomes possible to remove a greater number of components without audible effect.

The ATRAC system of compression or, more properly, data reduction, starts with the same 16-bit digital data as a CD but analyzes segments of the data for waveform content. During the recording process, the signal is quantized at a sampling frequency of 44.1 kHz and converted into digital data in the usual manner, using a 16-bit A/D





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converter. The ATRAC encoder divides this data into segments of up to 20 mS (approximately 1,000 samples). After applying Fourier transform analysis to the digital waveform in each segment, approximately 1,000 changes in amplitude are analyzed as single-frequency (sinusoidal) components. Each frequency is assigned bits based on its amplitude, using the two psychoacoustic principles described earlier, to identify only those components in the segment that humans can hear. This data is then format-encoded with error-correction data and recorded onto the disc.

During playback, the numerous frequency components recorded on the disc are recomposed by the ATRAC decoder, and the 20-mS segments are reconstructed into digital waveform data. This data can then be processed by a 16-bit D/A converter in the conventional manner. Sony does not claim that sound quality will be "identical" to that of CD or DAT, but they do maintain that it will be "closer to CD than to the sound quality of even the best analog cassettes."

Resistance to shock and vibration is a necessity for personal portable audio applications. While dozens of portable CD players have been introduced, there's no denying that even the best of them can mistrack when subjected to extreme (or even not so extreme) external forces. No jogger has been able to successfully listen to a portable CD player in the same way that he or she can with a portable tape cassette player. Sony has come up with yet another innovative technique for solving this problem in the MD system.

Although the MD pickup can read data from the disc at the rate of 1.4 megabits per S, the ATRAC decoder requires a data rate of only 0.3 megabit per S of information for proper playback. The MD player utilizes this difference in processing speed to create a buffer in a memory chip between the pickup and the ATRAC decoder. A 1-megabit buffer can store approximately 3 S of encoded digital information. This buffer makes it possible to virtually eliminate skipping or muting caused by vibration. If the pickup shifts out of position due to vibration, the correct digital information is still supplied to the ATRAC decoder from the buffer

Fig. 1—The magneto-optical recording system used in Sony's Mini Disc allows new data to be recorded while the old data is erased, with only a single laser.

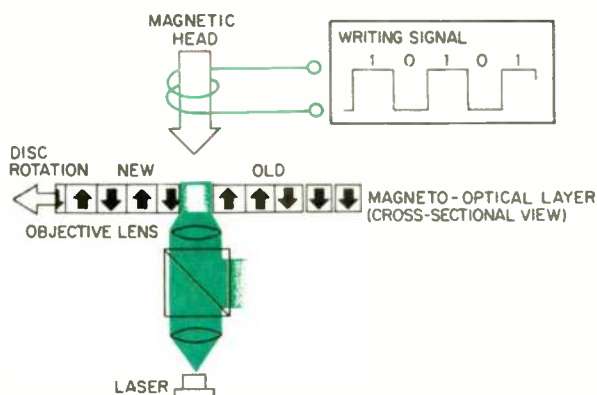
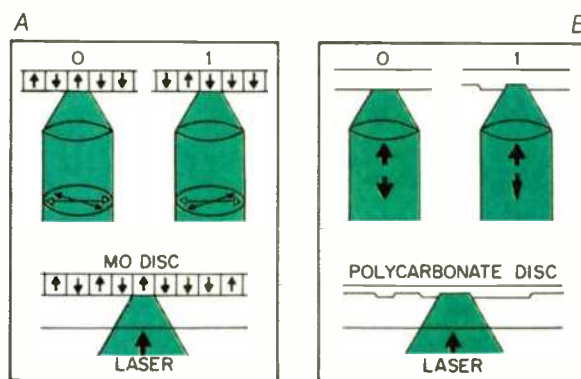



Fig. 2—The MD optical pickup system reads variations in light polarization when playing recordable MO discs (A) and variations in light intensity when playing conventionally pressed polycarbonate discs (B).

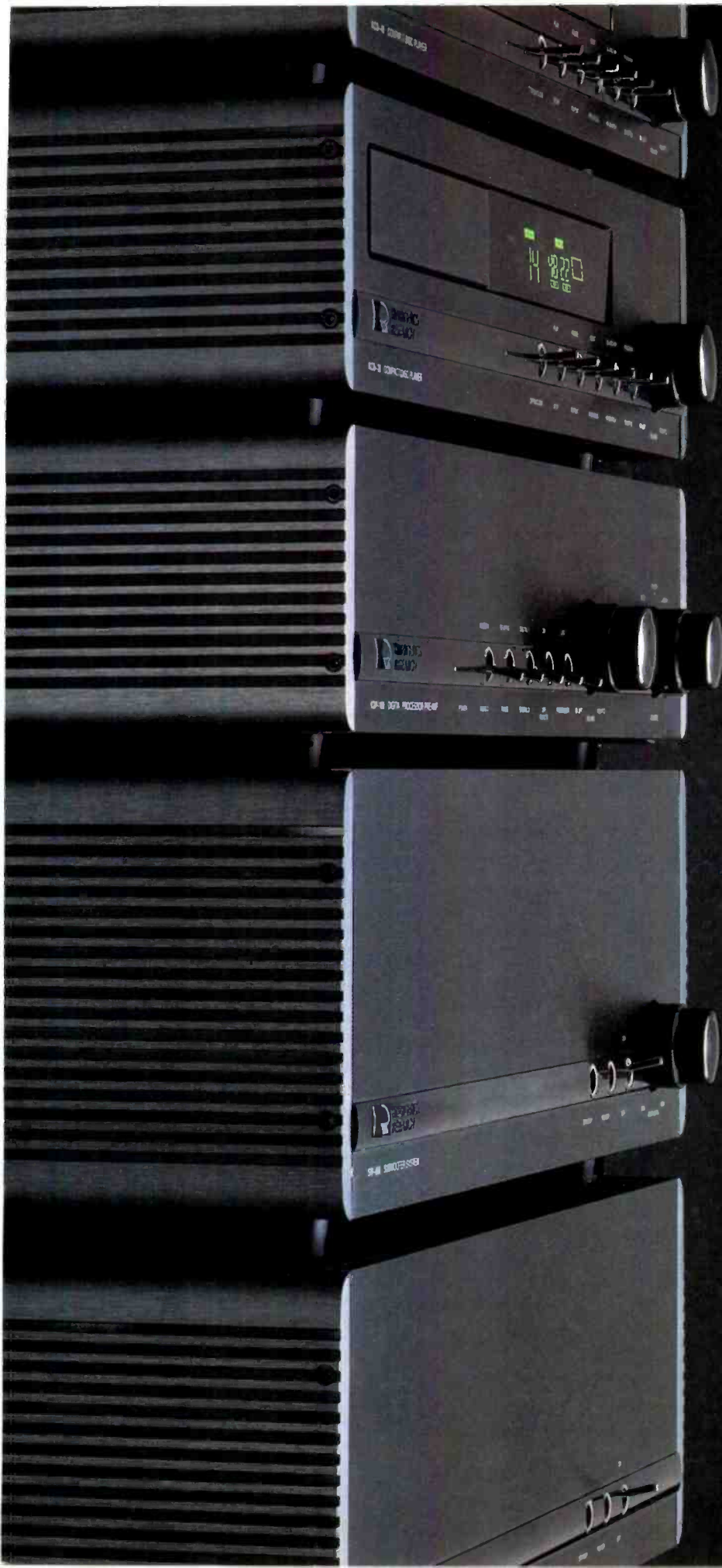


memory. As long as the pickup returns to its correct position within 3 S, the listener never experiences mistracking or muting.

Since signals enter the buffer faster than they leave it for decoding, the buffer will eventually become full. At that point, the MD pickup momentarily stops reading information from the disc. It resumes reading and scanning as soon as there is again room in the memory chip. Using a concept called sector repositioning, the MD pickup has the ability to quickly resume reading from the correct point on the Mini Disc, since address information is assigned on an MD every 13 mS. When the pickup is shifted or jarred out of place, the MD player quickly recognizes the disruption and instantly returns the pickup to its correct position.

According to Sony, CD will remain the quality standard for home high-fidelity music playback because it provides superior sound quality com-

pared to MD. Enhancements to the CD format also will bring further improvements in sound quality. In addition, Sony believes that CD will evolve from a strictly audio medium to a multi-media format, a process already underway with CD-ROM and CD-I. Digital Audio Tape will continue to complement CD as the ideal digital record/playback format for most home music systems, according to Sony; MD is envisioned as the ideal digital record/playback format to meet the portable application requirements of the mass market, thanks to its small size, ability to record and play up to 74 minutes of music, resistance to shock and vibration, and ability to access any point on an MD within 1 S. Whether MD repeats the success story of CD or goes the way of Beta VCRs or Elcaset is something no one can predict. But the elegance of this new technology and the level of engineering prowess that brought it about are awesome! 



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**Dick Olsher**  
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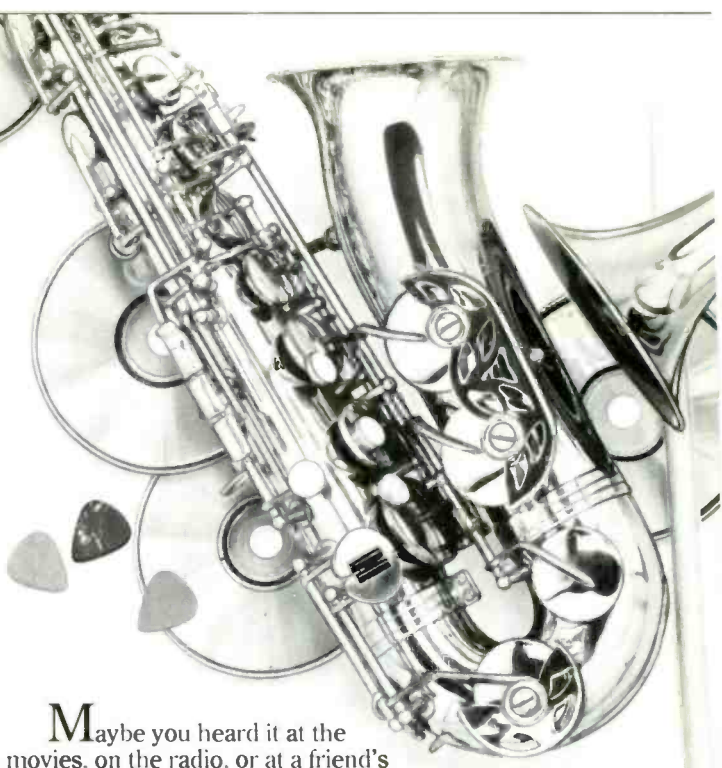
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THE AUDIO  
INTERVIEW

# MICHAEL CUSCUNA

## *Jazz Man with a Passion*

JON W. POSES

At 42, Michael Cuscuna already has substantial credentials as a record producer. He is a two-time winner of France's Grand Prix du Disque, that country's Grammy, once for his work on the Lester Young Blue Note reissue, the other for Anthony Braxton's *Creative Orchestra Music, 1976* (Bluebird). More than a decade ago, he received two Grammy nominations as producer of *Jazz Record of the Year*, the titles being Dexter Gordon's *Sophisticated Giant* (CBS) and Woody Shaw's *Rosewood* (CBS). Recent nominations were in the Best Historical Album category for *The Blue Note 50th Anniversary Collection* in 1990 and for *The Complete Recordings of T-Bone Walker, 1940-1954* (Mosaic) in 1991. Every year since 1982, as a producer, he has placed either Number 1 or 2 on *Down Beat* magazine's critics' poll.

The eclectic, unassuming Cuscuna began his career as a radio announcer at the University of Pennsylvania's WXPB before being asked to join the staff of Philadelphia's leading FM rock station, WMMR. He was all of 21 years old. Within two years, he found himself announcing in New York, hosting a free-form, mostly rock-oriented daily program on WPLJ. More recently, he acted as sometime consultant, producer, field producer, writer, and host for National Public Radio's syndicated *Jazz Alive!* program.

Hardly enamored with radio, however, Cuscuna "fell into" writing for periodicals such as *Down Beat*, *Jazz & Pop*, *Crawdaddy*, *Rolling Stone*, *Record World*, and *Saturday Review*. Yet his first love has always been, and remains to this day, record producing.

A fan of blues and R&B, Cuscuna started out in the early 1970s with such artists as Buddy Guy, Bonnie Raitt, and Garland Jeffreys. Cuscuna has primarily produced jazz since 1975; his credits include John Klemmer, Larry Coryell, Pat Martino, Oliver Lake, and Cecil Taylor. He has also directed such series as ABC/Impulse's *Dedication* reissues and previously unissued material, and now oversees Impulse's new reissue program.

Cuscuna, with Bruce Lundvall [see *Audio*, June 1989], is largely responsible for the reemergence of the Blue Note catalog, bringing the almost 52-year-old label up to, if not beyond, its

1960s heyday status. While Cuscuna still considers himself a freelance producer, he remains, along with label president and Capitol Records east coast manager Lundvall, in charge of Blue Note's reissue project and a consultant for all aspects of the label. Cuscuna simultaneously nurtures his chief passion, Mosaic Records. A partnership between Cuscuna and fellow producer Charlie Lourie, Mosaic is now in its ninth year and sells only by mail order (35 Melrose Place, Stamford, Conn.

06902). Geared to completist fans, archivists, and other connoisseurs, Mosaic releases boxed sets of, in Cuscuna's words, "personal favorites." Each release comes accompanied by elaborate and informative booklets filled with historical and musical information. Cuscuna and Lourie's 37-title catalog includes multi-volume sets from Thelonious Monk, T-Bone Walker, Chet Baker, Charles Mingus, Bud Powell, Stan Getz, and the acclaimed Dean Benedetti recordings of Charlie Parker. This fall will mark the release of the long-awaited Nat King Cole sets. *J.W.P.*



Eric Kaz, Bonnie Raitt, and Cuscuna, 1972.





Baritone saxophonist  
Gerry Mulligan, 1973.

Pianist/composer  
Thelonious Monk, 1971.

Paul Desmond, alto  
saxophonist, 1972.



*Where does your interest in music come from?*

Listening to the radio when I was about seven or so, I fell in love with mid-'50s R&B: Clyde McPhatter, LaVern Baker, The Robins. I began collecting 45s, some rock and roll—Chuck Berry, Little Richard, people like that. For some reason my cousin and I got a bug to play the drums at the same time. We started with a little beginner set, to play along with the records. For a long time we were just buying records and listening to just the drum solos. We sought out Benny Goodman's *Carnegie Hall Jazz Concert* (Columbia) because Gene Krupa took a long solo on "Sing, Sing, Sing." Little by little, we started to listen to the music around it, so we started to get into jazz ever so gradually. Then we made the progression from Benny Goodman to Dave Brubeck, who was very popular at the time, and

then John Coltrane. Eventually I became totally obsessed with it. *I know that you grew up in Stamford, Connecticut, but you were a radio announcer in Philadelphia. How did a Connecticut boy get hooked into radio in Philadelphia?*

I went to the University of Pennsylvania. I started at the Wharton School, Penn's business school. I thought some day I'd like to have my own record company. But they were gearing everyone to be the head of General Motors, so I quickly transferred to English lit, like everyone else who didn't know what they wanted to do. [Laughs.] I got into radio the first few weeks I was there. It was not anything I thought I would do or was driven to do; it was out of boredom. I thought that I might get some free records out of the whole thing.

My show got very popular, and it eventually led, in my senior year, to a professional radio gig. Dave Herman

was leaving WMMR. He called me and said, "I'm leaving to go to New York. Are you interested in coming here?" I was half-assed about it. . . . I didn't really care whether I got it or not, so naturally, I got it. [Laughs.] In fact, I had quit college radio because I'd become bored with it. The job at WMMR led, a year and a half later, to an offer from the same station Dave was on—WPLJ-FM in New York.

I did a morning show that was a mixture of rock, jazz, and any kind of music I wanted to play. Live phoners, people calling in, talk shows. I could have any kind of guest I wanted: Musicians, politicians, filmmakers, anybody. The second my station became formatted, I left radio, which I never really wanted to do anyway. But it was very good money, and I kept getting these gigs by accident. So I thought I would play it out for however long it rolled.

A week after I quit, I got an offer from Joel Dorn, an old ex-DJ in Philadelphia who was staff producer at Atlantic, who said he needed an assistant and a

## The better you know your

staff producer, and would I like the job. I said, "Yes."

*Before we talk about your producing, how did you become involved with writing about jazz?*

Another accident. It wasn't really anything I wanted to do, thought I had the ability to do, or was aware I could do. In college I wrote a few pieces for *Jazz & Pop*, then *Down Beat*, then it snowballed. Somebody called me to do liner notes. . . . Now I write a lot of the time, though I still hate it. As Dorothy Parker said, "I hate writing, but I love having written."

*How did you get into producing?*

My second year of college, I lived down the street from the great guitar player Pat Martino. The same guy who managed him at the time managed Groove Holmes, who had a very underrated guitarist, George Freeman. I recorded George with my own money—about \$1,000 I had inherited. I finally sold the recording, at cost, to Delmark Records, and it came out. But producing was something I always wanted to do. A lot of records were coming out, and I thought, "Gee, nobody's doing this, no one's doing that, there's a lot of things that could be done that aren't being done." That's the why of how I got into it.

Dick Waterman, who managed a lot of blues musicians, lived down the street from me in Philadelphia. I used to have blues guys living at my house all the time; the overflow from his apartment would sleep on my couch. Buddy Guy and I got to be good friends at a time when he was leaving Vanguard. He didn't like the staff producer. He said, "If you want to get into producing, why don't you come produce my date." I said okay, but I still didn't really know what I was doing. Vanguard wouldn't pay for him to come back to New York to mix his last album, and he really wanted to come back. So I said, "Look, I'd like to try an idea. I'd like to do an acoustic album. Would you play just acoustic guitar with Junior Wells on harmonica? I can get Junior Mance, who's a good jazz pianist, but he can play the blues. I called Blue Thumb Records; they knew me as a college radio DJ. Bob Krasnow said, "That sounds interesting. We'll give you a budget of \$4,000," or whatever it was. So I put that together, and eventually it was called *Buddy and The Juniors*.

Yeah. The whole deal was very cheap, but not cheap enough for Atlantic. So I got frustrated because all these people went to other labels and did very well. I realized, the label's not letting me make money for them, and they're not letting me make money for myself either. So I left, and I've been freelancing ever since.

*One of the early to mid-'70s key projects was the Arista/Freedom series.* Steve Backer [later with RCA] was working on a deal with Clive Davis and asked me if I would do some A&R and producing for him. That summer, 1975, I was recording Larry Coryell and the Art Ensemble of Chicago at Montreux, and I bumped into Alan Bates from England, who had the Freedom label. He was looking for an American deal, and I told him that Steve Backer was making a deal with Clive Davis, that Bell Records was going to be turned into a new label. So, we cut a deal. I started administrating the Freedom label and producing a lot of records for Arista proper. That was a nice run. Clive wasn't big on the stuff. He didn't

get into the Blue Note vaults, but George Butler, who was running Blue Note for United Artists, didn't know much about pure jazz, didn't seem to care about it.

I kept calling George. I said, "Look, you have a lot of unissued material. You can put it out." And he would say, "Yeah, maybe we'll have you do something," but nothing ever happened. Finally, Blue Note hired Charlie Lourie, who was at CBS, to be head of merchandising and marketing. I told Charlie, "Look, man, you got a lot of unissued material." He said, "Yeah, I know, we're going to do something with it. But there's no identification, no files." Soon afterwards, I showed him my notebook. He was so excited, he said, "You got a deal. You're going into the vaults tomorrow." I said, "Thank God. This is a five-year dream." All that unissued tape was driving me crazy, that it was never going to be heard. That was one of the greatest and worst days of my life. I mean, I walked into this dusty room in L.A., a third-floor walk-up. And there were reams of tape. All they said

## artists, the better you know when to use a sense of humor, when to relax.

Buddy's only reason for doing it was to get back to New York to mix the Vanguard album.

Then there was a singer/songwriter from Philly who I thought a great deal of, Chris Smither. I got him a deal with Poppy Records. I co-produced his first album and then produced his second and third. I had known Bonnie Raitt from before she sang and played; I couldn't do her first album because I was doing radio, but as soon as I left radio, she asked me to do the second album, which I did. That was about 1972, and that's when I joined Atlantic Records, where I spent a little over two years. After Atlantic, I started freelancing.

*What's involved in freelance producing?* Basically, waiting for the phone to ring. I had a very dry first year. It was scary, but I left Atlantic because I was not a very good company man. Almost everything I wanted to do, they said no, no, no.

### *Examples?*

I had very reasonable deals set up with Chick Corea, Gato Barbieri, Gil Scott-Heron, Wayne Shorter, Miroslav Vitous, and others.

*When you say "reasonable," you mean in terms of how much money you would need to pay them and put the record out?*

really have the passion. It didn't bring in big dollars, so he didn't care that much. But all the pressure he brought to bear, he brought to bear on Steve. Steve was sort of the buffer, and I just went along on my merry way doing the stuff I liked.

*That series involved solo projects, what people consider "outside," less accessible music. How many copies would be pressed?*

In those days, that stuff was doing well, better than it does today. That was Anthony Braxton's time. He was selling between 10,000 and 20,000 copies; a lot of others were doing 8,000 to 10,000 copies. I think a lot of the so-called avant-garde records now sell, in this country, more like 4,000 copies.

*How'd you become involved with Blue Note Records?*

I had a lot of friends who had been Blue Note artists. In the course of conversations, guys would make reference to all these dates that never came out. I remember Andrew Hill sitting in my living room, listing about 12 sessions—and he has an impeccable memory. He remembered the entire personnel on all of them, and he was right on the money. In the early '70s, I started a notebook about this stuff; I don't even know why. I kept trying to

was, "Jackie McLean, April 1962." No tune titles, no personnel, no notes, nothing. So I began chippin' away with what I knew. I made cassette copies, sent them to musicians. They would identify some of the sidemen. I tried to figure out the tunes by getting with BMI and seeing what tunes by the guys had been registered two weeks after the sessions. Then I'd get lead sheets and work backwards. It was a really long, laborious situation. Sometimes I got lucky and found information, but usually I didn't. That was the first Blue Note series of reissues I was involved in; it died after two years.

In 1979, when EMI bought the whole United Artists-Liberty-Blue Note-Pacific Jazz combine, I sold the idea to the new company. At the same time, somebody at United Artists Films discovered a big file of [late Blue Note founder, interviewed June 1987] Alfred Lion's notes on unissued material and delivered them to me. Suddenly, there were tapes that I hadn't been able to identify that I had the whole scoop on: Tune titles, personnel, suggested take numbers. So I did another series from the fall of '79 to the middle of '81.

In 1984, my friend Bruce Lundvall, for whom I produced Dexter Gordon and Woody Shaw at CBS, called to tell me

he was starting up Blue Note again. He knew I was an expert on Blue Note and asked me to do some reissues. He had the idea to do the project that became our *One Night at Blue Note* series, which was basically a concert recording at New York's Town Hall on February 22, 1985, featuring some of the label veterans, and he asked me to be the musical director and producer. After that, he asked me to write some ads and he started sending me tapes, as if I were an A&R man. My duties kept increasing. I was never hired, never given a title; there's never been anything formal about it to this day.

Stanley was doing those selections on street corners. He cut what he wanted to cut; there's nothing on the record that was done to be commercial. His success comes from the fact that he's a good musician. He's a guitarist. There are more young guitarists in this country who buy records than people who play any other instrument. Secondly, Stanley had this incredible tapping technique that made him receive instant, national attention. You don't have to do a commercial formula record with someone like that; they're commercial by the mere fact that they exist.

I space those out very deliberately. I won't put out a reissue any time around the new release of an active artist. We believe in carrying on the Blue Note tradition as well as having success with new things. Basically, we have four categories: We have a very striking artist who can have broad, broad appeal; then the labors of love; then it's important to have a lot of young talent that's in the tradition, a Bobby Watson, OTB... and finally there are the continuum artists—McCoy Tyner, Joe Henderson, Freddie Hubbard, Stanley Turrentine, the people who have been associated with the label in its '60s

## There have been a lot of people making fine records over the years, but

*Has Blue Note been healthy in its newest incarnation?*

Very healthy. The reissues still do well; the invention of the CD has helped a great deal. With new artists, we've been able to balance labors of love, like Don Pullen, Andrew Hill, and James Newton, with people like Dianne Reeves, Stanley Jordan, Lou Rawls, and Bobby McFerrin, with whom we've had incredible success.

*When you say "labors of love," what kind of sales numbers are we talking about?*

I can't get specific with any artist; that's really their business. But we're talking about sales in the neighborhood of 6,000 to 10,000 copies. With what it costs to make a record today, that's not very good. Especially with great artists. You're not going to underpay them, you're not going to cut corners on the quality of the record: You're going to make the best possible record you can. So you don't make money on something that sells 6,000 to 10,000 copies when you're dealing with a major company. If I had my own little label, I could. But we have a lot of albums that sell in the 15,000 to 30,000 range that turn a little bit of profit, and we have some big successes that keep the whole thing going.

*Don't you think somebody could argue that Stanley Jordan playing a Beatles tune is, in a sense, designed to sell records?*

They could if they wanted to, but he's been doing that for years. Stanley Jordan is one of the current generation of players who grew up listening as much to Jimi Hendrix and The Beatles as he did to Lee Morgan and Bud Powell. He doesn't see that much difference between any of it; it's all stuff he loves.

*How do you decide who to put on the label as a new artist? Also, how do you decide which albums to reissue, and when?*

Both situations are extremely arbitrary. With the labors of love, it's usually somebody that both Bruce and I feel extremely strongly about. I wanted to do Don Pullen—George Adams for five years. Bruce, who'd gotten interested in them separately, said, "Let's do it."

In one case, there's someone we both feel strongly about, but also it was Alfred Lion's last request to me. He felt Andrew Hill was the last major talent he'd found, and he wanted us to have Hill back on Blue Note. Andrew signed his contract the day we held our 50th anniversary celebration.

*When you sign people to Blue Note, I'm sure the terms vary, but are they single- or multiple-record deals?*

Always multiple. No, I guess sometimes single.

*How do you determine what records to reissue? How do you avoid glutting the market?*

Ideally, we space them out. We had a couple of very big releases initially. After that we've tried to issue them at about five or six a month, maximum. There's only so much room in stores; there's a lot of reissue programs, a lot of European imports, and new recordings of jazz. Stores are running out of space. They have to carry three formats. You also don't want to frustrate fans. There are people who want to buy all this stuff, and they only have so much money. You can't glut the market and drive people crazy, so you space them out.

*Do you find that some of your reissue product competes with current releases?*

heyday and are still recording strong music.

*Why is the distribution of jazz product so poorly executed; why is the availability so limited?*

First, there are stores that won't carry jazz because more and more stores are getting Top 100 oriented. With three formats firmly in place, that's even more of a problem. There are a lot of stores that won't carry Whitney Houston's first album; they're only interested in the one that's active now—so where is John Coltrane going to come in? They want to turn over a lot of product, and the way to do that is go with the hits. The mom and pop store and the full-catalog store that used to carry everything are pretty much a thing of the past. It's only through [Tower Records chairman] Russ Solomon's vision that the full-catalog store stayed alive or came back. I have no facts to back this up, but I bet you that 40% of pure jazz sales comes out of the various Tower stores. They have made the full-catalog store something appealing, a place you want to go, a place where you can find everything. But there are not that many Tower stores in the country. There are a lot of places that can't get the stuff. That's one of the reasons Mosaic started a subsidiary, True Blue Music, to start carrying the Blue Note reissues line, and we'll start to carry other reissues lines as well—because people don't always live near a Tower Records. I get letters with checks or cash from people who say they can't get a hold of something, begging me to send them Blue Note titles.

*What do you do in that instance?*

I take the money and stiff them, of course.... [Big laugh.] No, I can't

send out the records myself. The only things I get in the office are punched promo records. So now True Blue Music will handle it as mail orders.

*Why doesn't the industry treat jazz on the same level as classical music? Why does jazz always seem to be dumped into the pop marketplace?*

I don't know why it's that way, except classical music is "high art," and even people who don't like it, but who pompously want to be noticed, pretend to like it. It's probably why classical music gets subsidized. From a live performance situation, it's the most money-losing situation you can get

in the air that I was unaware of. Of course, I don't think I, or anybody else, could really measure up to what he had. The key is still, I believe, to have a personal relationship with an artist, then to have planning sessions about the purpose of an album, the material, the pacing, and the sidemen, so that the artist and producer can have a mental picture of what the album should be and try to realize that goal. Then rehearsals are very important so that everyone involved knows the material cold, and you can go into the studio and get an early take when the solos are still fresh and inspired.



## there was Alfred Lion—then there's the rest of us.

into. You have to keep 106 musicians on salary—for a whole year? I don't think even Sting could afford to do that in the real, capitalist world. But classical is very white, it's prestigious, it's time-honored. Jazz isn't; jazz is the bastard child that's an American art form which always has had to take care of itself.

*Who are some other producers whose work you like and respect?*

That answer will surprise you. Willie Mitchell, who produced all those Al Green and Ann Peebles records, Phil Spector . . . the producers I love are really pop producers. And the pop producers who are really more arranger-oriented, who really have a sound. I also love the R&B production of the '50s by the Atlantic team of Ahmet Ertegun and Jerry Wexler, as well as Jerry Leiber and Mike Stoller. Atlantic was able to train others through their tradition of soul, taste, and quality—such as Tom Dowd, Arif Mardin, and Joel Dorn, who carried the great Atlantic tradition into the early '70s.

As for jazz producers, Alfred Lion's records have been the ones I've loved most all my life. The art of the jazz producer is so vague and has so many intangibles. But a testament to Alfred was the noticeable drop in consistency and quality at Blue Note when he left. That's not to detract from what Frank Wolff and Duke Pearson did; it just was never the same. There have been a lot of people making fine records over the years, but in my opinion, there was Alfred and now there is the rest of us.

When I finally met Alfred, I was surprised at how similar our working methods and plans and feelings about making records were. I guess there was always some empathy floating around

*How do you decide which studio to use for which artists?*

For straight-ahead jazz, say from Art Blakey to OTB, anything like that, Rudy Van Gelder definitely has the best sound. What he brought to recording in the early '50s was a very lively sound, a lot of brilliance in the recording, before it was commonplace. He wasn't afraid to put as much level on the tape as possible and add some highs and brilliance to the piano, drums, and cymbals. He was able to develop a sound through echo and through EQ to really make the horns sound larger than life. If you couldn't get to see any of these guys live, the closest thing to the impact of that was, and is, Rudy Van Gelder's sound. No one can really duplicate Rudy; he's influenced every engineer I can think of.

*When you're planning a live recording, what are some of the logistics that you look for or set up ahead of time?*

Recording live requires several things. It's too costly and ineffective anymore, with jazz budgets, to get a mobile truck and record multi-track. Generally you have to hire an engineer who has gear,



Saxophonist/composer  
Oliver Lake, 1980.

◆  
Larry Coryell,  
guitarist, 1973.

◆  
Pianist/composer  
McCoy Tyner, 1980.



Bud Powell in 1964.  
The reissue of his  
Blue Note recordings  
is well organized and  
documented—typical  
of Mosaic's standards.



Cuscuna and producer  
Charlie Lourie.  
Together they started  
and presently operate  
Mosaic Records.



who comes in and sets up a recording situation of digital two-track in the club. Because you are going to two-track, you have to know your music exactly because you have to go for a mix right there. If you only have two or three days to record or—and it happens—one or two days to record, you have to

## The only way jazz will be

go for what you're targeting for the record. So you generally do a great deal of rehearsal, and you develop set cycles of the target material for the album. The audience is not going to hear that artist's old favorites that night, because what you do is set up a program of seven or eight tunes to get as much repetition as possible so you have three or four takes of everything. Not that you play the same material take one, two, three, four—play one song continuously and then move on to the next. You do have some rotation so the artists approach it freshly each time, so you have the interaction with the audience, and the ambience.

*How often do you want to record an artist live versus in the studio? Or does that just vary depending on the artist?*

It varies, depending on the circumstances. I mean, the nice thing about recording live is that the artists get feedback from the audience, if it's a room they love to play in and that the audience loves to go see them in. Most of the recording I've done has been at the [Village] Vanguard, just because it's such a wonderful, magical club. The artists love it, the audience loves it. Everyone who works there loves it too. It's really a special place.

*Getting back to the studio. In general, if you are not doing that kind of straight-ahead record, which I know you are doing almost entirely at this point . . .*

Not really. Variations would be things like Don Pullen–George Adams. That requires me to know the music, if we're recording digital two-track, for me to be at the board mixing all the time. That's not Rudy's kind of music, and, anyway, he doesn't let anyone sit at the board. So I have to go somewhere where the engineer doesn't mind me sitting at the board, mixing it as we record. There's a lot of textures with them, a lot of levels of intensity in that kind of music, a lot of different blends. To record that stuff, optimally, you have to keep changing it as you go along, so you have to know it. I need



that freedom; I need that access to the board.

Then there are records with vocalists. When doing multi-track, actually adding vocals and soloists and different elements as you go along, sort of the regular pop-record process, you also need access to the board. You

radio. If you can't, then that's just the way it is, and you hope that people will embrace it anyway.

After the artist brings you a number of tunes, you and he narrow it down to usually six or eight. Then you go to rehearsal and time a chorus. When you are working out the road map of who

pily, blues is big business, and I think that's very healthy for the scene.

*Obviously, you are friends with scores of musicians, but there must be a few who are special. How, for instance, was Dexter Gordon special to you?*

I'll start with the general issue. If you are recording somebody on a regular

◆ ◆ ◆  
**at a record company is if someone there loves it and can sell it to the others.**

need to sit there to flip tracks to decide which solo you want to use. You know what you're thinking, so it's easier if you sit there and do it on the board.

*Where did you learn your mixing and production skills?*

Well, you just pick up stuff along the way. You ask questions. I am not, by any means, equipped to be an engineer, but you learn what combinations of EQ you like. Eventually you also develop relationships with engineers.

*How do you put musicians together? How do you choose what players to use on which sessions?*

That's a collaboration between artist and producer, that's not solely the producer's function. Basically, you have your favorites, and an artist has his favorites, and you go back and forth and see who makes sense, who you can afford, and who is available, and you work out a road map. Let's say there are two pianists of equal talent who are available, and each of their styles would suit the situation. You go for the guy who's going to grasp the concept quickest, be easiest to work with, and give the most to the session. Ironically, the quickest and the best usually go hand-in-hand. The most talented people are usually the most decisive in their music.

*How often can you release a record by a particular artist? What determines why one artist records only once every three years and another once a year?*

Generally, for any artist from hip-hop to be-bop, once a year or every 18 months is really what it should be. With artists that take two and three years, it's because they're busy or have scheduling problems or writers' block ... whatever.

*How do you know what compositions to include, how long to make the tunes? Have you become very conscious of radio and airplay?*

Yes, but only to the extent, in a straight-ahead jazz record, that the songs that you believe will receive airplay should be kept under five minutes. That's the magic number for jazz

solos where and for how many choruses, you're able to get a general sense of what the time is going to be.

*Do you ever feel, as a producer, or have you ever felt, that maybe you are going stale or repeating yourself too many times?*

I think every engineer and producer has various burnout points where you feel like you are stale. It doesn't even matter whether you are or not, you just feel like it, and you have to get away from it for a while. Everything sounds the same, nothing excites you. It's a minor form of burnout.

I used to do people like Garland Jeffreys and Bonnie Raitt. I loved doing that. In the early to mid-'70s, the "Peter Asher sound" really hit. He had a lot of success with Linda Ronstadt. They're very manufactured records, very L.A. I mean, they are superbly crafted records, but not to my liking at all. I sort of dropped the ball on producing singer/songwriters, because Peter Asher's sound was having much more success and it was one that didn't appeal to me. I just figured what I was doing must be dated now, but there was no impetus for me to change what I was doing, because that's the way I liked it. I just let that part of my career go. If you don't love what you're doing, then it doesn't make any sense at all.

*Do you miss doing pop records?*

Yeah, I do. But a pop record today is not my idea of a pop record. I miss doing it, but I don't think I have the talent, qualifications, or inclination to do what a pop record is expected to sound like today.

*What about some of the blues players?*

Yeah, I would love to be able to produce some of them. The occasion has not presented itself since I did a bunch in the early '70s. Blues just sort of dried up in the marketplace, and in recording activity, except for people like Bruce Iglauer at Alligator Records, who loved it so much he created a record company and created a god-damned market for it, and did very well just by sticking by his guns. Now, hap-

basis, it's important to spend as much time with that person as possible. It's also important that you like each other and have a little bit of mutual trust and respect. You make sure that if that artist is playing a gig, you go. Sometimes you go on the road with them. You'll often hear things while they are playing on the road that they'll often forget when it comes time to make an album: Material, combinations of people.

The better you know a person, the better you can help him realize his dreams. The better you can steer the situation, emotionally, in the studio. The studio situation is stacked to lose unless you create the right atmosphere, defuse the right time bombs, and handle everything diplomatically to keep up people's energy levels, compatibility, and egos. The better you know someone, the better you know when it's time to relax, to use your sense of humor, let the dust clear, you know how far to go with your sense of humor. You know when someone is hurt or angry. Or you know when someone is ranting and raving that it's just some childlike thing and that all they need is attention and all it takes is a joke to bring them out of it. If you take them seriously, it'll be a fatal mistake and it will be the end of the day.

*In specific terms, what was the occasion of your meeting Dexter Gordon? In what way is that relationship so special?*

Dexter was special, first of all, because of the special way he played the saxophone. Not only was he the first to adapt be-bop to the tenor saxophone, but he also had such melodic depth and richness without losing that joyous, soulful feeling. He was a singular giant beyond his place in the history of the music. But also a fascinating, well-read man who was very involved in following the news and the world situation. I first met Dexter when his manager, Maxine Gregg, and I shared an office in Manhattan. Maxine and I thought of ourselves as a team, she in management,

me in producing. So Dexter and I were sort of thrown together.

The night we were supposed to start recording his *Homecoming* album at the Vanguard, Dexter and I shared a cab. It was the first time we were alone. I asked him a question at 44th Street; there was silence until about 34th Street, and I'm thinking, "I ask him a question, and this guy is sizing me up. Does he dislike me? Why the long silence?" Finally an answer came forth. I just wasn't used to his style. You ask Dexter a question, and he'll respond very quickly, or he'll stop and think about it. You'd think he was stonewalling you, but all he's doing is thinking so he can give you the best answer.

Over that weekend, Dexter and I hung out until about 8 o'clock in the morning. It developed into a very close relationship. Everyone loved Dexter; he had a million friends, but he didn't have many close friends, he didn't open up to that many people. Over the

friend, too—but my first priority is to Mosaic in the long run.

*If someone had never heard of Mosaic Records, how would you describe its purpose to them?*

Mosaic's starting purpose—and I hope it branches out—was to bring to the American public fast-food spaghetti. [Another big laugh.] And when we couldn't do that, we decided to go into jazz. No, Mosaic started out when I was in the Blue Note vaults everyday in L.A. but wasn't working. What was I going to do, go crazy? Lament my poverty? So I worked on it everyday. I found some unissued Monk tunes and some great alternate takes, but it wasn't enough for an album. There was also some Monk on 78s, and the way Alfred put out the two Monk albums, he scrambled everything up chronologically. And there were a bunch of other Monk tracks on the Milt Jackson albums. Everything's here, there, and everywhere. I thought, maybe the best

*Why is that?*

We created the business to be this way. By mail order, we get the full price. If we sell our records for \$10, then that's what Mosaic gets; if a record company's list is about \$10, they get about \$5.60. As a result of this, of course, our product isn't spread everywhere, so we don't have to overpress, we don't have to take returns, and we don't have a lot of overhead. We go right to the mailbox of the people who want the stuff.

*How large was the original Monk set? When did you issue it?*

It was four LPs. It came out in early '83, and we pressed as we went. We've sold out our 7,000 copies. It's the biggest seller because it's Monk, it's Blue Note, and it was the first one that we issued. It's unfair to say this is our biggest seller, because they all sell gradually. Add five years to the Herbie Nichols set, and that might be where the Monk numbers are.

## To do a definitive boxed set with great sound, and to get the right people to

years, we had watched a lot of sunrises, had a lot of very meaningful and vulnerable conversations.

*You mentioned earlier on that the idea for Mosaic Records was born out of frustration of not being able to get to the Blue Note vaults. Where does Mosaic fit into your life, and what is its purpose?*

Yes, it was out of frustration, but it was also born out of something else. Charlie Lourie and I were on bad times. Charlie was laid off, and it was a dry period for me, very dry. We figured if we're going to go through bad times, we might as well go through bad times building something. We needed insurance, because in this industry, there's no security, no pension, no loyalty. We wanted to create something where we would have control of our destiny as well as do stuff that we never could get away with at a major. The kind of things Mosaic does, for the most part, would not make money at a major record company.

It was a horrible struggle. We learned as we went along. It was a struggle and a terrible strain on Charlie's family; I didn't have a family at the time. But it worked, and has been gradually growing every year. Hopefully, we're going to be able to get out more boxed sets and pick up speed. I want to really concentrate on Mosaic. I'm very loyal to Blue Note, and to Bruce Lundvall—as a

thing was to start from scratch, do it right once and for all. The complete Monk in chronological order, no matter how many records it turned out to be. I guess that was the Virgo in me, the completist. And there are so many things you can address in a booklet that you can't on a 12 x 12 piece of cardboard, especially with a guy like Monk, who was the only jazz giant that no one really knew very much about prior to his 40th birthday.

That's how it started. We tried one more time to approach Capitol about resurrecting Blue Note. They were very friendly and told me they were "getting Capitol back into markets, genre by genre, on a step-by-step basis. We are going to go down the list, and jazz is something we're going to do but not right now."

So I costed out our Monk boxed set. A major company would lose money, but I realized that maybe if we did a limited edition, say, 7,500 copies, we might be able to have an ongoing business. Charlie put pencil to paper, came up with the same figures I did, and said, "Yeah, let's try this."

If I put on my Blue Note hat and put out a boxed set and a booklet—I mean, the booklet costs \$15,000 or \$20,000—they would have every right to say to me, "You're out of your mind, goodbye." Yet with Mosaic, I can sell 1,700 copies and keep my doors open.

We have such a great relationship with our customers. When we put out the Tina Brooks set, a lot of people bought that four-record set who had never heard of Tina Brooks. We received so many letters thanking us for turning them on to this guy. People seemed so grateful. That's why we're able to put out Tina Brooks, Herbie Nichols, and Ike Quebec. And these are dreams come true for me. They are pet artists—God, to be able to not just squeak out a reissue in a reissue program that'll disappear in four years, but to be able to really do a definitive, comprehensive thing, with great sound, and to do a booklet and get the right people to write it. It's very hard work and it's a drag when you're doing it, but it sure is gratifying.

*What was your relationship with/to Alfred Lion?*

When Charlie and I started Mosaic, we suddenly received this letter from Alfred Lion. I stared at it, saying, "That's really Alfred's handwriting! He's really writing us!" He wanted a copy of the Monk and sent us a check. So we sent a copy and sent him his check back. He was so moved by the whole project, by the Monk and the Albert Ammons—Meade Lux Lewis, that he called. I was in shock. We were on the phone for two hours. Still, he didn't give me his number. He was very secretive. He had a heart condition. His

wife didn't want him to deal with the business anymore; she kind of protected him. Still, he kept calling. We had a phone relationship for a couple of years. Finally, Bruce said, "Next time he calls, why don't you invite him to One Night at Blue Note? Maybe he'll come out for it." Well, he couldn't resist, and that was the first time we met face-to-face. Some people couldn't believe it; they said, "You guys are like father and son." We were very alike in some ways. He was a very strong-willed, stubborn man who had great instincts for the music—and cared.

*Why has the definition of jazz been watered down?*

It doesn't bother me, because the watering down does not affect the real music. It's not like, wow, look, Kenny G., Najee, I wonder what they would have sounded like with Art Blakey. It's not taking away from the music at all, because it's not real jazz musicians who are playing it. It's good in the

Bassist/composer  
Charles Mingus, 1978.

◆  
"Sophisticated Giant"  
Dexter Gordon, 1979.

◆  
Bluesman Buddy Guy,  
1983.



no longer a dirty word to a talent booker on TV shows, and to radio stations, and to people in general, then great. Suddenly, there'll be more opportunities for the real artists.

*Why do so many labels' jazz programs eventually wind down? Do they only have a life of so many years?*

No, they don't have to wind down, but they ultimately do because companies get into financial trouble and have to cut the number of faces, the amount of

◆  
**write the booklet, is hard work but very gratifying.**

sense that it gives the illusion jazz has wider appeal. At the end of the year, when they figure out each music's market share, you come up with a higher percentage of jazz because of these people, and executives will let a Cus-cuna or a Backer into a record company to create a jazz program.

So it helps in that sense. I think it also helps in that it's educating people that a vocal is not always necessary. People are now much more used to listening to instrumental music, which lets them get into jazz or classical music a lot easier.

*Don't you think, in some ways, it's mis-educating people as to what jazz is all about?*

Yeah, but a certain amount of people will find their own way to jazz from it. You get into a lot of kinds of music and then look back at the stuff that first dragged you into it and ask, "God, how did I ever like that now that I'm hard-core and well-versed?" But it was strong enough to suck you in. I don't care how anyone gets to jazz, as long as they get to it. That's all I care about. *Does it bother you that the genre is misdefined?*

No. It bothers the hell out of a lot of people, but I really don't care. I don't think any of that stuff really matters. I mean, no one can really define what jazz is, anyway! So if some wallpaper music gets defined as jazz and jazz is

activities. So what's the first thing to go? Jazz, which doesn't lose money, but doesn't make enough to justify its taking up the energies of the staff—art department, publicity people, whoever. In the scheme of things, it's much better to lose \$300,000 on four or five failed groups and then find an artist that does platinum-plus for the run of a contract. That's a lot more profitable than dealing with jazz and making nickels and dimes.

*For jazz people like you—or freelance producers who head a label's jazz program until the parent organization decides to jettison the concept and personnel as not profitable enough—doesn't it begin to wear on you?*

There's a certain amount of frustration toward the end of a relationship with a label. The only way jazz, or classical music, or blues, or a quality minority-taste music will ever be at a record company is because somebody who loves it passionately is there and can sell it to everyone else at the company. And that honeymoon only lasts a certain amount of time. When it's over, it's stressful when everything starts falling apart. Then you just have to find another place to go.

But the new Blue Note has been going for seven years and gets better every year; EMI has a wise, new emphasis on catalog. This could break the mold. A



# Airborne Audio



## Hi-Fi in the Sky



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**RICH WARREN**

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*F*lying at 41,000 feet, you move almost as rapidly as the speed of sound itself. The wind noise generated at close to 600 mph, coupled with the thousands of pounds of thrust from turbo-fan jet engines, creates an ambient noise level of about 70 to 85 dB. No wonder airlines fail to boast about their audio entertainment in advertising.

Welcome to the acoustical environment of a commercial airliner, where your ears pop on the way up and on the way down and suffer in between. This mobile environment challenges good sound more than the automobile. Unlike an automobile—where you can choose the performance parameters of the vehicle, its operation, and the sound system installed within—an airliner is a fixed system.

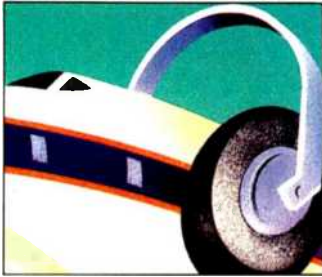
Airborne audio grew out of in-flight movies. Since the movie soundtrack needed to be sent to the seats, a few additional wires provided separate au-

dio programming as well. Initially, airlines offered movies and audio only on their longest flights as a way to alleviate passengers' boredom. This being more than a decade before the Sony Walkman, you either enjoyed the entertainment supplied by the airline or brought along a good book.

The airlines designed the system with motion picture dialog as their major concern. After all, it was a treat to have any diversion, so quality was not paramount. In this era of primitive audio technology, the expensive and heavy Koss Pro-4 represented the state of the art in headphones. In the airline business every ounce counts, which made heavy 'phones unacceptable. To reduce weight and save money, the airlines skimmed on the quality of the headphones. Compact Cassettes were far from widely accepted before the launch of Dolby B noise reduction. The media the airlines used to provide sound on airplanes have



ILLUSTRATION: BOB SCOTT



Once portable stereo sound became available, passengers brought their systems with them—and spoiled the cheap ride airlines had been on.



been an open-reel system with wide tape and multi-tracks, a 4-track tape cartridge system akin to the unlamented 8-track in design, and jumbo cartridges with 24 tracks.

The reproduction system concealed the deficiencies of the source. In the seat's armrest, the electronic signal vibrated two tiny diaphragms. The airlines provided a pair of hollow tubes similar to a stethoscope. These acoustic tubes carried the sound from the armrest to your ears. (A telephone provides comparable sound quality.) The acoustic tubes satisfied airline requirements for an ultra-lightweight, cheap, robust, reusable, theft-deterrent headset. Although it was useless outside of an airplane, this headset was acceptable to the flying public because it was the only game in the sky.

The advent of the Sony Walkman over a decade ago spoiled the cheap ride for the airlines. People discovered higher quality sound through comfortable, lightweight electronic headphones. Many people brought along their own portable music system. When they did watch the movie, they became increasingly irritated by the poor-quality audio.

In the mid-1980s, many airlines made a concession by installing a standard mini-jack in the seat's armrest. Passengers are able to connect their own 'phones, but the airlines still charge the \$4 fee for coach passengers. This covers the royalty charge the airlines pay to show the movie, plus a profit—not the cost of providing the audio entertainment. By the late '80s, the airlines began providing inexpensive lightweight Walkman-style headphones to passengers in first class and business class; however, coach passengers are still suffering with the acoustic tubes.

Airlines remain very sensitive about passengers using their own 'phones. Lufthansa, Air France, and Air Canada use proprietary two-prong jacks that don't accommodate passenger-supplied 'phones. After installing jacks in its coach seats, American has begun blocking them to prevent passengers from hearing movie soundtracks without paying. United charges the standard \$4 whether you use your own or airline-supplied headphones on movie flights in coach. Both American and United provide electronic headsets in business and first class, and they welcome the use of personal 'phones in those classes. British Airways installed standard mini-jacks in all seats. It invites all flyers to use their own 'phones

and provides electronic 'phones for business and first class. The relaxed attitude results from BA's complimentary movie policy.

Regardless of policy, plugging in your own 'phones leads to disappointment. Good-quality 'phones reveal all the flaws in the system, above and beyond the ambient noise level. For example, United specs out its original systems at a frequency response of 50 Hz to 10 kHz,  $\pm 3$  dB, a signal-to-noise ratio of 50 dB, and THD of less than 1%. Other airline systems have S/N as low as 45 dB, THD as high as 1.5%, crosstalk of  $-50$  dB, and wow and flutter of 0.08% wtd. rms. Most airlines equalize the sound to compensate for the acoustic tubes, resulting in ear-piercing sound when heard on electronic 'phones.

The Jetset and Jetman adaptors overcome many airline headphone problems. Lotus, an English company, designed the Airdaptor system, now manufactured in China, that is used in the Jetset and Jetman. The little black box, the size of a DAT and powered by two AAA batteries, converts the armrest acoustic output into an electronic output. An acoustic tube mates with the holes in the armrest. From the tube, the sound enters the box and filters through a series of baffles providing acoustic equalization. A pair of sub-miniature electret mikes then converts the sound to an electronic signal that is amplified by an IC amplifier and fed to a stereo mini-jack for headphones. The \$22 Jetset comes with a set of inexpensive lightweight headphones; the \$35 Jetman is integrally packaged with slightly higher quality earbud 'phones. Both sound better than listening through airline-supplied electronic 'phones plugged into the electronic armrest jack, and they both accept higher quality 'phones, which greatly improve performance. Travel boutiques stock variations of the Jetset/Jetman. The easiest way to obtain them is from their largest distributor, Executive Travelware, P.O. Box 59387, Chicago, Ill. 60659; (800) 397-7477 or, in Illinois, (708) 673-8282.

The popularity of the open-air Walkman-style 'phones further impedes the quality of aircraft sound. These 'phones fail to block the high ambient noise level. Aircraft generate the greatest noise in the critical, and most audible, midrange frequencies and to a lesser extent in the bass region.

First-class passengers enjoy a slightly quieter ride because they are farther away from the engines than

coach passengers. To minimize noise, you should request a seat forward of the wing, and in or near the center of the cabin when on a wide-body jet. One of the quietest rides is flying in the front of the narrow-body McDonnell Douglas MD-80, which has its engines at the rear.

Both Bose and Sennheiser are experimenting with a totally new kind of headphone specifically designed for aviation use. Pilots quickly bought out the first production run of the Bose Aviation Headset. This noise-canceling headset sells for the steep price of \$995. Tiny microphones pick up ambient noise and send it to a phase-inverting servo amplifier that feeds the anti-noise signal at just the right level back into the headphone. The Aviation Headset's special gel/foam Clear Comfort ear cushions mechanically seal out noise and have an exceptionally comfortable fit. Bose intends to market a consumer version of this noise-canceling headphone in the near future. Wearing the Bose Aviation Headset on a long flight reduces fatigue.

The Sennheiser headset uses a less sophisticated design and produces less dramatic results. The company is marketing it to airlines for passenger use, at a cost of about \$150 each. Theft probably will not be a problem, since the 'phones will require a special external power supply.

Familiar names dominate sky-high sound systems. Matsushita Avionic Systems (MAS; Matsushita is the parent company of Technics and Panasonic) and Sony Trans Com provide most aircraft sound systems. Avicom and Hughes are also well known in the business. MAS counts 143 airlines among its customers. Different companies specialize in different aircraft. A single airline may do business with all of these companies, while other airlines deal almost exclusively with a single supplier.

MAS marketed the first major improvement to in-flight entertainment systems when it began supplying audio from cassettes encoded with dbx NR. Each "deck" holds six tape transports. The tape format differs slightly from the consumer version. The four tracks all play in the same direction and are slightly wider than those on consumer cassettes. Two transports can operate in tandem for an unrepeated program time of 90 minutes. MAS provides the flexibility of any combination of 12 channels, such as six pairs of stereo channels or three pairs of stereo channels plus six mono channels. The



**AIDS TO IMPROVE YOUR AIRBORNE LISTENING INCLUDE THE JETSET (TOP) AND JETMAN (MIDDLE), BOTH FROM EXECUTIVE TRAVELWARE, AND (BOTTOM) CUSTOM-MADE EARPHONES FROM RADIO PARTNERS.**



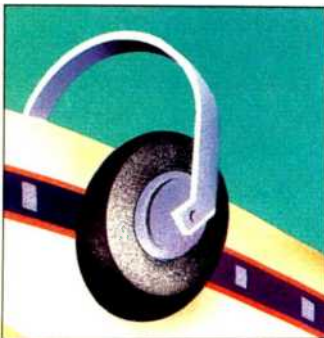
use of dbx noise reduction improves the S/N to 70 dB, and the upgraded tape heads and electronics improve the rest of the specifications to a frequency response of 40 Hz to 12.5 kHz,  $\pm 3$  dB, better than  $-70$  dB of crosstalk, and THD of 1%.

American continues to use a multi-channel, 1-inch open-reel tape, which gives it a playing-time advantage. The airline recently introduced the first two-hour audio programming; as a rule, a single audio program runs only one hour before repeating.

A new generation of aircraft ushers in a revolution in airborne audio. Systems for the Boeing 747-400, 767-300, and 777, the McDonnell Douglas MD-



**P**lugging in personal headphones can easily lead to disappointment, since quality headphones will reveal all the flaws in an airline's audio system.



11, and the Airbus A-320 and A-340 will cruise far above previous attempts at high fidelity. Sony boasts of its initial selection to provide the entertainment systems for the new 777, recently ordered by United, which will be flying in 1995. For the 777, Boeing targets a range from 76 to 82 dB for interior noise levels.

United plans to convert all its video systems to the Hi8 format, with its inherently better fidelity than the non-Hi-Fi Beta system now in use. United also intends to supply audio programming from CD when an economical recordable CD system becomes available. The Sony Trans Com 800 series currently being installed in United jets will accept a CD source with minimal modification and can even mix CDs and cassettes. The CD system also can handle random-access cabin announcements.

Air Canada considers Hi8 more than a video source. Not only does it plan to use the digital stereo soundtracks for movies in Hi8, but it is considering as well the full digital capabilities of 8-mm video for audio. The 8-mm format provides six pairs of PCM audio tracks in lieu of video. Air Canada will also test DAT when it takes delivery of its new 767-300 this year. If DAT performs well in the new aircraft, the airline may retrofit other planes. Air Canada won the 1990 AVION Award for the best in-flight audio programming from the World Airline Entertainment Association.

JAL supplies audio from DAT on its new aircraft. The airline also makes a point of supplying not just electronic headphones in first and business class but Sony's MDR line of 'phones. (MAS furnishes all of JAL's audio equipment other than the headphones.)

Airlines and their suppliers are eager to cut the cord. Wiring audio to each seat means that each time the seat is moved, the wiring must be rearranged. Airlines move seats frequently and sometimes in a hurry: An airline can change a business-class section to an economy section and vice versa in a matter of hours. The wiring to each seat also adds weight, which requires additional fuel.

Currently, airlines multiplex the audio signals to the seats, which reduces the number of wires. To keep quality high with the least amount of wiring, MAS designed multiplexed digital systems to carry the audio from the equipment bay to the seat. They use adaptive delta modulation (ADM) because of its inherent simplicity and resistance to noise.

The airlines are now eyeing infrared audio transmission systems and wireless headsets. Besides speeding seat relocation, it would increase passenger freedom of movement and make the headsets less desirable to steal. With cordless headsets, passengers in tourist class will find it impossible to hear movie soundtracks without paying. The major disadvantage of cordless headsets will be the continuous need for battery replacement. (Sony Trans Com claims its infrared headset will sound better than conventional aircraft headsets.)

While waiting for the airlines to catch up with home audio, many music lovers turn to their trusty personal headphone stereos; however, headphone stereos often lack the power to overcome cabin noise, and the few that do might damage your hearing when used for prolonged periods. One option is to choose headphones that seal out external noise. Unfortunately, most of these are less sensitive than the open-air type specifically designed for headphone stereos. Thus, you will hear greater amounts of distortion.

Blocking the ear canal reduces ambient noise. With this in mind, Radio Partner melded hearing aid technology with high-quality earbud 'phones. Radio Partner takes an impression of your ear canal (either at its New York office or from a do-it-yourself kit sent by mail). It then molds a Sony transducer into a vinyl earpiece that fits only your ears. The vinyl blocks ambient noise, which permits playing your personal portable (or airline-supplied audio) at lower levels. This generally results in lower distortion and less chance of hearing damage. An added benefit is that the custom-molded pieces don't fall out of your ears. The basic Radio Partner model uses Sony 414 Turbo earbuds and costs \$69 (complete with fitting kit). A more expensive model using Sony Triple Turbo 565 earbuds costs \$109. Radio Partner's telephone number is (800) 321-3364; in New York, (212) 924-1125.

If you are using a portable stereo system, remember to load it with alkaline batteries rather than the rechargeable battery supplied with many models. The rechargeables usually give out over Omaha when you're heading for Los Angeles.

You'll never mistake a jet airplane for a sonic paradise. Yet during the next decade, the airlines will finally not only move you at nearly the speed of sound but also speed improvements to the sound inside the airplane. **A**

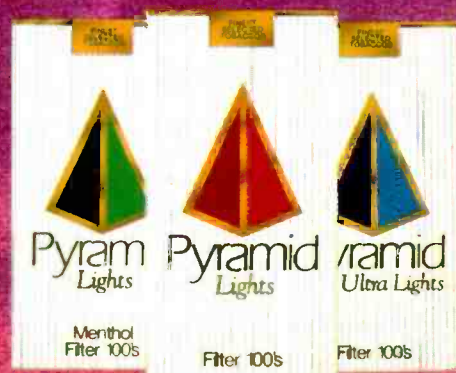


**Ultra Lights:** 5 mg. "tar," 0.5 mg. nicotine; **Lights 100's:** Regular: 10 mg. "tar," 0.9 mg. nicotine; **Menthol:** 10 mg. "tar," 0.8 mg. nicotine, av. per cigarette by FTC Method.

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**SURGEON GENERAL'S WARNING: Smoking By Pregnant Women May Result in Fetal Injury, Premature Birth, And Low Birth Weight.**

Why can't you get other  
premium cigarettes for this price?  
Another mystery of the Pyramids.

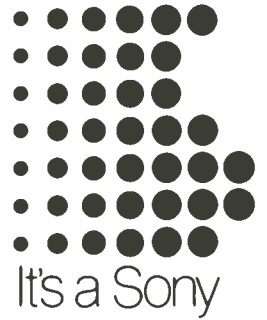


Available in your favorite styles.

**OUR NEWEST  
DISCMAN  
MAY HAVE  
AN EQUAL,  
BUT  
NOT IN THIS  
WORLD.**



Come to where the horns are mellower, the flutes purer and the voices sweeter. We refer, of course, to our newest Discman® CD player, the D-303. It's the world's first to bring the accuracy of 1-bit technology to a CD player you can bring anywhere. With superlative low-level linearity, the 1-bit system captures even the softest, subtlest sounds. Taking music to a higher plane of existence.



Sony's headphone cord remote control lets you operate the D-303 even if it's in a briefcase. Our MegaBass™ circuit brings you thunderous low frequencies. There's a convenient Quick Charge rechargeable battery. As a finishing touch, you have a choice of titanium or black finish. There's only one portable CD player with 1-bit technology. And only one conclusion. The D-303 is worlds apart. **SONY.**

# 1

## JVC AX-V1050 AUDIO/VIDEO AMPLIFIER

### Manufacturer's Specifications (U.S. Version)

#### Amplifier Section

#### Power Output, 8-Ohm Loads:

Front, 100 watts/channel; center, 80 watts; surround (rear), 60 watts/channel.

**THD at Rated Power:** Front, 0.009%; center and rear, 0.08%.

**Dynamic Power:** Front, 220 watts per channel into 4 ohms or 300 watts per channel into 2 ohms.

**S/N:** Phono, 77 dB; CD direct, 105 dB.

**Input Sensitivity:** Phono, 2.3 mV; high level, 200 mV.

**Phono Overload:** 200 mV.

**Damping Factor:** 100 at 1 kHz, for 8-ohm loads.

**Tone Control Range:** Bass,  $\pm 8$  dB at 100 Hz; treble,  $\pm 8$  dB at 10 kHz.

#### Digital Section

**Surround Programs:** Dolby Pro-Logic (theater, mono, and stereo), Symphony Hall, Recital Hall, Church, Jazz Club, Pavilion, and Stadium.

**A/D and D/A Sampling Frequencies:** 32, 44.1, and 48 kHz.

**Converters:** D/A, pulse-edge modulation one-bit type with fourth-order noise shaper; A/D, one bit with fourth-order noise shaper and 64-times oversampling.

**Input Levels:** Coaxial, 0.5 V peak to peak; optical,  $-23$  to  $-14$  dBm.

**Output Level:** Coaxial, 0.5 V peak to peak.

#### Video Section

**Composite Video Input/Output:** 1 V peak to peak.

**S-Video Input/Output, 75 Ohms:** Luminance (Y), 1 V peak to peak; chrominance (C), 0.286 V peak to peak.

#### General Specifications

**Power Requirements:** 120 V a.c., 50/60 Hz, 340 watts.

**Dimensions:** 17 $\frac{7}{8}$  in. W  $\times$  6 $\frac{13}{16}$  in. H  $\times$  17 $\frac{3}{8}$  in. D (45.4 cm  $\times$  17.3 cm  $\times$  44.2 cm).

**Weight:** 35.6 lbs. (16.2 kg).

**Price:** \$1,500.

**Company Address:** 41 Slater Dr., Elmwood Park, N.J. 07407.

For literature, circle No. 90



Let me begin by saying that the version of JVC's AX-V1050 A/V amp with digital surround processor that I tested was not the U.S. production model. In fact, it was hurried to my lab directly from Japan, and therefore contained a Japanese owner's manual. Despite this, and thanks to some keyword translations handwritten by a kind soul at JVC's U.S. headquarters, I was able to figure out the features of this audio/video amplifier/processor and to recognize that when it does hit our shores, it is likely to be well received.

What amazed me most about this unit is the number of adjustments that can be made with its relatively few controls. And since this unit is, after all, intended to be operated in association with a TV set, JVC has wisely provided video on-screen displays that tell you the status of the many adjustable parameters. In addition to the many audio and video program sources that can be hooked up to this amplifier/processor, there is provision for connecting direct digital data from such components as a CD player, a DAT recorder/player, and a VCR equipped with digital audio sound. (JVC has demonstrated such a VCR, but it still has not come to market in the U.S.) In the case of a DAT recorder, both the digital input and output can be connected to this JVC unit. S-video (Y/C) connectors are provided for most of the video inputs as well as for the output signal that would normally connect to a TV monitor/receiver.

Up to six loudspeakers can be hooked up to the AX-V1050's amplifier outputs: Two main (or front) speakers, a pair of rear/surround speakers, and one or two center-channel speakers. The sample I tested can handle speaker impedances from 6 to 16 ohms, but I am told that the power amplifier section has been redesigned for the U.S. market and will be able to accommodate 4-ohm speakers as well. If only a single center-channel speaker is used, its impedance can be anything from 4 to 16 ohms. A powered subwoofer can be connected to either of two mono output jacks for line-level audio signals.

In addition to providing all the accepted modes of Dolby Surround reproduction (normal Pro-Logic, Dolby three-channel logic, phantom center channel), the digital signal processing circuits can simulate a specific "Symphony Hall," a smaller "Recital Hall," a "Stadium," a "Church" or cathedral, a "Jazz Club," and a "Pavilion" (a fairly live concert hall modelled after one in Tokyo). For each of these simulations, you can adjust apparent room size, liveness,



reverberation level, frequency response of the reflections, rear/surround level, and the relative level of digitally processed signals mixed into the front channels. When using Dolby Surround, center-channel level can be adjusted, and center-channel frequency response can be altered by means of a single-band parametric equalizer. As any of these adjustments are made, the front-panel display tells what is going on and the degree of adjustment that you have selected.

This amplifier/processor also features JVC's Compu-Link system, which thoroughly integrates its operation with many other JVC components. For example, if you use a JVC TV set and VCR and wish to play back a prerecorded videotape, inserting the tape into the VCR will turn on power to the TV and the amplifier, as well as to the VCR. The input selector of the TV and the source selector of the amplifier will be appropriately set, and the tape will begin to play—all automatically!

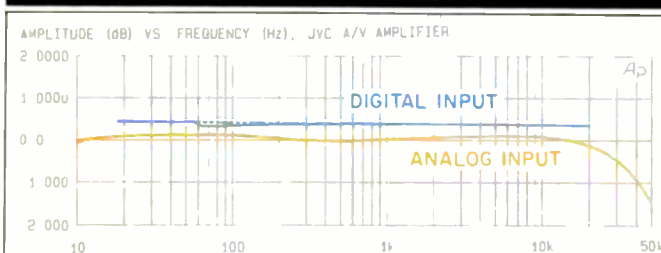
The supplied remote control is a universal type that comes preprogrammed with the infrared commands of JVC components and can also "learn" the commands of other components. A switch on the remote shifts between its three memory banks ("Audio," "Video," and "AUX"). The factory-preset commands programmed into the first two banks can be overwritten but can also be restored, as they are in permanent (ROM) memory. The "AUX" bank is for storing commands without overwriting the factory presets. The remote control not only duplicates adjustments found on the unit's front panel but can be used to actuate the pink-noise test tones that cycle from speaker to speaker, around the room, when you want to balance all those speakers for proper surround sound.



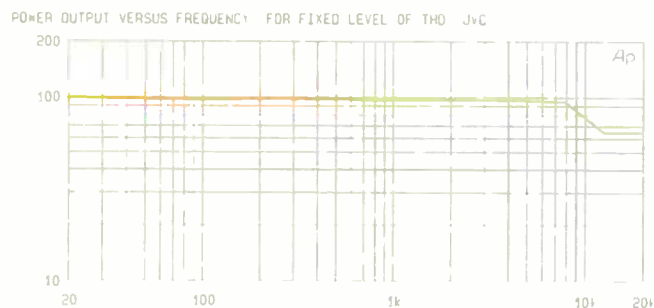
### Control Layout

A "Power On/Standby" switch is at the upper left of the front panel. Below are pushbuttons for selecting digital inputs and "Processor" on/off. Below these is a stereo headphone jack. The display is located to the right of the power switch, while further to the right are banks of indicator lights that show digital sampling frequency and input modes, whether audio tape or videotape outputs and monitor inputs are in use, and whether the "Sound Selector" (which puts together video and audio signals from different sources) is on. A rotary volume control is at the far right of the panel, and below it are a set of audio/video input jacks (including an S-video connector), ideal for connecting a camcorder without having to go around to the rear panel.

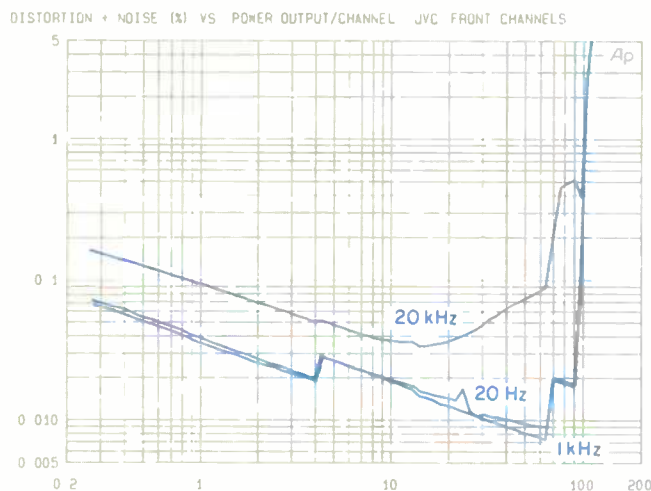
The rear channels provide enough distortion-free, clean output even when overall sound levels are set very high.



**Fig. 1—Frequency response; see text. Curve for digital input has been displaced for clarity.**



**Fig. 2—Front-channel power output vs. frequency for a constant THD level of 0.1%.**



**Fig. 3—Front-channel THD + N vs. power output for 8-ohm loads.**

No fewer than 13 pushbuttons, arranged horizontally over most of the length of the panel, are used for source selection. Seven of the buttons select video-related program sources; the remaining six are for audio-only sources.

Pushing the lower half of the panel releases a drop-down hinged flap that reveals secondary controls. Here are all the processor controls (including a one-band parametric equalizer for the center channel), the "On Screen" button, a speaker on/off switch, the digital input selectors, the "Sound Selector," the record-output and monitor switches, and the bass, treble, and balance controls. The digital input selectors, labelled "CD Direct" and "DAC Direct," bypass the regular source selector, the balance controls, and the processor circuitry. The "DAC Direct" button would be used with a program source that is connected directly to one of the digital inputs when you want the most direct signal path between this unit's internal D/A converters and power amplifiers.

The rear panel houses all the required audio and video inputs and outputs, including no fewer than seven S-video connectors, counting the monitor output jacks. Three optical digital inputs and two pairs of coaxial digital inputs and outputs are at the extreme left of the rear panel. There are three sets of Compu-Link jacks, six sets of speaker terminals, and three a.c. convenience outlets (two switched, one unswitched).

### Measurements

Frequency response of the AX-V1050, measured via the high-level inputs, was essentially flat from 10 Hz to beyond 20 kHz, as shown in Fig. 1. At 50 kHz, response was down by only 1.5 dB. I noted, however, a very slight bump extending from 1 kHz downward and amounting to no more than 0.1 to 0.2 dB. I thought this must surely be caused by the tone controls, which, though set to their center points, might nevertheless not be at electrical center. I was certain that a repeat of this test, made in the "CD Direct" mode, would surely bypass the tone controls and therefore result in absolutely ruler-flat response. Such was not the case; the response curve in "CD Direct" mode was almost an exact replica of that shown, with the same minor rise in the bass region. Using a digital signal and the digital inputs, however, yielded the absolutely flat response at the amplifier output that I expected, as shown.

As I mentioned earlier, the amplifier section of the Japanese unit I tested is configured for 6-ohm loads (unlike that of the U.S. version, whose specs are on the first page of this review). Since my heavy-duty, lab-standard loads are 4, 8, and 16 ohms, I decided to see what the amplifier would do when connected to 8 ohms. As I might have expected, with these loads it was unable to deliver the 100 watts per front channel, at 0.02% THD, that it is rated to deliver into 6 ohms. The power output obtained at 8 ohms for that low level of distortion, for all but the highest test frequencies, was about 80 watts per channel, as I learned when I tested THD versus power output. But first I wanted to run a regulated sweep of power band for some specified level of THD. I selected a THD of 0.1% as the parameter to be held constant by the regulation facilities of my Audio Precision test system (a not unreasonable level of distortion) and plotted power output

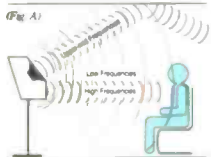
# AR ANNOUNCES A STARTLING NEW DIMENSION IN STEREO LISTENING. HOLOGRAPHIC IMAGING.™

It's astonishing. You're used to speakers blanketing a room with ambience. Or limiting imaging to a narrow sweet spot.

Holographic Imaging unites imaging and ambience to recreate music in its proper position. The music is projected into the room. The effect is electrifying. Three dimensional.

## THINK OF IT AS A SONIC HOLOGRAM.

And you're right in the middle of it. Imaging is far more focused than conventional speakers, so not only can you pinpoint instruments with striking accuracy, but experience their size, weight and texture as well. We've combined that improved definition with more spacious, natural ambience that envelops you in what we call the Spatial Soundstage.™ (Fig. A)



The technology responsible for Holographic Imaging could only have come from the people who invented acoustic suspension.

## ASTOUNDING SOUND BECAUSE WE BROKE THE VERY RULES WE MADE.

For instance, the first four in the H/I Series have the woofer on top, angled precisely. This minimizes unwanted crossover components and diffraction effects, leaving nothing between you and the music.

The offset dome tweeter adds strong, precise imaging over a broader area than merely the traditional sweet spot. (Fig. B)

FIG. B.



In the two largest H/I Series, we put the midrange on the top on an angle. Then we mounted the woofers into

an acoustic suspension cabinet that fires into a filtered

chamber. The result...Filtered Suspension...tight bass response combined with dynamic, efficient performance. (Fig. C)

The narrow speaker encasement (Minimal Baffle Design) reduces reflected information and gives you an enormous sound from a surprisingly small amount of space.

## SOUND DESIGN DICTATED COSMETIC DESIGN.

The design philosophy here is "form follows function." As such, every physical characteristic is born from specific physics and psych-acoustic principles. The result is a seamless blend of engineering innovation and visual art.

From bookshelf to tower, each sleek, uncompromising model projects precise stereo performance. Other finish options are available on the largest model.

See and hear these new speakers only at selected AR dealers. They are offering an extraordinary demonstration featuring Nova artists such as Brandon Fields and Jude Swift on a special CD which you're free to keep afterward.

The other thing free is information. So if you have questions about the H/I Series or Holographic Imaging call 1-800-969-AR4U.



FIG. C.



WE CAN BREAK THE RULES BECAUSE WE MADE THE RULES.

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The JVC's center-channel controls include a delay, to compensate for the center speaker's position, and a quasi-parametric equalizer.

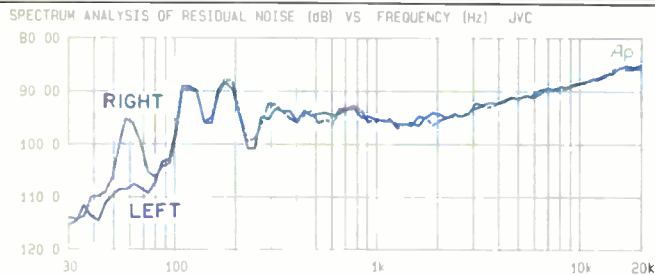


Fig. 4—Spectrum analysis of front-channel residual noise for 1-watt output.

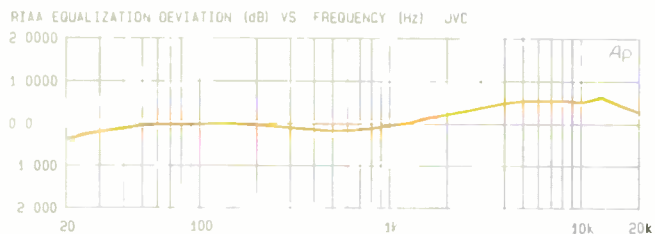


Fig. 5—Deviation from RIAA equalization.

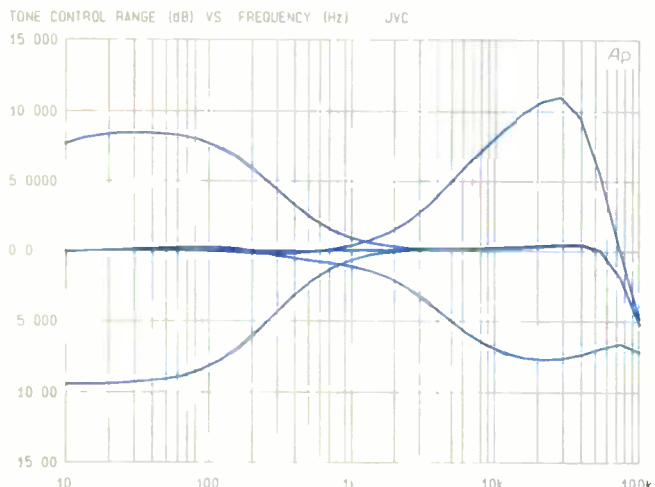


Fig. 6—Bass and treble control range.

versus frequency for that level. Results are shown in Fig. 2. Over most of the audio range, power output averaged just under 100 watts per channel; it dropped to less than 70 watts per channel at 20 kHz.

Figure 3 provides excellent confirmation of the results obtained in Fig. 2. For this test, I plotted THD + N versus power output for the front channels at three different frequencies: 20 Hz, 1 kHz, and 20 kHz. Power output via the center channel was slightly higher than that obtained from the main front channels, providing I did not drive the surround channels at the same time as the other three. It is not possible to measure the power output of the surround channels directly without disconnecting their power amplifier sections from the processing circuitry that is always connected when these channels are active. However, I can state from experience gained during the later listening tests that the rear channels provided enough clean, distortion-free output to complement the front- and center-channel output even when overall sound levels were set very high, as they would be when reproducing soundtracks of the action films that lend themselves to Dolby Surround.

I measured A-weighted signal-to-noise ratio via the high-level inputs, with 500 mV of signal applied and the volume control reduced to deliver 1 watt of output at the front-channel loads; my readings were 80.1 dB for the left front and 80.3 dB for the right front channels. In the plot of residual noise versus frequency (Fig. 4), the major components are not random noise but low-level signals arising from the power-supply frequency of 60 Hz and its harmonics, as is often the case. Interestingly, while the 120- and 180-Hz hum and buzz components for this amplifier are virtually identical for the left and right channels, the 60-Hz component is present to a much greater extent in the right-channel output than it is in the left channel.

Sensitivity for the high-level inputs, referred to 1 watt output, was 20 mV; for the phono inputs, input sensitivity for the same output, using a 1-kHz test signal, was 0.22 mV. Phono overload measured 120 mV.

Figure 5 illustrates the degree of deviation of the phono preamplifier section's playback response from the standard RIAA playback equalization curve. It is nearly perfect at low and middle frequencies and has a maximum deviation of only +0.6 dB in the treble region.

Figure 6 shows the response obtained during a series of sweeps in which the bass and treble controls were adjusted for their maximum boost and cut settings. In addition to these overall tone controls, the AX-V1050 has a semi-parametric equalizer for the center channel, with 15 center frequencies available. For the three center frequencies I selected (100 Hz, 1 kHz, and 6.3 kHz), the maximum boost and cut turned out to be almost exactly the +8 dB specified in the owner's manual at all but the lowest frequencies. (Though I can't read Japanese, I am able to read numerals!) Results of successive sweeps of these EQ settings are shown in Fig. 7. Notice that even in the absence of any equalization, the low-frequency response of the center channel is deliberately rolled off. This is true only in the "Normal" center mode—which splits off center-channel bass and feeds it to the left and right front speakers—for use when the center speaker is too small for good bass. The



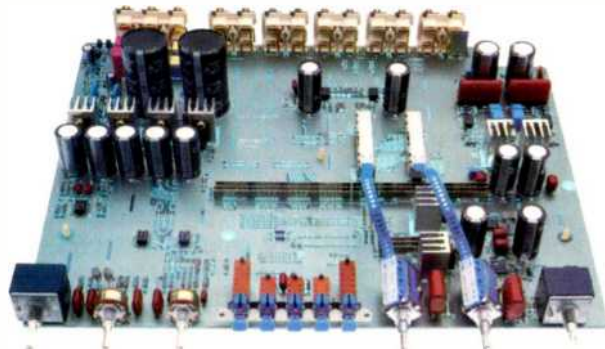
# Adcom's GFP-565 Preamp: Pure and Simple.



## In Search of Sonic Perfection, Adcom Took the Path of Least Resistance

The fewer circuits a musical signal encounters on its way to your loudspeaker system, the greater its musical purity will be. Now, through obsessive attention to detail and design ingenuity, Adcom has created the GFP-565 — the world's first affordable preamplifier with direct, linear gain path circuitry. By combining the GFP-565 with any of Adcom's power amplifiers, you can experience the exceptionally lifelike sound which has astonished even the most demanding critics.

From Input to Output,  
the Signal Path is  
as Direct, Pure and  
Simple as Possible



*By gold plating all input and output jacks, and then directly mounting all jacks, switches, potentiometers and other laboratory grade components on a double copper-plated, glass epoxy printed circuit board, signal losses and noise are dramatically reduced.*

## Three Sets of Outputs for the Perfect Balance of Performance and Flexibility

You can use one or more sets of outputs: 1) **BYPASS** - direct-coupled before tone controls, filters, etc. for the most direct path to your power amplifier while retaining control of volume and balance. 2) **LAB** - direct-coupled with no output-coupling capacitors yet with tone, filter and loudness controls. 3) **NORMAL** - same as LAB but with highest quality output capacitors for use with amplifiers needing the extra protection of ultra-low-frequency roll-off.

Bi-amped and tri-amped systems are easily accommodated by this flexible arrangement.

## Pure Convenience

The minimalist aesthetics of the GFP-565 are deceptive in their simplicity. Without being overly complicated to use, this preamplifier is able to integrate and control all of the components in the most sophisticated of music systems. There are five high-level inputs as well as a phono input. A separate front-panel switch allows the use of an external processor, only when needed, leaving both tape circuits free. And, of course, you may listen to one input while recording from another.

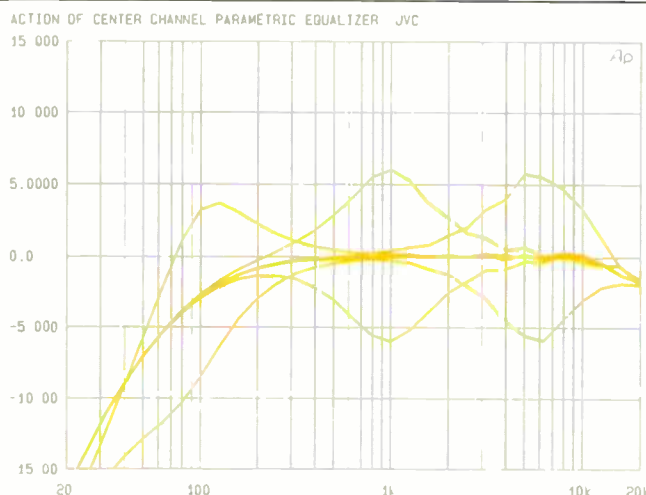
## More Sound, Less Money

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Setting the parameters for a medium-sized hall spread the orchestra beyond my speakers and gave real dimension to the piano.



**Fig. 7—Center-channel parametric EQ range for three frequencies (100 Hz, 1 kHz, and 6.3 kHz) in "Normal" mode, which incorporates deliberate bass roll-off; see text.**

center-channel response in this mode rolls off by about 6 dB at around 60 Hz. In "Wide" center mode, response to center and front speakers is flat. There is also the usual "Phantom" mode, which splits center signals to left and right front speakers, for systems that lack a center speaker, and an "Off" position.

The purpose of the center channel is to keep dialog centered at the screen when playing video software encoded with Dolby Surround. The center channel is therefore only active in the Dolby Surround logic modes: Dolby Pro-Logic, "Theater" logic (which combines Pro-Logic with digitally simulated theater acoustics), and Dolby three-channel logic (which simulates rear-channel effects in systems without rear speakers by feeding out-of-phase information to the left and right front channels, according to JVC). The AX-V1050's center-channel adjustments also include a button labelled "C.Position," which sets the system's time delays to compensate for center-speaker positions up to 1 meter behind or in front of the plane of the left and right front speakers.

#### Use and Listening Tests

It took me a while, but with a little bit of experimenting with this versatile A/V amp/processor, I was able to figure out just about every parameter and how to adjust it. Much of the credit for this goes to JVC's excellent on-screen display. As I touched each button, the parameter being adjusted and the amount of adjustment (in dB) were immediately displayed on the TV screen. Furthermore, since all of these adjustments could be made from my viewing and listening position, I didn't have to keep jumping up and down from my seat until the many parameters were ideally adjusted for proper viewing.

I must confess that, rather than simply listen to musical program sources, I promptly hooked up the AX-V1050 in my own home theater installation, using a couple of small passive speakers that I keep in reserve for use as surround/rear speakers. (In my permanent installation, surround sound is provided by a pair of small powered speakers.) I used only a single center speaker despite the fact that two could have been used to flank my 32-inch TV.

After checking balances with the built-in test tones, I settled down to view a copy of *Who Framed Roger Rabbit*. The opening cartoon sequence is overwhelming when viewed and listened to over a properly calibrated and correctly installed home theater system. I must have watched and listened to this sequence a half dozen times during the evaluation of this and other A/V systems in the past month or two, and it's just as much fun each time. The frenetic activity of Roger as he scampers around, and the demolition of everything in sight by his racing about, are reproduced with a sonic intensity that defies description.

I tore myself away from Mr. Rabbit long enough to check out a couple of scenes from *Gremlins* and *Harry and the Hendersons*, both of which are recorded on excellent quality LaserDiscs with full stereo and Dolby Surround encoding. The ease with which I was able to adjust the system for my particular listening and viewing room, and for my own seating position, is an indication of how the designers have programmed this component and its controls.

If you should audition this amplifier, don't neglect to listen to audio-only program material, using the various sound-field simulations that it provides. My own listening included such fare; I turned off the TV monitor for these tests and played a recent Telarc recording (CD-80252) of the Brahms Piano Concerto No. 1, featuring Horacio Gutiérrez accompanied by the Royal Philharmonic Orchestra under the direction of André Previn. I set the AX-V1050 parameters for a medium-sized concert hall: The piano sound suddenly took on the dimensions that it would have had in a true concert hall environment, while the orchestral accompaniment seemed to expand well beyond my speaker systems and the limited dimensions of my listening room (about 14 feet x 20 feet).

The second disc I auditioned, a recent acquisition from Delos (DE 3091), featured Bella Davidovich on piano, playing, among other Grieg selections, the Piano Concerto in A Minor, with Gerard Schwarz conducting the Seattle Symphony. I felt that this Grieg work demanded a bit more reverberation in my personal "concert hall," which was easily accomplished by varying the hall size and increasing the liveness and reverb level. Given the flexibility afforded by a unit such as this JVC A/V amplifier, I found myself wanting to adjust parameters for each disc I auditioned, and I suspect that others will want to do the same. Fortunately, optimizing the system for different programming only takes a few seconds, and it's worth doing. If production units intended for the U.S. perform as well as this Japanese sample, JVC should enjoy great success with it. I would guess that it will join the growing ranks of all-in-one A/V amplifier/processors and A/V receivers beginning to proliferate in home theater systems around the country.

Leonard Feldman

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## Listening in the 90's

Today people have become more and more space conscious. Many apartment dwellers don't want to give up valuable floor space for large speaker systems. Others who are planning a surround sound or home theatre system simply don't have the room for more speakers in their listening rooms or hesitate to commit the floor or wall space to a good sounding pair of speakers.

Until now, serious music lovers have had little, if anything, to choose from that would produce a large, bigger-than-life sound in a small, compact size. Systems that fit one's space requirements have been woefully disappointing in sound quality.

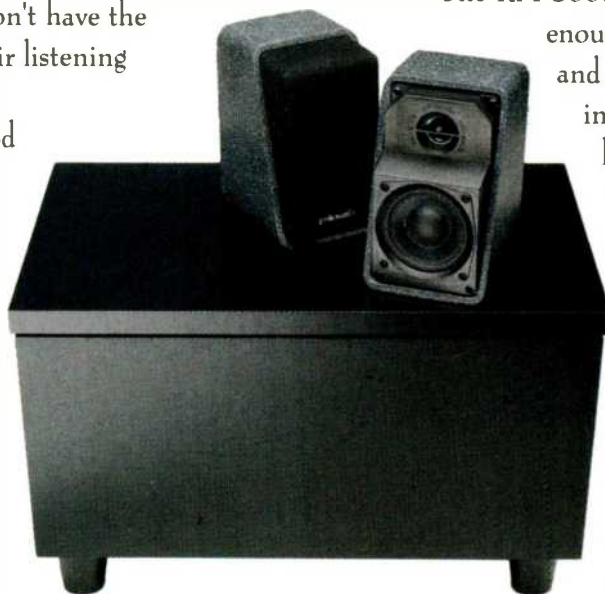
### The RM 3000 Three Piece System

Polk's engineers had determined long ago that there were indeed certain technical advantages in

sonic performance.

The small satellites can be located on shelves, mounted on a wall or placed on their own floor stands. They are very attractive and yet small enough to be hidden from view if desired.

The RM 3000 subwoofer is also small enough to sit behind your furniture and can be used on its side to fit into tight spaces. And since it is beautifully finished, it can be used as a piece of furniture.



*The RM 3000's satellites measure 7"H x 4 1/4"W x 5 3/8"D and are available in black matrix, gloss black piano or paintable white. The subwoofer is 12 1/2"H x 20"W x 12 1/2"D and is available with black wood grain sides and a black, mar-resistant top.*

### The Legendary Sound of Polk

In the tradition of Polk Audio, Matthew Polk and his team of engineers were determined to make the RM 3000 sound better than any other speaker of its type.

Initial reactions have been filled with superlatives including Julian Hirsch of

*Stereo Review* magazine who says, "...they sound excellent...spectral balance was excellent—smooth and seamless."

## Sound as big as life from speakers

small speaker systems. Both high and mid frequencies could be faithfully reproduced with superior transient response and dispersion characteristics, and the convenient, more flexible placement of small enclosures within the listening area could create an ideal sound stage. Unfortunately, reproducing the life-like, full body of the lower frequencies could not be achieved in a truly compact enclosure.

Polk's RM 3000 replaces the traditional pair of speakers with three elements, two compact midrange/tweeter satellites and one low frequency subwoofer system. This configuration makes it easy to properly and inconspicuously place the system within your listening room while offering superior

Behind these accolades is an impressive technical story.

### The Technical Side

The big sound of the RM 3000 is due, in part, to the unique arrangement of the tweeter and midrange elements. This "time aligned system" delivers the high and mid frequencies at precisely the same instant. The result is a clear, lifelike and expansive presentation.

The cabinet materials selected for the satellites are over four times as dense as typical enclosures. The black matrix finish is a non-resonant polymer aggregate (FOUNTAINHEAD®). The gloss black piano and paintable white finishes are rigid ABS

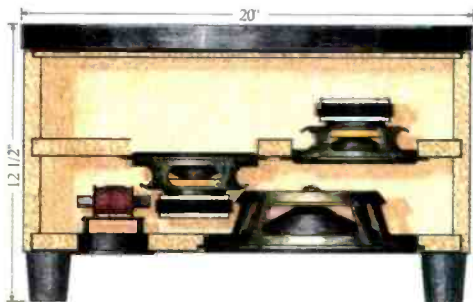


*Polk's RM 3000 Three Piece Speaker System easily fits into today's home decor.*

## small enough to live with.

surrounding a mineral filled polypropylene inner cabinet. Polk engineers have all but eliminated any "singing" or resonating of the satellite enclosure. You hear the effortless, free sound of a much larger system.

Most subwoofer systems look alike on the outside, but the Polk is worlds apart on the inside. Utilizing twin 6 1/2" drivers coupled to a 10 inch sub-bass



*For deep, well defined bass, Polk uses twin drivers coupled to a sub-bass radiator. Normally, one subwoofer system is used for both channels. For those desiring even greater low frequency performance, a second subwoofer can be added, one fed by the left channel, the other by the right channel.*

radiator, the bass is tight and well defined. There is no tuned port to create "whistling" or "boominess" of the bass frequencies.

### You Have To Hear It To Believe It

You really won't believe how good the RM 3000 sounds until you hear it. We invite you to your nearest authorized Polk dealer for a demonstration. You'll hear sound as big as life...from a speaker you can live with.

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## 2

## WHARFEDALE DIAMOND IV SPEAKER

### Manufacturer's Specifications

**System Type:** Two-way, vented mini-monitor system.

**Drivers:** 5-in. (120-mm) metal-cone woofer and ¾-in. (19-mm) metal-dome tweeter.

**Frequency Response:** 50 Hz to 25 kHz,  $\pm 3$  dB.

**Sensitivity:** 86 dB SPL for 1 watt input at 1 meter.

**Crossover Frequency:** 3.5 kHz.

**Impedance:** 8 ohms nominal, 6.4 ohms minimum.

**Power Handling:** 100 watts.

**Dimensions:** 10½ in. H  $\times$  7¼ in. W  $\times$  7¼ in. D (26.7 cm  $\times$  18.4 cm  $\times$  18.4 cm).

**Weight:** 17⅞ lbs. (8 kg) per pair.

**Price:** \$300 per pair, not including stands.

**Company Address:** 1940 Blake St., Suite 101, Denver, Colo. 80202.

For literature, circle No. 91



Quick: Think of an American loudspeaker company that has been in operation for nearly 60 years operating under the same name. You're right, there aren't any! There is one in the U.K., however, and that's Wharfedale. Gilbert Briggs founded the company in 1932 by building his first loudspeaker in the basement of his home in the town of Ilkley, county of Wharfedale (love those British names!). Loudspeaker production by Wharfedale Wireless Works increased quickly to 4,600 speakers per year by 1934. Today, Wharfedale, with its driver, cabinet, and R&D facilities in Leeds, England, exports to more than 43 countries and is a very significant competitor in the consumer loudspeaker market worldwide.

Historically, Wharfedale has been at the forefront of innovative research and production techniques. It was the first speaker company to successfully use laser interferometry to create a contour map of a moving speaker diaphragm with

a technique called SCALP (Scanned Laser Plot). Wharfedale also applies SCALP when measuring cabinet side-wall vibration. (The British Celestion is another company that makes extensive use of laser interferometry.)

The Diamond IV is the smallest in a line of five systems in Wharfedale's economically priced Performance Series, which range in price from the Diamond IVs at \$300 per pair up to \$950 per pair for the Model 440. The four larger systems, Models 410 to 440, are all essentially two-way designs, with the two largest containing dual 8-inch woofers. All use drivers designed and manufactured by Wharfedale.

The Diamond IV is quite small and light, with a footprint of only about 7  $\times$  7 inches. A single system can comfortably be held in one hand with your arm outstretched. Even though light in weight, the box has side walls that are quite rigid and stiff. The only available finish in the Performance Series is an attractive black ash. The appearance and build

quality of my review samples were first-rate. As with other mini-monitors, the low-frequency performance of the speakers does not compete with that of larger systems.

The tweeters of the Performance Series use hardened, anodized-aluminum diaphragms, with Ferrofluid-cooled voice-coils, which Wharfedale claims operate as perfect pistons to beyond 35 kHz. According to the literature, this results not from "brute-force application of exotic (expensive) materials, but by the good design and engineering only possible with long experience with the tools for investigating diaphragm behavior. . . ." The bass drivers use diaphragms made of Wharfedale's proprietary plastic material called MFHP2, a mineral-filled polypropylene with high stiffness, relatively low mass, and high self-damping. It is claimed to greatly reduce colorations as compared to other plastic cone materials.

The tooled plastic grille assembly of the Diamond IV actually fits around the front of the cabinet and snaps into grooves on either side of the front panel. This mounting method minimizes diffraction and, in addition, looks quite good. Without the grille, the speaker is also quite attractive, due to Wharfedale's use of tapered, hard-rubber rings around each driver. The ring around the woofer is not completely round but extends to, and terminates at, the top of the enclosure. The tapered rings minimize diffraction in addition to very efficiently hiding the driver mounting hardware.

The side edges of the front panel are rounded, while the top is bevelled and contains the raised letters of the manufacturer's name—a nice touch! These boxes do not have the mundane look of typical low-cost, high-volume, vinyl-wrapped cabinets. I preferred the look of the systems without the grilles and used them that way for most of my review activities.

The box is fitted with a tube, 1 inch in diameter and 4¼ inches long, mounted at the top rear of the enclosure and having a rounded entry. An outside visual inspection of the tube's interior showed damping material placed right up against its inside end. This presumably deliberate condition had a large impact on the low-frequency performance of the system. (See my comments in the "Measurements" section of this review.)

A recessed input-terminal panel is mounted in the center of the box's rear and contains two heavy-duty, double-banana jacks mounted on ¾-inch centers. The wire insertion holes in these jacks are nearly 3/16 inch in diameter and can easily handle 10- or 12-gauge wire, if desired. Although not gold-plated, they serve their purpose very well and are quite accessible. Bi-wire capability is not supported.

### Measurements

The anechoic frequency response, for a 2.83-V rms input, is shown in Fig. 1, smoothed with a tenth-octave filter. The curve was taken at a distance of 1 meter, normal to the enclosure's front surface, with the microphone midway between the woofer and tweeter. The grille caused less than a 1-dB variation in the response below 10 kHz; at higher frequencies it provided increasing attenuation, but with a maximum loss of only about 2 dB at 20 kHz. All the following measurements were taken with the grille off.

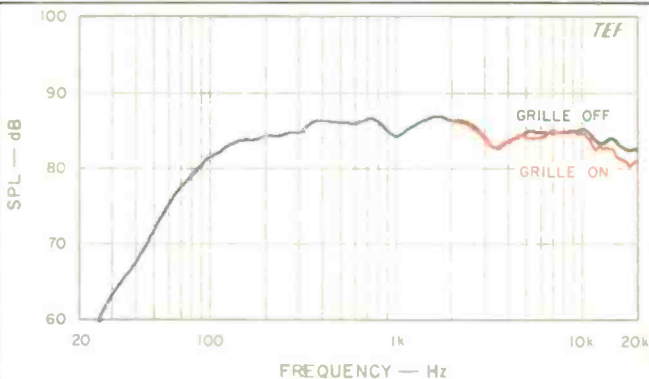


Fig. 1—One-meter, on-axis frequency response.

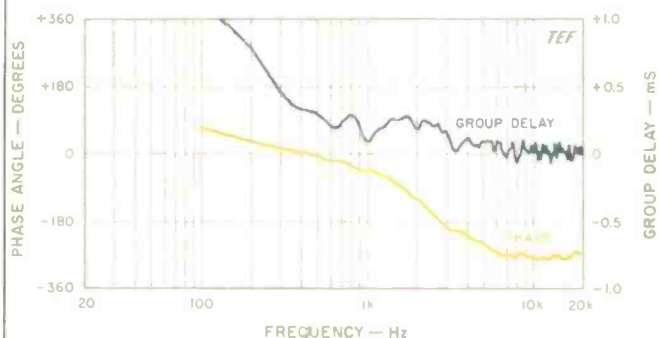


Fig. 2—Phase angle and group delay.

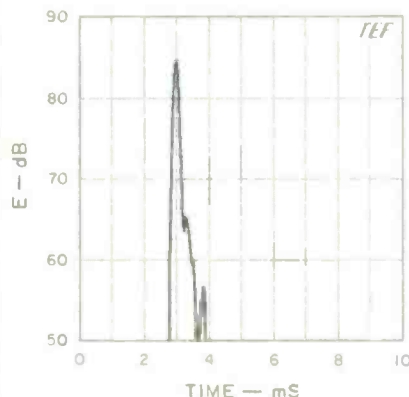
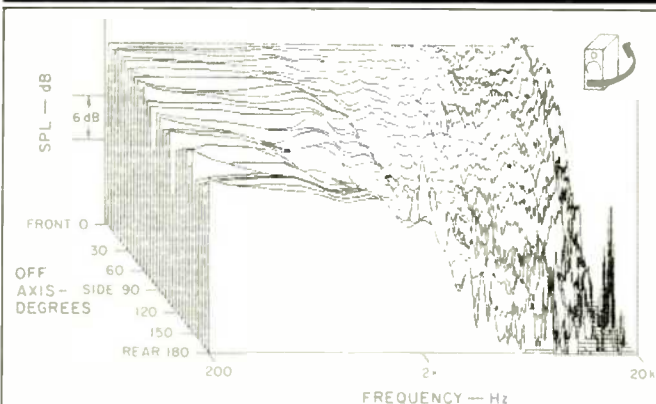
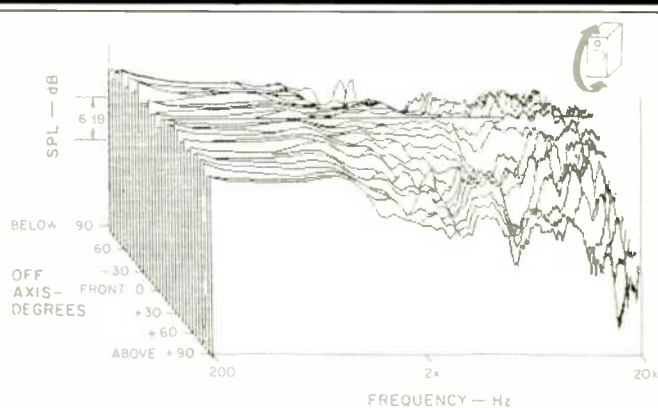


Fig. 3—One-meter, on-axis energy/time curve.

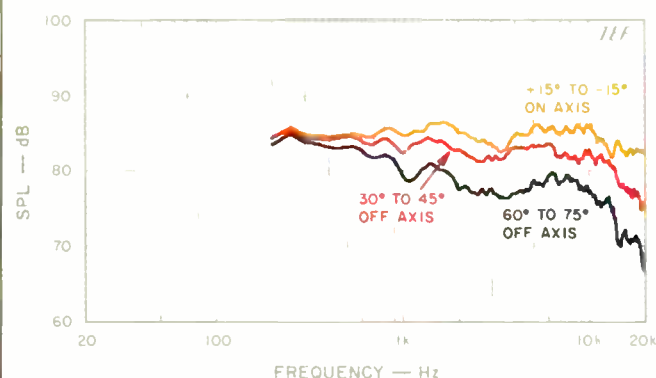
The hybrid closed/vented design reduces the woofer's excursion without causing a rapid roll-off below the box's cutoff frequency.



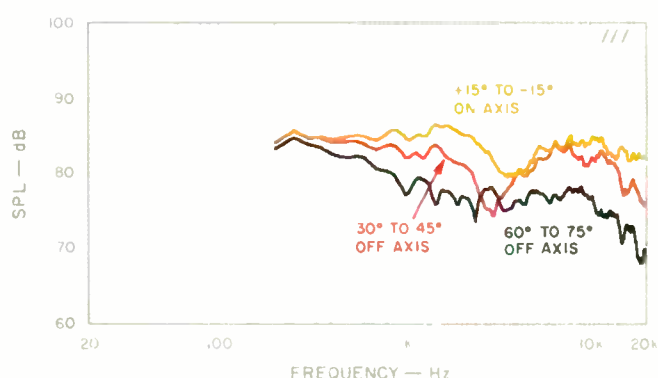
**Fig. 4—Horizontal off-axis response, normalized to the on-axis response.**



**Fig. 5—Vertical off-axis response, normalized to the on-axis response.**



**Fig. 6—Mean horizontal responses derived from data of Fig. 4.**



**Fig. 7—Mean vertical responses derived from data of Fig. 5.**

The response curve fits within a  $\pm 3.0$  dB envelope from 95 Hz to 20 kHz. Above 120 Hz, the curve fits a commendably tighter  $\pm 2.0$  dB envelope. No major irregularities are exhibited except for a slight dip at the 3.5-kHz crossover. Below 80 Hz, the response falls at 12 dB/octave, typical of closed-box systems (but unlike vented-box systems, whose response drops at 24 dB/octave!). Averaging the axial response over the range from 250 Hz to 4 kHz yielded a sensitivity of 85.8 dB, equalling the manufacturer's rating of 86 dB SPL. The systems were matched quite closely, measuring within  $\pm 0.75$  dB in the range from 100 Hz to 20 kHz. A high-frequency measurement up to 32 kHz revealed no tweeter resonances.

The axial phase and group-delay measurements of the system, corrected for the tweeter's arrival, are shown in Fig. 2. The phase response exhibits a total rotation of only about  $230^\circ$  between 1 and 20 kHz. Group delay is fairly well behaved above 1 kHz, and the curve shows that the woofer/midrange lags the tweeter by about 0.20 ms. This is about three-fourths of a wavelength at the 3.5-kHz crossover.

The 1-meter, on-axis, 2.83-V rms energy/time curve (ETC) of the Diamond IV is shown in Fig. 3, for a test signal swept from 200 Hz to 10 kHz. The main arrival, at 3 ms, is notably compact and well behaved, with only slight broadening at levels 20 dB below the peak. Note that under these test conditions, a perfect energy/time curve would appear as a single sharp spike centered at 3 ms, with a width of about 1 ms at the base (50-dB line) and tapering to a rounded point at the top.

Removal of the woofer and rear terminal panel revealed a very well-constructed box with tight fit and close tolerances. The front panel is made from a hefty,  $\frac{7}{8}$ -inch-thick material which seemed denser than medium-density fiberboard, as it is identified by Wharfedale. The remaining walls are  $\frac{1}{2}$  inch thick. The very dense front-panel material allows accurate routing for the very unusual driver-mounting method employed for the Diamond IV. The drivers are deeply recessed into the front panel and covered with a tooled, tapered hard-rubber ring which minimizes front-panel edge diffraction and greatly improves the cosmetics of the system.



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The small diameter of the Diamond IV's tweeter gives it broader high-frequency coverage than can be had from larger tweeters.

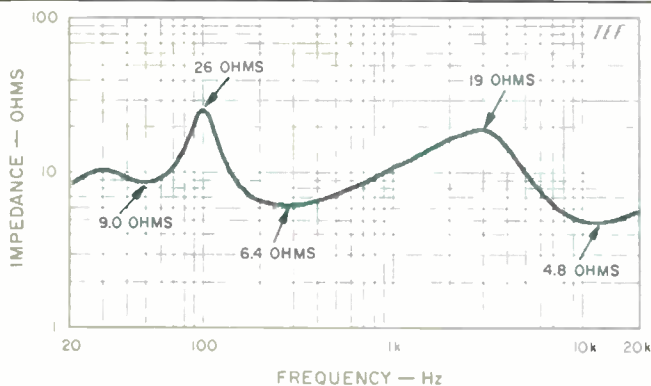


Fig. 8—Impedance.

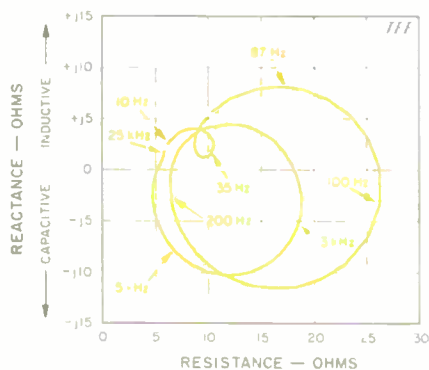


Fig. 9—Complex impedance, showing reactance and resistance vs. frequency.

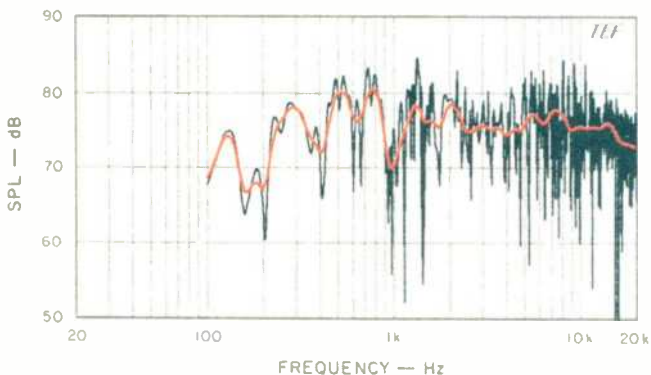


Fig. 10—Three-meter room response, showing both raw and smoothed data.

To damp internal reflections, white batting (apparently cotton) is used inside the box, rather than fiberglass. The batting was positioned up against the inner end of the vent tube, changing the system from a pure vented-box design into a leakage-damped closed-box system. This hybrid design is functionally equivalent to Dynaudio's Variovent design used in the Special One system (*Audio*, December 1990). The vent, rather than acting as a mass of air to resonate with the air trapped inside the cabinet, acts primarily as a resistance to the flow of air into and out of the box. This technique somewhat reduces the woofer excursion compared to that of a conventional closed box of the same size, but does not bring with it the vented box's rapid roll-off below cutoff. An additional benefit of the design is a significant reduction in air-rush and wind noises often associated with vented-box systems having small-diameter vents.

A high-level, low-frequency sine-wave sweep revealed no significant cabinet side-wall resonances. A comparison of the woofer's excursion, with the port open and closed (covered by my hand), revealed that the port reduced the woofer's excursion over a broad range from 35 to 95 Hz, reaching a maximum reduction of about 25% at 55 Hz. The woofer did not exhibit any detectable effects of dynamic offset. At 13-V rms input at 55 Hz (about 20 watts), wind noises were minimal; however, when the batting was pushed away from the inside end of the port tube, wind noises increased dramatically.

The woofer overloaded gracefully at high levels, with no objectionable noises. The effective piston diameter of the woofer is about 4½ inches (as measured from the middle of the surround on one side to the middle of the surround on the other). The woofer's linear excursion capability was about ¼ inch, peak to peak, with an excursion limit of about 0.35 inch, peak to peak.

The crossover network of the Diamond IV consists of five parts: Two inductors, two capacitors, and one resistor, forming essentially a 12-dB/octave electrical design. The crossover's p.c. board is mounted on the rear of the cabinet, just below the input-terminal panel. The woofer's inductor is of iron-core design, while the tweeter is air core. Nonpolarized electrolytic capacitors are used. All internal wiring is stranded 18 or 20 gauge, with push-on terminal clips.

Measurements of the drivers' separate acoustic responses, connected to the crossover, revealed that the actual electroacoustic response is effectively 12 dB/octave through the region. The drivers were in phase with each other below and up to about 4 kHz, one-sixth octave above the crossover, and rapidly went out of phase at higher frequencies. The mainly in-phase condition of the drivers' responses minimizes lobing. However, some lobing is expected above crossover, because the drivers' phase responses are not the same. The individual responses also revealed that the drivers' output levels were somewhat low through the crossover region, causing the previously noted dip in the on-axis response.

The normalized, horizontal, "3-D" off-axis curves of the Diamond IV are shown in Fig. 4. The curves are quite well behaved and indicate even horizontal coverage, which is required for good lateral localization and imaging. Figure 5 shows the vertical off-axis curves. These curves are also



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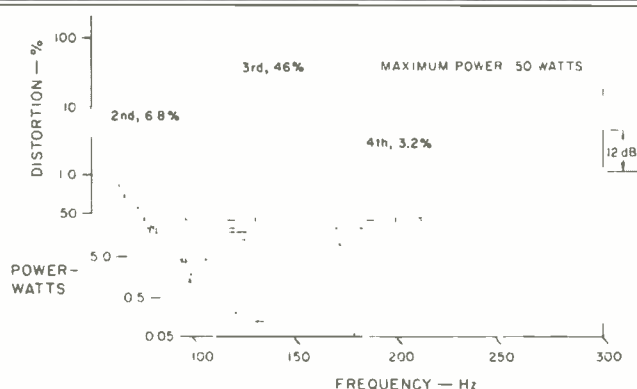
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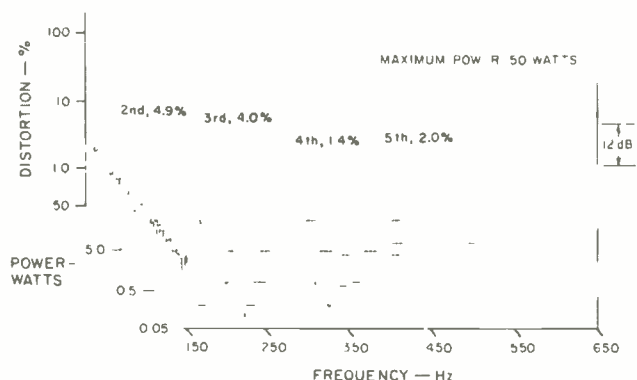
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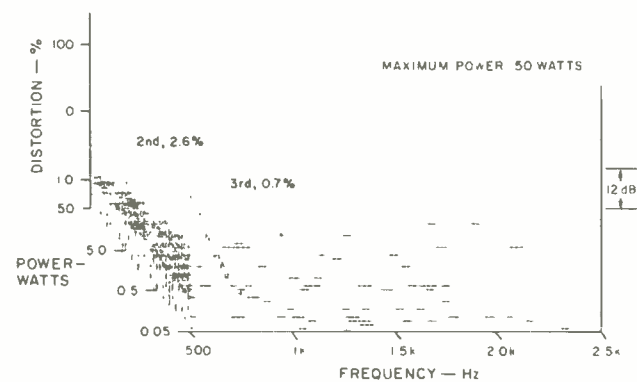
Small as the Diamond IVs are, their sensitivity and efficiency equal those of much larger systems.



**Fig. 11—Harmonic distortion products for the musical tone B<sub>1</sub> (61.7 Hz).**



**Fig. 12—Harmonic distortion products for the musical tone A<sub>2</sub> (110 Hz).**



**Fig. 13—Harmonic distortion products for the musical tone A<sub>4</sub> (440 Hz).**

quite well behaved and reasonably symmetrical above and below axis, which indicates minimal response changes with shifts in vertical listening position.

The NRC-style, mean horizontal and vertical on- and off-axis response curves of the Diamond IV are shown in Figs. 6 and 7, respectively. The horizontal axial response curve in Fig. 6 is quite smooth and extended except for a slight crossover dip at 3.5 kHz. The off-axis response from 30° to 45° is also well behaved and extended, and begins to roll off only above 15 kHz. The response from 60° to 75° off axis is smooth above 2 kHz and rolls off above 13 kHz. The small-diameter (3/4-inch) tweeter contributes to the Diamond IV's high-frequency coverage. Most other systems, with larger tweeters, maintain coverage only up to about 10 kHz at extreme off-axis angles.

The mean vertical responses of the Diamond IV are shown in Fig. 7. The averaged axial curve exhibits an octave-wide response depression at crossover, which also carries over to the 30° to 45° averaged response. The somewhat low level of the drivers in the crossover region, as noted before, and the woofer/tweeter driver spacing contribute to the energy loss in the crossover region. With the exception of the response through crossover, all the curves are quite smooth and extended.

Figure 8 shows the Diamond IV's impedance plotted from 20 Hz to 20 kHz. The system had a measured low of 4.8 ohms at 12 kHz and a high of 26 ohms at 100 Hz. This is a fairly easy load for most amplifiers. The characteristic double-humped impedance response of the vented-box enclosure is evident between 20 and 150 Hz, but with the upper peak significantly higher than the lower peak. However, the shallow dip at 50 Hz indicates only slight loading at the Helmholtz box resonance. The system's minimum impedance of 4.8 ohms, coupled with its minimum-to-maximum variation ratio of 5.4 (26 divided by 4.8), makes the Diamond IV somewhat sensitive to cable resistance. To keep cable-drop effects from causing response peaks and dips greater than 0.1 dB, cable series resistance must be limited to a maximum of about 68 milliohms.

Figure 9 shows a well-behaved complex impedance from 10 Hz to 25 kHz. The phase angle of the impedance (not shown) reached a maximum of +31° at 77 Hz and a minimum of -49° at 5 kHz.

The system's 3-meter room curve, with both raw and sixth-octave smoothed responses, can be seen in Fig. 10. The Diamond IV was in the right-hand stereo position, mounted on its stand and aimed at the listening location; the test microphone was placed at ear height (36 inches), at the listener's position on the sofa. The system was swept from 100 Hz to 20 kHz with a 2.83-V rms, sine-wave signal (which corresponds to 1 watt into the rated 8-ohm load). The parameters of the TDS sweep were chosen to include the direct sound plus 13 mS of the room's reverberation. The curve is reasonably well behaved and extended except for some response roughness below 1.5 kHz, mostly due to room effects. Above 2.5 kHz, the curve is quite smooth and extended, all the way to 20 kHz.

An additional room curve was taken with the system mounted in a bookshelf, where a typical listener might put it for casual listening. The curve (not shown) was very much



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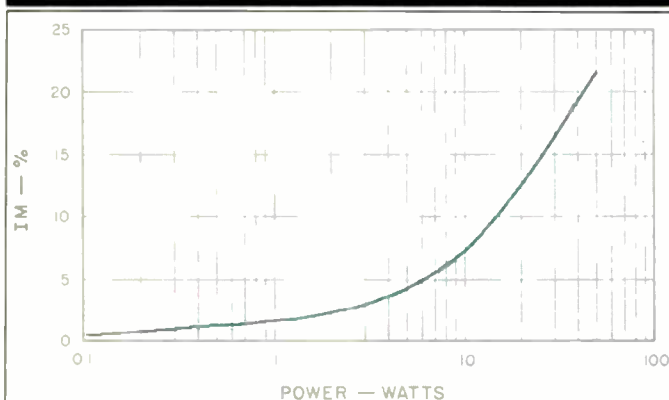
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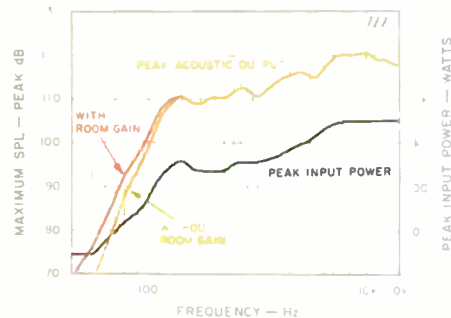
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Although the Diamond IVs don't have extended bass, they do have above-average resistance to bass overload.



**Fig. 14—IM distortion on 440 Hz ( $A_4$ ) produced by 61.7 Hz ( $B_1$ ) when mixed in one-to-one proportion.**



**Fig. 15—Maximum peak sound output, measured at 1 meter on axis, and corresponding maximum peak input power levels.**

rougher, with large peaks and dips in the response due to close-in reflections. A separately measured ETC (also not shown) confirmed that this mounting location caused a large number of high-amplitude, early-energy returns that were not evident in the normal mounting position, which places the system a significant distance from any close reflecting surfaces.

The distortion spectra of applied single-frequency tones versus power level for the musical notes of  $B_1$  (61.7 Hz),  $A_2$  (110 Hz), and  $A_4$  (440 Hz) are shown in Figs. 11, 12, and 13. These measurements indicate the level of harmonic distortion generated by the system with the application of a single-frequency sine wave at power levels from 0.05 to 50 watts ( $-13$  to  $17$  dBW, a 30-dB dynamic range) in steps of 1 dB. The power levels were computed using the rated system impedance of 8 ohms (20 V rms equals 50 watts, etc.).

Figure 11 shows the  $B_1$  (61.7-Hz) harmonic distortion data. The higher tone,  $B_1$ , was used instead of the customary  $E_1$  (41.2 Hz), because  $E_1$  generated excessive distortion (126% third harmonic at 50 watts!). Even using  $B_1$ , the distortion at 50 watts reaches a high 46% third harmonic. At 50 watts, the system generates 94 dB SPL at 1 meter.

At  $A_2$  (110-Hz) harmonic data is shown in Fig. 12. The second harmonic reaches a moderate level of about 4.9% at full power, while the third reaches 4%. The fourth and fifth harmonics are only 2% or lower at full power. At 110 Hz, the system generates about 100 dB SPL at 50 watts at 1 meter.

The  $A_4$  (440-Hz) harmonic measurements, shown in Fig. 13, are quite low, reaching only 2.6% for the second harmonic at full power, where the system generates 104 dB SPL at full power at 1 meter.

The IM distortion shown in Fig. 14 was created by mixing 440-Hz ( $A_4$ ) and 61.7-Hz ( $B_1$ ) tones at equal input power levels. The higher,  $B_1$ , tone was used for the lower modulating frequency because the usual  $E_1$  tone generated excessive distortion. Even using  $B_1$ , the IM distortion reached a fairly high 22% at full power.

Figure 15 shows the system's short-term, peak-power input and output capabilities as a function of frequency, measured with a tone burst of third-octave bandwidth. The peak input power was calculated by assuming that the measured peak voltage was applied across the rated 8-ohm impedance. The maximum power handling of the Diamond IV is shown in the lower curve. At 30 Hz and below, the peak power must be limited to about 3 watts or less to prevent excessive distortion and intermodulation. Above 30 Hz, the power handling rises gradually, reaching a plateau of about 300 peak watts (about 50 V peak) between 200 and 630 Hz. Above 630 Hz, the power handling again rises gradually, reaching a maximum of 3.2 kW above 6.3 kHz.

The power handling in the range from 125 Hz to 1 kHz is somewhat low compared to other systems I have measured. (That is, if you judge 300 to 400 peak watts as being low! This corresponds roughly to the peak output of an amplifier rated at 150 to 200 watts continuous.) Evidence leads me to believe that the metal-core inductor in the crossover's woofer leg is responsible.

The upper curve in Fig. 15 represents the peak sound pressure levels the system can generate at a distance of 1 meter on axis for the levels shown in the lower curve. Also shown on the upper curve is the "room gain" of a typical listening room at low frequencies, which adds about 3 dB to the response at 80 Hz and adds 9 dB at 20 Hz. The peak output rises with frequency up to 200 Hz, where a plateau of about 110 dB is reached. Above 1 kHz, the maximum output rises to about 120 dB above 6.4 kHz. With room gain, a single Diamond IV can generate peaks in excess of 110 dB SPL (but only above 160 Hz) and of 100 dB above 90 Hz. Below 160 Hz, the low-frequency output rolls off at about 18 dB/octave. A pair of these systems, operating with mono bass, will be able to generate bass levels some 3 to 9 dB higher, particularly if they are set up near wall boundaries.

#### Use and Listening Tests

I listened to the Diamond IVs primarily in my customary location, placing them on stands so that the tweeter was approximately at ear height. This location positioned them a significant distance from any reflecting surfaces that might interfere with imaging, localization, and midrange smoothness, but they were at a clear disadvantage with respect to any beneficial boundary reinforcement that would tend to augment their low-frequency output.

The Wharfedales' quality and musical honesty would benefit systems costing far more than their price of \$300 per pair.

Even though the Diamond IVs are quite small, their sensitivity and efficiency equal those of much larger systems. The laws of loudspeaker physics dictate that their low-frequency efficiency and output will be much less than those of larger systems. (Assuming the same efficiency, an octave lower extension of low-frequency performance requires an eight-fold increase in enclosure volume!) In other words, to compete unaided with larger loudspeakers, very small systems need to be placed close to reflective boundaries to enhance their low-frequency performance. This, unfortunately, often impairs higher frequency performance because of the detrimental effect of high-amplitude reflections which closely follow the system's direct sound.

I chose to evaluate the Diamond IVs as stand-alone systems for serious critical listening—putting more emphasis on higher frequency performance parameters such as smoothness, imaging, and accuracy—rather than as systems that might be used for casual applications such as background music reproduction. In the latter situation, sound reproduction is not as important as other considerations, such as size and ease of placement, although the Diamond IVs can be used for this application as well.

So as not to be biased by the lack of low end in some of my listening tests, I requested that Wharfedale send me a three-piece satellite/subwoofer system that they currently market (the System 2130) so that I could experiment with the subwoofer as an adjunct to the Diamond IVs. Before you cry foul, let me add that I did a great amount of listening to the IVs both with and without the subwoofer. I greatly appreciated its augmentation in the octave from 40 to 80 Hz in many cases. When the subwoofer was in use, I hooked the Diamond IVs directly to the power amplifier and did not use the 2130's internal, high-pass crossover output. I simply added the subwoofer in parallel with the IVs (the 2130 has dual internal woofers connected separately to right and left channels) and depended on its internal, low-pass filtering to roll off its own higher frequency response. When I used this subwoofer with the Diamond IVs, I placed it in the front of my room to approximate the overall low-end balance of my reference systems. It was an easy matter to connect and disconnect the added bass system.

Driving equipment included an Onkyo Grand Integra DX-G10 CD player and a recently acquired Enlightened Audio Designs (EAD) "Ultra" modified Rotel RCD-855 CD player, along with Jeff Rowland Design Group's Consummate pre-amplifier and two Jeff Rowland Model 7 power amplifiers. Hookup was with Straight Wire Maestro interconnects and speaker cables. I did most of the listening before the measurements.

As mentioned, most listening was done with the Diamond IVs placed on stands and aimed at my head. They were about 6 feet away from the short rear wall, separated by 8 feet, and with a side-wall spacing of about 4 feet. I sat on the sofa, about 10 feet away, which placed my ears about 36 inches high. The System 2130's subwoofer, when used, was placed on the floor in front of the bookshelves at the front of the room, offset laterally by a couple of feet.

First impressions of the Diamond IVs were very positive; these speakers have a balance and sensitivity very close to my reference systems (the B & W 801 Matrix Series 2)

except for a much-attenuated low end. There was a slight loss of energy in the upper mids as compared to my reference, but it was not all that objectionable. The balance and response in the top two octaves were nearly indistinguishable from the reference, which indicates a very smooth, extended top end.

Reproduction of male voices on the CD *Jack Lemmon Tells the Musical Tale of Peter and the Wolf* by Prokofiev (LaserLight 15 386) was very balanced and even, with no tubbiness, and created a very believable center image. (Here the subwoofer was not needed, as it only added some unwanted upper bass emphasis.) The high-frequency sound effects on the same disc, in Mozart's *Children's Symphony*, were re-created outstandingly.

The choral music on *J. S. Bach: The Motets, BWV 225-229* (Sony Classical SK 45859) was portrayed with excellent vocal separation and delineation of the different choir sections. The instruments on *Vivaldi: 6 Double Concertos* (flute, violin, strings, and harpsichord, Sony Classical SK 45867) demonstrated the clarity and smoothness of the Diamond IV's midrange.

Although the Diamond IVs do not have extended low-end capabilities, they exhibited above-average resistance to below-band bass overload. The organ passage that caused IM problems in the Monitor Audio Studio 10 speakers (see July issue) was handled acceptably, i.e., you could hear the IM distortion, but it was not as objectionable.

The Diamond IV loudspeakers exhibited a reasonable amount of upper-mid tonality changes on the pink-noise, stand-up/sit-down test. When I was sitting or partially standing, the Diamond IVs sounded quite similar to my reference B & Ws, but when I stood up fully, there were noticeable tonal changes. On third-octave band-limited pink noise, the systems' output dropped quickly below 80 Hz. At 40 Hz and below, the output was unusable. However, when the Wharfedales were mounted in the bookshelves at the end of the room, the low end held up well to below 50 Hz, although this was coupled with unacceptable upper-frequency tonal changes. The addition of the 2130 bass module corrected most of these bass deficiencies, except for the output at 32 Hz and below. The additional bass module did cause some unwanted emphasis in the region from 80 to 125 Hz, which presumably would be corrected by fully using the 2130's internal crossover.

On the jazz-fusion CD *The Pugh-Taylor Project* (dmp CD-448), the Diamond IVs could be played quite loudly, with only slight harshness. The very dissonant sound of the dual trombone pairing of Pugh and Taylor on track 2 was maintained up to quite loud levels, with minimal changes in tonal character.

I am quite pleased with the overall performance of the Diamond IVs. Their quality and musical honesty benefit systems of much greater cost. At \$300 a pair, they are a genuine value and can compete sonically with systems way above their price bracket. Their small size and price may just fit your audio budget. As small monitors, however, their bass performance is lacking compared to that of larger systems. Coupled with a high-performance subwoofer and associated electronics, they could form an accurate, relatively inexpensive, near high-end system. *D. B. Keele, Jr.*

## 3

MISSION  
CYRUS ONE  
INTEGRATED  
AMPLIFIER**Manufacturer's Specifications**

**Power Output:** 25 watts continuous per channel into 8 ohms, 40 watts continuous per channel into 4 ohms.

**THD:** 0.003% at 1 kHz and 0.015% at 20 kHz into 8 ohms, 0.004% at 1 kHz and 0.025% at 20 kHz into 4 ohms.

**SMPTE-IM Distortion:** MM phono, 0.003%; MC phono, 0.01%.

**Frequency Response:** Phono, "New RIAA" (see text) +0, -0.2 dB from 20 Hz to 20 kHz; line, +0, -3 dB from 1 Hz to 50 kHz.

**S/N:** MM phono, 84 dB; MC phono, 67 dB; line, 86 dB.

**Input Sensitivity for 1-Watt Output:** MM phono, 0.4 mV; MC phono, 0.04 mV; line, 65 mV.

**Input Overload Level:** MM/MC phono, 31 dB; line, infinite.

**Input Impedance:** MM/MC phono, 47 kilohms, 100 pF; line, 14 kilohms.

**Maximum Tape Output Level:** 11 V rms.

**Dimensions:** 8½ in. W x 3½ in. H x 14 in. D (21.6 cm x 8.9 cm x 35.6 cm).

**Weight:** 16 lbs. (7.3 kg).

**Price:** \$599.

**Company Address:** 2461 Bellevue, West Vancouver, B.C., Canada V7V 1E1.

For literature, circle No. 92

Mission, true to its British audiophile heritage, has a very individual way of doing things. Whether you delight in or deplore that individuality exemplified in the Cyrus One will depend at least as much on your mind-set as on the properties of the component. If you approach it as a dandy little moderate-power integrated amp with remarkably simple controls and even more remarkable compactness, it should not disappoint. If sheer bench-test performance numbers are your bag, however, you may wonder how the Mission name has garnered such a sterling reputation.

These days, an integrated amp that can be balanced more or less comfortably on the palm of one hand is something of a phenomenon. The Cyrus One's front panel measures only about 8½ x 3 inches, and the chassis (ignoring the front panel's a.c. switch and the back panel's power-cord projection) is only 13½ inches deep. All the phono and line connections, and the banana jacks for the speaker connections, are mounted on a semi-recessed horizontal

panel at the back, so the associated plugs need no clearance allowance.

The line connections are all standard RCA jacks (no DIN connectors, thank goodness!). A switch on the rear panel chooses between MC and MM modes for the single pair of phono inputs. The line inputs are marked "Tape," "Video," "AUX," and "CD." The omission of a tuner input is startling, but any unused line input can be pressed into service for the purpose. One output pair services the tape deck. You will need individual banana plugs on your speaker cables, because the output jacks will accept nothing else. They're even too closely spaced (less than the standard ¾ inch) to accept dual-banana plugs.

The RCA connections are all made directly to the single circuit board used in the design. Mission says it has taken special care in its choice of parts for the board—an unusual approach in a low-power model, where cost-cutting is the rule at most companies. Military-grade metal-film resistors

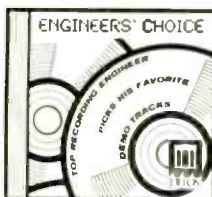




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AUDIO81

It's rare for a company to take a high-end approach to a low-power amplifier as Mission has done with the Cyrus One.



and polyester capacitors complement the short, straight-line signal paths, which contain a minimum of interruptions. There are no tone control circuits, for instance, and no pre/main jumpers for inserting an equalizer. Single-point grounding assures identical ground potential in all parts of the circuit.

The power-supply section is built around a toroidal transformer and employs what Mission claims are custom split-foil capacitors that deliver unusually steady current flow plus reduced interference with other electronic parts. Further reducing potential interference are the computer-aided design of signal paths and the "electrically transparent" chassis and cover (which, according to Mission, allow free passage of fields that could influence signal properties if they were reflected).

The front panel has one toggle switch (for the a.c.), a rotary "Volume/Balance" control (with an outer collar for the latter), and rotary "Listen" and "Record" selectors. Now *that's* simplicity. (Even a headphone jack, seen in some photos of the Cyrus One, was omitted in the final design.) Both selectors include "Mute" positions as well as positions for each of the available inputs, so you can defeat either the amp's output or the tape-out feed. The latter may be important, depending on the design of your deck, because the passive line circuits could be loaded by a deck whose power is off, affecting the listening signal.

Though the directness and intuitiveness of this control scheme is admirable, it has one flaw that could be preemptive if you're excessively disorganized in the way you use audio equipment. The inclusion of the "Tape" source option on the recording control permits feedback that could damage your speakers—or the amp itself—if you choose this option with the deck turned on and then switch to monitor the source—in this case, the deck itself.

The owner's manual warns you not to invoke this option, but omitting it in the first place would have made more sense. With provision for only a single deck (and therefore no possibility of tape dubbing), the sole objective served by its inclusion is the symmetry of the two selectors. Without the tape-source recording option, the recording control would have one fewer position, and the "Tape" legend on the panel would refer to the listening control alone. Somebody has gotten a bit carried away with the most superficial of design considerations, it seems.

### Measurements

In general, the measurements performed by Diversified Science Laboratories document that the Cyrus One is a good product, but one with a number of unexpected quirks on the bench. Some of these will want careful consideration in the context of your overall system and objectives.

The power output data must be read in light of an addendum in the owner's manual stating that minimum speaker impedance should be 8 ohms. Since there are 4-ohm ratings on the spec sheet, the Cyrus One was tested with that load as well. Noticeable power-supply ripple did appear in the output by the time the 4-ohm rating had been achieved, and the onset of instability (rather than clipping, which had not yet occurred) was used as the criterion for the measurement of 2-ohm dynamic power.

The 8-ohm clipping output at 1 kHz was 28 watts, 0.5 dB above the rated power level of 25 watts. The 4-ohm output began to run out of steam 0.2 dB below the rating point, 38 versus 40 watts. In the dynamic power test (using the IHF pulsed signal), about 1 dB of headroom above the continuous power (clipping) output was measured, for the equivalent of 34 watts into 8 ohms and 48 watts into 4 ohms. With the 2-ohm load, output remained stable to 47 watts.

Output impedance of the power section proved quite unusual—a steady 100 milliohms at all measured frequencies, from 1 to 20 kHz, just as it was at 50 Hz. Usually, output impedance rises with frequency, to the consternation of those who believe that low impedance is even more important at high than at low frequencies, where it (or, rather, its reciprocal, damping factor) is traditionally measured. As a matter of fact, the Cyrus One's 50-Hz damping factor is 80. This number certainly is above reproach, though it's not as hefty as that of many an amp with higher high-frequency output impedance.

Driven at the 1-watt level, the amp produced negligible (less than 0.01%) harmonic distortion over most of the frequency band. The THD crept above this figure at frequencies above 4 kHz but never exceeded 0.034% at any test frequency. At rated output, THD remained below 0.02% throughout the critical midrange but increased noticeably toward the frequency extremes, to 0.035% at 20 kHz and 0.071% at 20 Hz. However, since normal music or speech signals are extremely unlikely to call for rated output at these extreme frequencies, there is little significance to these numbers. Probably more important is the predominance of the third and fifth harmonics in the distortion products at rated output but not at 1 watt, where the second harmonic predominated.

Channel separation was better than 67 dB, which is more than adequate. It decreased very gradually with frequency but still was almost 58 dB at 10 kHz.

The stepped volume control has 40 positions (in addition to full off), with graduated increments. The standard IHF test conditions resulted in a setting of 28 on this control and attenuated output by 17.1 dB (as measured in the left channel). Turning the volume lower produced increasingly large steps, beginning at 2.4 dB; turning it up produced ever finer steps, starting at 1.5 dB, jumping back to 1.7, then 1.5, then 1.0 dB, and so on, with no increment at all at the top step. While this behavior pattern (which basically mimics that of conventional tapered pots) is not as neat as one might ideally like, it is no cause for complaint either. With the balance control at its detent, output from the left channel was 0.94 dB higher than that from the right channel.

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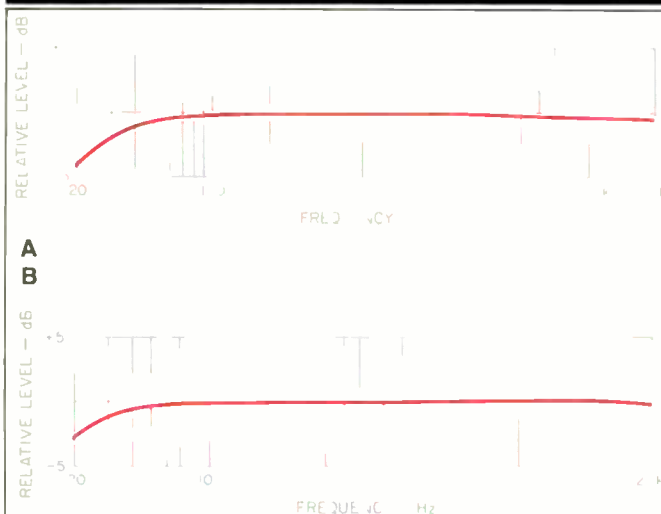
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**Fig. 1—Frequency response through phono section (deviation from RIAA equalization) for MC**

**(A) and MM (B) settings. The bass roll-off is deliberate; see text.**

**Table I—Input and tape output characteristics.**

| Parameter             | Input       |            |             |
|-----------------------|-------------|------------|-------------|
|                       | Line ("CD") | MM Phono   | MC Phono    |
| S/N Ratio             | 88 dB       | 78 dB      | 66 dB       |
| Sensitivity           | 66.4 mV     | 0.42 mV    | 42 $\mu$ V  |
| Input Overload        | >10 V       | 78 mV      | 7.8 $\mu$ V |
| Input Impedance       | 13 kilohms  | 48 kilohms | 48 kilohms  |
| Input Capacitance     |             | 260 pF     |             |
| Tape Output Level     | 485 mV      | 780 mV     | 780 mV      |
| Tape Output Impedance | (Direct)    | 160 ohms   | 160 ohms    |

Other volume settings presumably would deliver other figures for channel balance.

The frequency response measurements proved somewhat mysterious. At the standard volume setting, output from a line ("CD") input measured +0, -0.25 dB from below 10 Hz to 17.7 kHz. The gentle high-frequency roll-off was down 0.5 dB at 24.1 kHz, 1 dB at 25.3 kHz, and 3 dB at 67.5 kHz. Turning down the volume by about 10 dB improves each of these figures (to -3 dB at 78.1 kHz, for instance), while turning it up generally shaves a bit off each—though not consistently. The differences are not large enough to be a source of concern, though the apparently erratic response is certainly a curiosity.

More startling, in a way, are the results for phono response (Fig. 1). A decade ago, there was a proposal to alter the RIAA equalization by building in a playback high-pass filter to attenuate energy generated by record warps. The proposal never was adopted in the United States, yet some manufacturers were misled into believing that it had been and designed their phono sections accordingly. When Mis-

sion refers to the "New RIAA" standard, this appears to be what it means. The high-pass filter certainly is there, in any event. It can be argued that this is either good or bad. Those who opposed including the filter in the standard saw it as an option that should be exercised only when needed—not imposed on everyone willy-nilly. In an extremely simple design like this one, however, a fixed filter probably is preferable to any intrusion of switching—let alone to the threat of power-sapping infrasonic surges on every warp. Here, the signal at 5 Hz (the heart of warp territory) is attenuated by a hefty 20 dB (slightly more for MC, slightly less for MM), which should be deeply appreciated in some systems.

Response was nearly identical for MM and MC phono. (In fact, the only significant difference between them appears to be 20 dB more gain for MC.) The roll-off at the bottom end was, of course, the top end of the high-pass filter. The MC curve fell off at a slightly higher frequency than did the MM curve: 1 dB down at about 40 and 30 Hz, respectively. The MC curve drifted off very gently above 1 kHz and was down 0.6 dB at 20 kHz. The MM option was even flatter, down 0.3 dB at 20 kHz and exhibiting a slight rise in the treble (up 0.1 dB in the region around 3 kHz). Just what these numbers will mean depends to a large extent on the nature of the cartridge feeding the section, of course.

Additional performance measurements for the phono and line inputs are given in Table I.

### Use and Listening Tests

Simply put, the Cyrus One is a joy to use. Without a really good amp of similarly modest power to compare it to, its sound is hard to characterize. If I didn't hear quite the transparency or natural bloom that I associate with my standard comparison amp, that amp has much more power and costs much more (even without a preamp). And in most sonic respects, I found them well matched despite the disparity in price and power.

To approach it in a more positive light, the One will deliver better sound than I suspect you're likely to find in any other 25-watt integrated amp on the American market. Leave it to the British, who always have put astonishing care into what American audiophiles might consider "underpowered" amps, to do so with this unit. Cheap-and-dirty is the rule elsewhere.

What you make of the little quirks, like the omission of a tuner input (or, at least, of one *labelled* as such) or the nonstandard banana-jack spacing, is your business. You may find them charming, though I must admit I found them vaguely annoying. Even calling the built-in infrasonic filter (which can be a godsend in some systems) a new-standard phono equalization makes a potential virtue sound somehow devious.

What makes the Mission so satisfying to use, however, is the directness of its control scheme. It's one that (aside from the tape-feed problem discussed earlier) you simply don't have to think about. When you want to listen, you reach for the listening selector; when you want to record, you reach for the recording selector. It's that simple. In a world choking on technological kitsch, it's like a whiff of pure oxygen.

*Robert Long with Edward J. Foster*

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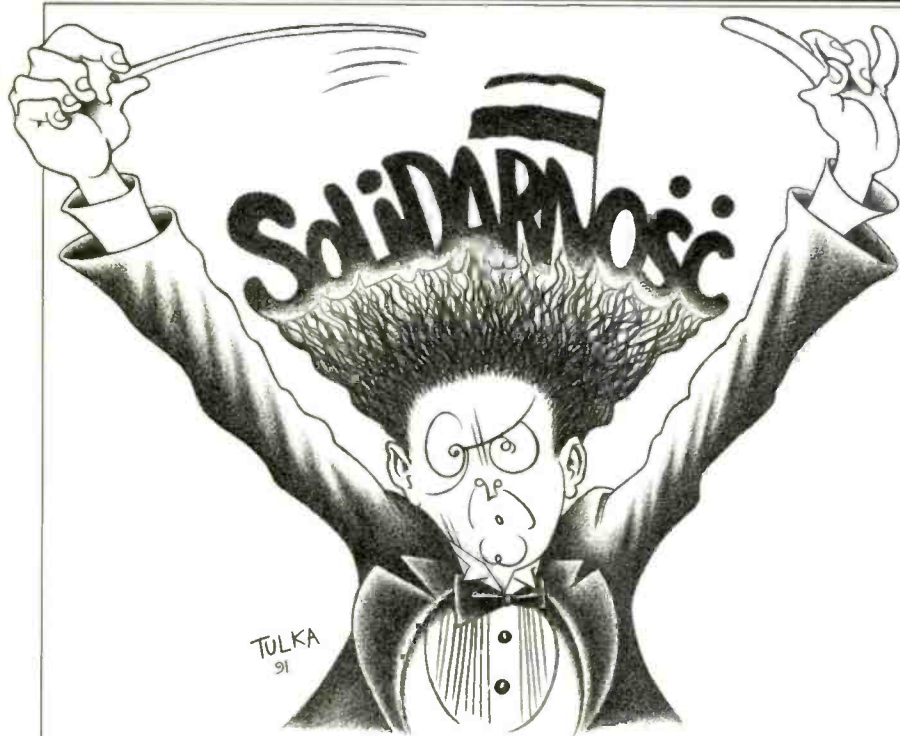
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## EYE FOR AN EYE



**Penderecki: St. Luke Passion.** Sigrune von Osten, soprano; Stephen Roberts, baritone; Kurt Rydl, bass; Warsaw National Philharmonic Chorus; Cracow Boys' Choir; Polish National Radio Symphony Orchestra, Krzysztof Penderecki.

**Argo 4303282**, CD; DDD; 76:21.

**Penderecki: Polish Requiem.** Ingrid Haubold, soprano; Grazyna Winogradska, mezzo-soprano; Zachos Terzakis, tenor; Malcolm Smith, bass; North German and Bavarian Radio Choruses; North German (Hamburg) Radio Symphony Orchestra, Penderecki.

**Deutsche Grammophon 4297202**, two CDs; DDD; 1:27:46.

Now, with Poland's Communist rulers ousted and Lech Walesa's democratically elected government in power, this story can finally be told.

A phenomenally gifted 23-year-old Krzysztof Penderecki (pronounced, Penderetski) blazed onto the international musical scene at the time of Poland's first avant-garde music festival, The Warsaw Autumn, in 1956. In a national competition for new music, works were submitted anonymously by all of Poland's leading composers; Penderecki won all three prizes. Before

long, people mentioned him in the same breath with such major avant-garde pioneers as Pierre Boulez, Luciano Berio, Luigi Nono, and Karlheinz Stockhausen. His music (e.g., the wildly experimental orchestral work "Fluorescences") went about as far out as music at that time could get. And then, in 1966, he suddenly confounded both his supporters and antagonists with his St. Luke Passion—not only because it turned away from avant-gardism, back to Gregorian chant and old Orthodox polyphony, but because Penderecki, alone among all his colleagues, turned to writing music for the church.

Several years passed, with one big liturgical work following another. I myself came to know Penderecki well enough to know one could hardly classify him as a pious believer; furthermore, divorce and remarriage had brought him automatic excommunication. When I felt I finally could hazard the question, I asked why, under such circumstances, he almost ostentatiously composed that succession of big liturgical works. By that time Poland, ever since The Polish October of 1956, had had to cope with a succession of governments founded on the improbable *modus vivendi* worked out and po-

larized between Poland's Communist Party and its Roman Catholic Church. Penderecki's forthright reply to my question: "Anything I can do to annoy this government, I will do." For his fellow Poles, his steadfast musical devotion to the Church proclaimed where he stood personally; it also, automatically, meant one in the eye for the Party.

Not only since World War II has Poland had a turbulent, troubled, often tragic history, but individual events in that recent history gave rise to Penderecki's Polish Requiem, movement by movement. Its conception coincided with the monument in Gdansk commemorating the striking shipyard workers of Lech Walesa's independent union, Solidarity, who were gunned down there by law-enforcement forces. For its unveiling and dedication in 1980, Penderecki composed a piece he called *Lacrimosa*, from the Latin word for tears. Developments in his beloved homeland continued, sadly, to provide other such occasions for his musical commemoration; movement by movement, his Polish Requiem grew and took on form. Deutsche Grammophon's leaflet doesn't mention Father Jerzy Popieluszko, the dissident Polish priest tortured and murdered by his Secret Police kidnappers, but when Penderecki conducted his Requiem at La Scala in February 1985 as a work still in progress, he spoke to me about composing one section to commemorate that appalling tragedy as well.

Restoration of democracy to Poland, with Lech Walesa now president, has automatically brought the formal conclusion of this Requiem, making it possible to record it in its final form. Together with the earlier St. Luke Passion, it amounts to a contribution major not only by musical but also by political and humanitarian standards.

Penderecki not only interweaves other, slightly extraneous material into his liturgical texts, he also exploits these various texts' dramatic potentials to the fullest. Ever the restless explorer of new vistas in tone-color, he has the chorus in the Passion's crowd scenes ominously mutter and finally yell, in a manner unsettlingly evocative of a lynch mob. He can also attain amazingly apt effects by means of highly unlikely sonic methods; one would scarcely believe the remorseful poi-

Illustration: Rick Tulka

gnancy he achieves, for instance, by having all his choristers whistle, softly, in a gradually dying fall in pitch.

Both Argo and Deutsche Grammophon have exerted themselves to make these recordings authentic landmarks. Particularly, the Passion benefits by Argo's having recorded it in the Cathedral of Christ the King in Cracow, where Penderecki has lived almost all his life. That basilica has a wonderful acoustical warmth, and a reverberation time in the exceptionally high neighborhood of 10 seconds. Deutsche Grammophon recorded the Requiem in Lucerne's Jesuit Church, in Switzerland, where the Pendereckis today maintain a second home.

What with all forces hand-picked and personally trained by the creator and conductor of these powerful, profoundly moving works, one must obviously regard both these recordings as definitive, and as milestones in contemporary music. *Paul Moor*

**Khachaturian: Spartacus, Ballet Suites 1 to 3.** Scottish National Orchestra, Neeme Järvi.

**Chandos CHAN 8927**, CD; DDD; 62:53.

No, this is not the soundtrack from the recently rereleased movie *Spartacus*. These are three suites from Khachaturian's 1956 ballet, which was indeed based on the same theme of the slaves revolt in Rome as depicted in the film.

Khachaturian, best known for his "Sabre Dance," wrote a vividly colorful score for *Spartacus*. It has many musical elements similar to those of Borodin and Rimsky-Korsakov, and there are great soaring melodies and frenetic dances as well. It has been condemned as vulgar and overly sentimental by some critics, but it is still frequently performed in Russia.

Perhaps the most famous section is the opening "Adagio of Spartacus and Phrygia" from the second suite. This is lush, romantic music of great sweep and beauty. (It was used as theme music in a British TV series, *The One-Din Line*.) Neeme Järvi is in his element with this kind of music, and he gets top-drawer playing from his orchestra.

Chandos' sound is detailed, but warm and resonant as well, in the slightly

overreverberant acoustics of Henry Wood Hall in Glasgow. *Bert Whyte*

**The NFB Horn Quartet: Gallay, Hindemith, Wadenpuhl.**  
**Crystal CD 241**, CD; DDD; 42:49.

Here's my friend Peter Christ (as in Crystal) once more, back with a typical product and a nice one of its sort: The total professional musician at work. In this case it's a jolly crew of four French horn players. They may be professional, but they aren't in any way hard-boiled or overly brassy. They have good phrasing and balance, excellent understanding as to who at any moment is forward or should be light and in the background, in contrast with a lot of professional horn playing, however expert. This, very simply, is what we call good ensemble. Also good style. Go a step further—it's intelligent playing. What else?

And yet—the narrowness, enforced by circumstances—earning a living, keeping up with competition in a tough musical world—is astonishingly evident. *This* horn world starts and stops with the modern horn in its present complex configuration, though horn music as such goes back centuries. The very first piece, a show work by one of those specialist composers that

every instrument seems to boast, was composed as the ultimate in horn technique back in the middle 19th century and dedicated to Rossini (whose musical ghost is amusingly present). It was awesomely written for four *hand horns*, the old ones without valves, each in a different basic key. The notes point out that for this to be played, an even more astonishing technical ability must have been at hand. Unbelievable. Even more so when you hear the music.

But do these gents thereupon give us a rendition on four hand horns? Perish the thought. Obviously it did not even occur to them. One plays modern horn now, doesn't one?

Not true! No longer true. There are hand horn players, as many of us know, who can acceptably play all the standard horn music from Bach to Mozart, Beethoven, Weber, even perhaps Brahms, who loved the effect of the old horns and is said to have written his music (at least in theory) to fit them. Count the recordings of the Brandenburg Concertos of Bach that feature natural horns as well as the natural trumpet. Plenty.

Not that I didn't enjoy the modern-horn version of Monsieur Gallay, the hand horn man. It's quite lovely and often amusing in its mid-Romantic showoff effects. And the other works,





Bernard  
Haitink

## Two different conceptions of Mahler's Fifth Symphony are presented by conductors Christoph von Dohnányi and Bernard Haitink.

composed for the modern horn, were not only impeccable as to technique but also very musically played, start to finish. The four-horn Hindemith never sounded better. But, typically, the final super-showpiece for eight horns (via double tracking), much praised by all concerned, I found just silly. So it's tough to play? Are we supposed to be impressed, like so many pros?

Hey, gents, why not take a vacation from too much horn and general musical strife and get together a brace of hand horns, one each in G, D, E, and C (top to bottom), and expand your horizons into history? I'd hate to listen to the first rehearsal, but I bet you could do it. Mr. Christ, please note.

*Edward Tatnall Canby*

**Mahler: Symphony No. 5.** The Cleveland Orchestra, Christoph von Dohnányi.

**London 425438-2**, CD; DDD; 65:21.

**Mahler: Symphony No. 5.** Berlin Philharmonic, Bernard Haitink.

**Philips 422355-2**, CD; DDD; 78:47.

It is probable that no other composer's music has been so thoroughly discussed and minutely dissected by musicologists as that of Gustav Mahler. Every aspect of Mahler's works, especially the symphonies, has been scrutinized. Endless arguments about tempo, phrasing, accenting, rubato, etc. have occupied musicologists for years. Everyone has his interpretation of how Mahler's music should be per-

formed, and, of course, anyone who doesn't agree is an insensitive clod. Even among the conductors who are considered modern "Mahler experts," like Haitink, Tennstedt, and the late Bernstein as well as the fondly remembered Mahlerians of yesteryear—Bruno Walter, Otto Klemperer, Willem Mengelberg, Jascha Horenstein—there is little agreement on matters of performance.

Mahler rarely indicated metronome numbers on his scores, but he was among the most lavish of composers in supplying performance markings. Thus, sections would have notes like "langsam" (slowly), "bewegt, doch nicht zu schnell" (agitated, but not too fast), "sturmisch bewegt" (stormily agitated), and so forth. Even with these aids, there is still the question between conductors of "how fast is fast?" Of course, differing ideas about other performing tempos exist.

A case in point is Mahler's Fifth Symphony. The glorious fourth movement, Adagietto, is marked by Mahler to be played "sehr langsam" (very slowly). The new Philips CD with Bernard Haitink conducting the Berlin Philharmonic traverses this movement in 13:55. On the London CD, Christoph von Dohnányi performs the same music with the Cleveland Orchestra in 10:19. Similarly, the other four movements of the Mahler Fifth are slower in Haitink's interpretation, and the total time for the complete symphony is 78:47. Dohnányi's total timing is 65:21.

It is obvious that a difference of 13:26 between these recordings is considerable. Yet one cannot arbitrarily state that either the Haitink or Dohnányi performance is wrong. There is no wrong here, except in the dogmatic opinions of musicologists on each side of the fence. Dohnányi and Haitink simply have different conceptions of the Mahler Fifth Symphony. Both men are conducting world-class orchestras which play magnificently for them. So, in the absence of musicological erudition, which is usually the case with audiophiles, it really comes down to the sonic values of the recordings and to which provides the most natural and convincing illusion of musical realism.

The Philips recording was made in Philharmonie Hall in Berlin, always a difficult recording venue. Their engi-

neering team included the redoubtable Volker Straus, who is an exponent of multi-mike technique, but who is highly regarded for his keen sense of orchestral balances. Yet in spite of the use of multi-miking, the overall sound, even in tutti sections, does not have as much projection or "launch" into the acoustic space of the hall as you might expect. Dynamic range is fairly wide, and fortissimo sections generate considerable energy. However, more orchestral bloom would have made the sound more convincing.

The London recording was made in Masonic Auditorium in Cleveland, a hall in which the Decca engineers have made many truly outstanding recordings. In this case, Decca's chief engineer, James Lock, has provided a masterful recording. Using the famous Decca "Christmas tree" mike array, along with discreetly mixed stereo "sweetening" mikes, the sound has great projection in the spacious acoustics. Dynamic range is very wide, along with great dynamic expression. Every instrument and orchestral choir is clearly delineated in the wide soundstage. Depth localization is very realistic. The fifth movement, Rondo-Finale, opens with a mezzo-forte call from a solo French horn clearly in the left rear of the orchestra, magically floating out of the acoustic space. Then a chuckling bassoon enters in the "phantom" center, there's a passage on clarinet in the center, another horn call is heard on the left, and finally, the low strings enter on the right. In the tremendous fortissimo outburst in the Finale, the weight of brass chords, the impact of percussion, and the projection of massed strings and woodwinds are truly exciting.

Revelatory sound of this quality makes one appreciate anew the beauty and profundity of Mahler's glorious music.

*Bert Whyte*

**Mozart: Symphonies Nos. 35 and 38.** Staatskapelle Dresden, Colin Davis. **Philips 416 155-2.**

These two popular symphonies, the "Haffner" and "Prague," are conducted by Davis with his customary insight and élan. He gets superlative playing from the Staatskapelle Dresden and a finely detailed sound enrobed in warm, spacious acoustics.

*Bert Whyte*



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## A SENSE OF RUMOR



**Rumor and Sigh:** Richard Thompson  
Capitol CDP 7 95713 2, CD; ADD;  
61:11.

Sound: A                      Performance: A +

A sex deviant just out of the slammer. A schizophrenic woman's electroshock therapy. A tattooed heavy-metal queen. Maggie Thatcher and an obsessed collector of 78-rpm records. This is not a teaser for a supermarket thriller but rather part of the richly variegated, grimly ironic landscape cinematically portrayed by Richard Thompson on *Rumor and Sigh*.

At first pass, these tunes seem like well-crafted pop songs informed by Thompson's long love affair with British folk music and his finely honed ability to create hooks immune from cliché. But deeper levels quickly emerge, revealing his offbeat sense of humor and his fascination with the darker side of the human psyche.

Imagine the predicament of a young man, scion of a family too repressed to communicate, about to have his first sexual encounter armed only with knowledge of the birds and bees culled from advice in girly magazines and plain-wrapped clinical treatises. Somehow it doesn't help, even though he's "Read About Love." On the an-

themic rocker "I Feel So Good," Thompson explores the buoyant anticipation of a sexual offender just released from jail and about to go out and abuse some women to celebrate. Reversing the coin on the pulsing, syncopated "You Dream Too Much," Thompson's persona is led on by a gorgeous, self-possessed woman who enjoys emasculating her drooling dates.

Thompson's perspectives slip seamlessly from first-person psychodramas about being forced to commit your wife ("Grey Walls"), to acoustic narratives like the story of a wild young man and woman obsessed by a motorcycle ("1952 Vincent Black Lightning"), to rowdy, scathing political satire ("Mother Knows Best"—ironically, recorded the day before Margaret Thatcher resigned), and perverse yet poignant, introspective folk meditations ("God Loves a Drunk"). And let's not forget the old 78s. A drunk at a party is about to sit on a rare record: "They don't mend with sticky tape and glue/Unless you want to wind up black and blue/Don't sit on my Jimmy Shands" (old accordion music, which Thompson collects). All this culminates in a weirdly absurd art song about the demented, homicidal denizens of "Psycho Street," which sounds like a theme

song for a TV sitcom in a bizarre world presided over by Alfred Hitchcock.

Producer Mitchell Froom reins in Thompson's idiosyncratic guitar genius in order to let the net effect of the songs shimmer through. Never fear, however, there's still plenty of some of the most original playing to be heard anywhere. Thompson always manages to grind and waver a footstep beyond what you expect, creating little epiphanies, often through the simplest of ear-expanding harmonies that no one's ever thought of before. His singing displays a paradoxical mix of emotive sympathy and witty detachment which deftly draw you in to the changing realities of his lyrics. Like the songs, the production is sophisticated and highly textured; Thompson himself calls it psychedelic, although this is more a reference to its complexity than a generic observation.

*Rumor and Sigh* is a brilliant tour de force. Every twist and turn is a revelation of inspired songwriting, a collage of shifting points of view, a musical collection of short stories as startlingly definitive as James Joyce's *Dubliners*. Just when the insipid homogeneity of most rock music makes you think the genre is dead, great art like this comes along. *Michael Wright*

**Illuminated:** The 360's  
Link 1 61039-2, CD; AAD; 30:23.

Sound: B                      Performance: B +

It's going to be very hard for The 360's to avoid being compared to The Pretenders, even more so than it was for Concrete Blonde and Divinyls. But those bands have recently become fairly successful, so who can say whether this is a blessing or a curse? Audrey Clark has her own twist on the Patti Smith side of Chrissie Hynde, guitarist Eric Russell takes more than a few cues from James Honeyman-Scott, and even the rhythm section of Brian Evans (bass) and John Grady (drums) could easily be mistaken for Pete Farndon and Martin Chambers.

Although these songs might sound like possible Chrissie Hynde outtakes, The 360's adopt the early Pretenders style and tone with an intensity that smacks of "Precious" and "Up the Neck," and they do this more than reasonably well. Indeed, at times they are

positively inspired, as on the title track and "Deadpan Superstar," though the entire album can be faulted for lacking variety. Where The Pretenders released catchy pop songs like "Brass in Pocket," "Kid," and "Talk of the Town," The 360's are largely committed to anti-pop songs. This debut seems to have been recorded very quickly and cheaply, and perhaps with more imaginative production there would be more depth to their work. As is, *Illuminated* is a very impressive first effort, and one would expect that the group will polish what it has started and come up with a more distinctive second album.

Jon & Sally Tiven

**Star Time:** James Brown

**Polydor SACD 331**, four CDs; AAD: 71:40, 74:36, 72:57, and 75:34.

Sound: B+ Performance: A

*Star Time* is a digitally remastered collection of what must surely be called James Brown's greatest recordings. Some of these versions are the full unexpurgated renditions of what has been available only in edited form. If this isn't the ultimate James Brown retrospective for both longtime aficionados and newcomers alike, then we might as well all pack up our ears and head for the planet of the deaf. The

Hip-Hop Nation will be sampling this one for decades.

James Brown is one of the few artists who can fill four CDs with nearly five hours of music and not have it sound like anything less than a Greatest Hits collection. The key is that a lot of these records were cut as extended jams and subsequently edited into singles, some of which were so long that they were divided into parts one and two on either side of the 45. Most of these have never been issued as whole pieces, so now when one hears the nine minutes of "Talking Loud & Sayin' Nothin'" uninterrupted, it is a revelation. Many of the middle- to late-period performances are improvised, with the most exciting moments occurring toward the end of the vamp, when James, knowing he's already sung the song, simply lets loose and turns everything inside out.

The recordings on this compilation span Brown's career from the early days at Federal in the mid-'50s through his 1984 single "Unity" with Afrika Bambaataa. However, the material largely stops at the end of the '70s, when he stopped making records for Polydor. While it must have been a massive undertaking to go through the wealth of material that accumulated through the years, the Polydor folks

who assembled this compilation have taken great care not to miss a trick. *Star Time* will most likely be followed by more James Brown compilations (there is more material, including his various productions of people like Hank Ballard). But chances are that this will be his *Crossroads*, and when people look for the authoritative James Brown anthology, *Star Time* will be it.

Jon & Sally Tiven

### The Brand New Heavies

**Delicious Vinyl 422-846 874-2**, CD; AAD: 42:36.

Sound: B+ Performance: B+

With a name like Brand New Heavies, it's easy to mistake these guys as the newest members of the Hip-Hop Nation. It wouldn't be a bad thing, it's just that BNH is so much more. You'd be hard pressed to find a digital sample or beat-box on this record. What you do find, however, are exceptionally arranged horns, great vocal tracks, unrelenting grooves, and analog keyboard sounds that I haven't heard since I was splurging my allowance on Herbie Hancock's '70s catalog.

Clearly, BNH has immersed itself in '70s funk, soul, and fusion—everyone from Herbie, Donald Byrd, and Roy Ayers to Average White Band and Brass Construction. But what's cool about these guys is their brazen idolization of their heroes. When I say idolization, I mean to the extreme of using Mini-Moog synths, Hohner Clavinets, and that ubiquitous '70s workhorse, the Rhodes piano. Drums are basically reverbless and up-front—particularly the snare—and guitars are loaded with envelope followers, fuzz tones, phase shifters, and other relics.

Revivalists, perhaps, but certainly not in a *bad* way. Five years ago or less, wasn't everyone laughing at the '70s? Today, too many of us seem to be longing for them, whether credit belongs to Deee-Lite or *Women's Wear Daily*. Nobody does a time warp better than The Heavies, though. In fact, they update it for the '90s.

Four out of 10 tracks feature vocals from N'Dea Davenport, who has worked previously with Madonna. These songs will get The Heavies onto radio and their first single, "Dream Come True," is presently big in club-





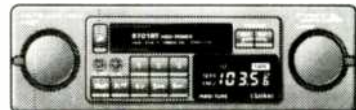
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## TWO-BASS HIT



**Dream Keeper:** Charlie Haden and the Liberation Music Orchestra  
**Blue Note CDP 7 95474 2**, CD; AAD; 48:43.

Sound: A – Performance: A –

**Dialogues:** Charlie Haden and Carlos Paredes

**Antilles 422-849 309-2**, CD; DDD; 42:27.

Sound: A Performance: A

Today the presence of world music and its influence on the recording industry—which thrives on new ideas and talent—is considered *de rigueur*. Although industry pundits only take notice when the Paul Simons and Peter Gabriels acknowledge the trend, those cross-cultural currents have always been present. More often than not, politics has been a driving force behind the free exchange of ethnomusical ideas.

Bassist Charlie Haden has released two discs this year, both of which extend the multi-cultural and political themes in his work—a tradition he's developed over the course of his career. *Dream Keeper*, a title adopted from a collection of poems by Lang-

ston Hughes, is the third in a series of recordings of Haden's Liberation Music Orchestra. This large ensemble's first release of songs of liberation and tributes to freedom fighters came out in 1969. Haden followed that initial release with *The Ballad of the Fallen* in the early '80s.

*Dream Keeper* is arguably the strongest of the three Liberation Music Orchestra records. The title track is an extended seven-part composition that alternates arranger and conductor Carla Bley's music, written to the words of Langston Hughes' "As I Grow Older," with three traditional themes from El Salvador, Venezuela, and the Spanish civil war. This version of the orchestra is a collection of talent awesome even by jazz standards. Guitar fans used to hearing Mick Goodrick's electric guitar will marvel at his sensitive treatment of "Feliciano Ama" and "Sandino," played on a classical guitar. Ray Anderson's "signifying" trombone and pianist Amina Claudine Myers' gospel improvisations bracket smaller but no less heartfelt contributions by Haden and Branford Marsalis in Haden's "Spiritual." "Hymn of the Anarchist Women's Movement" spar-

kles with the triple-tongued wizardry of tuba player Joe Daley paired with drummer Paul Motian's brushes. Tom Harrell's trumpet and flugelhorn work lends an air of authenticity to all of the music of the various Latino cultures.

Haden has not ignored the flash-point of recent cultural and political activity, South Africa. His orchestra's reading and Bley's voicing of "Nkosi Sikelel'i Afrika," which is the anthem of the African National Congress, is one of the most moving performances of the decade. The anthem opens, sans rhythm section, with brass and winds stating the theme in traditional African harmonies. Then, in a brilliant stroke of execution, the music accelerates to a hard-swinging four with altoist Ken McIntyre and tenor man Dewey Redman soloing, while Haden is walking the bass furiously underneath. The tension is again altered when the ensemble restates the theme in the original, slower tempo opposite all of this activity, giving one the impression of a perpetual canon.

Although *Dream Keeper* is licensed for release in the U.S. by Blue Note, the producer is the Japanese label Disk Union. This is clearly one of their better recordings, for probably two reasons. Clinton Studios in New York, where most of the recording took place, is a nice-sized space with high ceilings and does not sound hollow. More importantly, these players (more or less) have been working together as an *ensemble* for two decades. Their sense of balance and performance as a unit are not dependent on stage monitors!

The first Liberation Music Orchestra record included a composition called "Song for Che." Haden's performance of this piece at a 1971 music festival in Portugal got him arrested. It also made him a hero. During a return trip to that country some seven years later, Haden heard a performance by Carlos Paredes, a master of Portuguese guitar. Paredes, who had himself been a political prisoner, was introduced to Haden through a mutual friend; they met again 12 years later in a Paris studio to record *Dialogues*.

*Dialogues* is a powerful duet. Although the politics here are felt as an undercurrent rather than being overtly stated, they do contribute to the emotional weight of the recording. The Por-

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Although the politics in *Dialogues* are felt as an undercurrent, they do add to the emotional weight of the recording.

tuguese guitar is a pear-shaped, 12-stringed instrument with a decidedly sharp timbre. The combination of that guitar and the full-bodied sound of Haden's bass makes *Dialogues* the kind of recording that speaks to each listener in a very personal way.

Carlos Paredes' music has its roots in traditional Portuguese music called fado. But he has transformed the somewhat fatalistic character of the acceptance of one's position in this music to a more celebratory faith in a better future. The music is, at various points, mournful, full of lament, and reverent. In "Divertimento," "Marionetas," and "Dança Dos Camponeses" the music takes on a much more optimistic character. Although the majority of the compositions were written by Paredes (also included is a version of Haden's "Song for Che"), the music was performed from memory, giving this recording a notably fresh and vibrant quality.

Charlie Haden's penchant for duet recordings has been documented in his work with Alice Coltrane, Keith Jarrett, and most importantly Ornette Coleman. *Dialogues* is a critical addition to his work in this area and represents the best of the new wave of world music recordings. *Al Pryor*

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*Mike Bieber*

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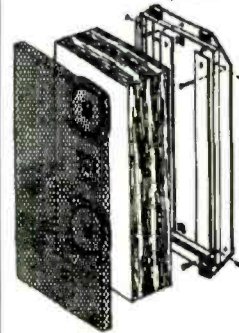


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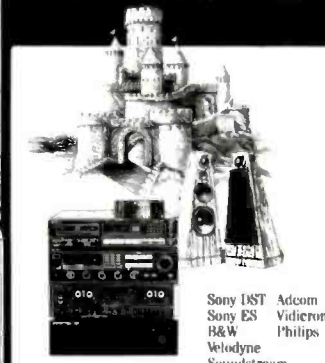
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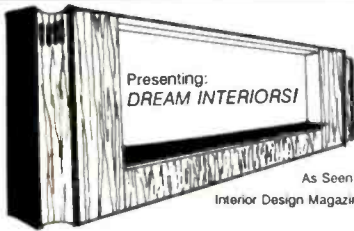
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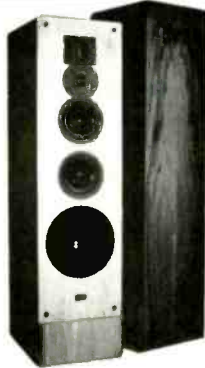
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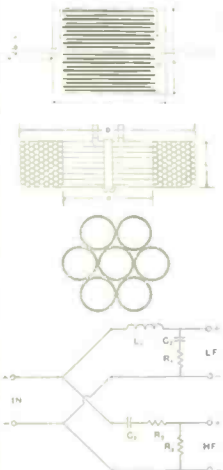
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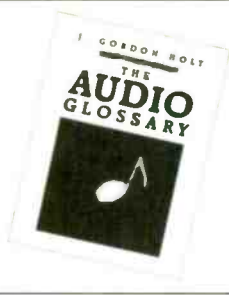
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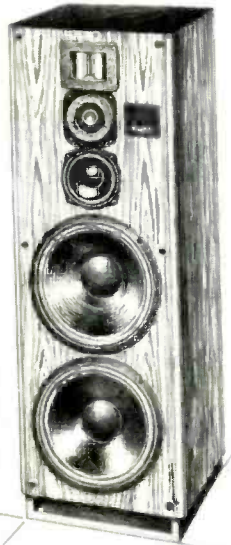
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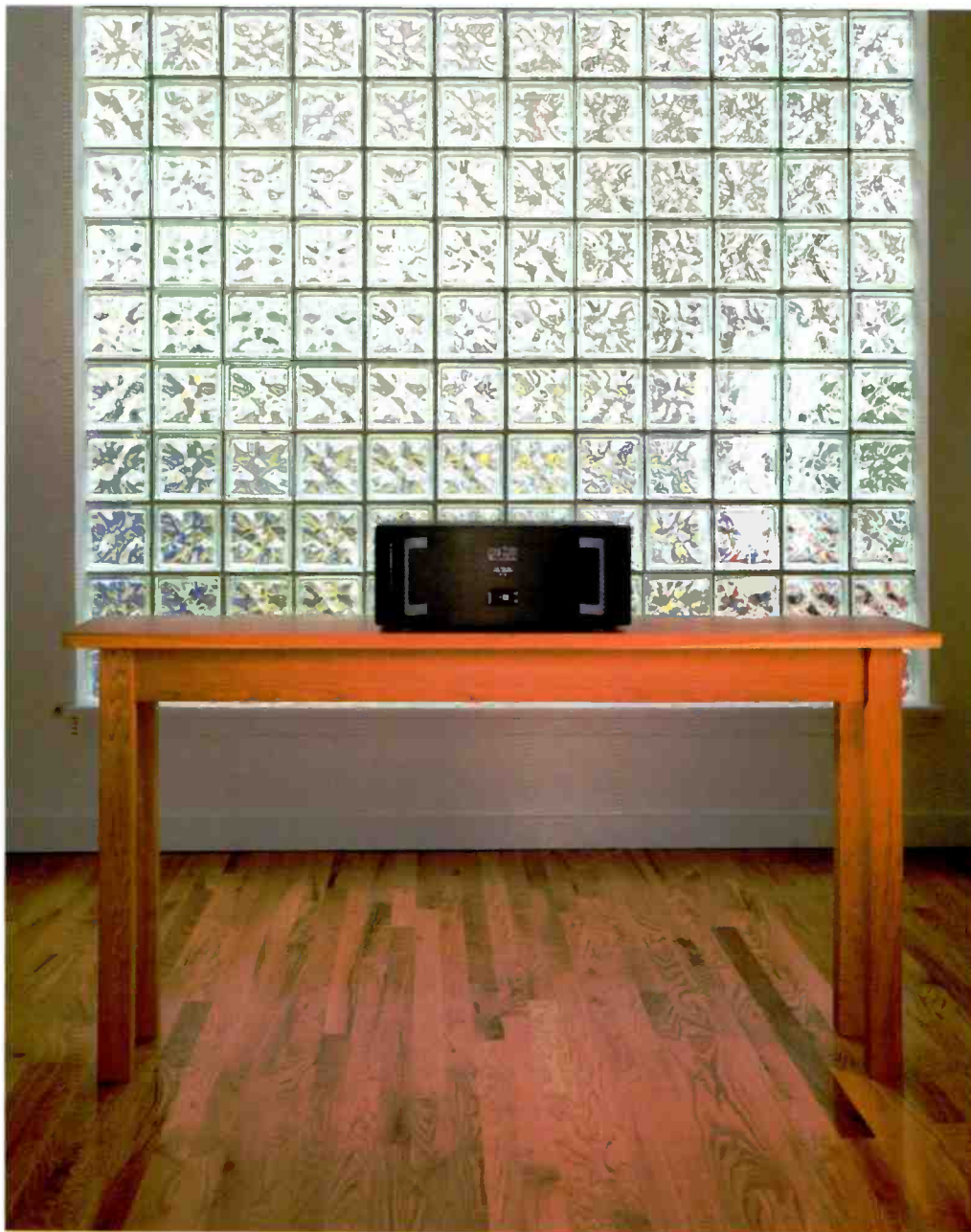
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