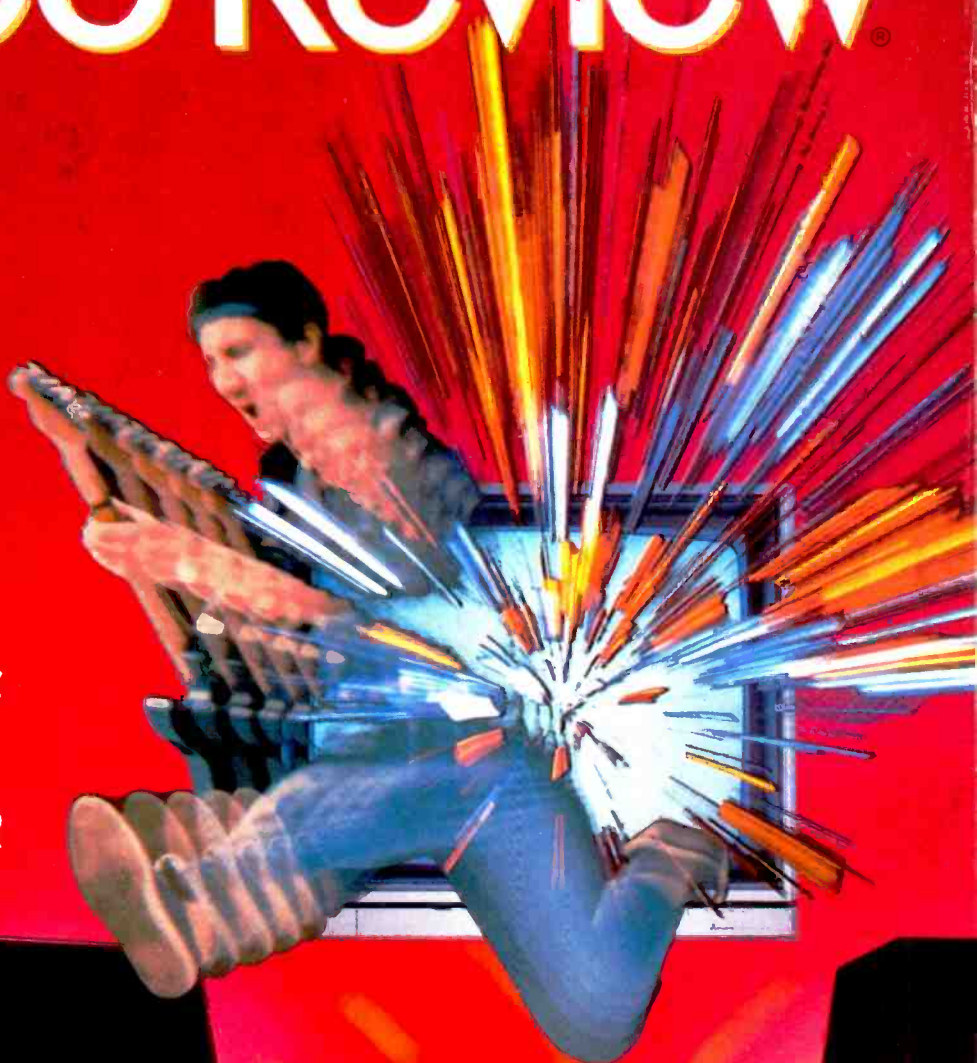


Stereo Review

JULY 1984 \$1.50

AUDIO M E E T S VIDEO



AT LAST: STEREO TV!

**VHS HI-FI—
FIRST LAB TESTS**

10 TOP ROCK VIDEOS

**EXCLUSIVE REPORT:
DBX'S FIRST SPEAKER
(IT'S SUPERB!)**



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07*HV

by Christie Barter and Gordon Sell

CED LIVES!

The CBS Records Group says it will continue to make CED video discs along with RCA despite the latter's decision to stop production of CED video disc players. CBS is a leading custom presser of video discs, which it produces at its state-of-the-art facility in Carrollton, Georgia. Support for the CED format is also coming from such companies as Toshiba, Hitachi, and Sears, which plan to continue selling the players.

TECH NOTES

Technics has introduced a Compact Disc player changer that can hold and access fifty-one CD's in seconds. It has remote control and costs \$1,500....Watch for RCA to launch a line of audio components to go with their new stereo TV's and hi-fi audio VCR's. RCA's stereo TV's come with multiple connectors for external VCR's, video disc players, and cable decoders, plus stereo audio interconnects for video and audio equipment. They are expected on the market in June or July....Polk is introducing a bookshelf speaker that utilizes their SDA technology....Analog record producer Sheffield Labs is taking the digital plunge and releasing eleven Compact Discs....Motorola has been pushing manufacturers to use their AM stereo system exclusively. The list of Motorola-only companies now includes Sherwood, GM-Delco, Chrysler, Concord, Samsung, Jensen, Marantz, McIntosh, and Pioneer. Toshiba will manufacture and sell the Motorola AM stereo chip in Japan....Sansui has just introduced a line of receivers and tuners that decode all four AM stereo system broadcasts....Onkyo has introduced an

\$800 three-head cassette deck with Dolby B and C, dbx, and Dolby HX Pro....KLH, now owned by Kyocera, will introduce a new line of speakers this summer.

HOME VIDEO WINS

"Pavarotti," a Las Vegas production starring the famous operatic tenor, is being released on video cassette by U.S.A. Home Video ahead of any scheduled telecast. The show was taped live in March but won't be aired until the summer, giving U.S.A. Home Video a head start in getting the Luciano Pavarotti show to home viewers.



TAPE FORMULATIONS

Atco's cassette version of the Yes album "90125" introduces a formulation called Magnetite-12, an "extremely high quality" bias I tape produced by Agfa-Gevaert. Magnetite has been used in tape before, but this is the first time such a formulation has been incorporated into a prerecorded tape for the consumer market.... All new cassette releases on A&M, Windham Hill, I.R.S., and Gold Mountain are being duplicated on premium BASF chromium dioxide tape at no increase in price.

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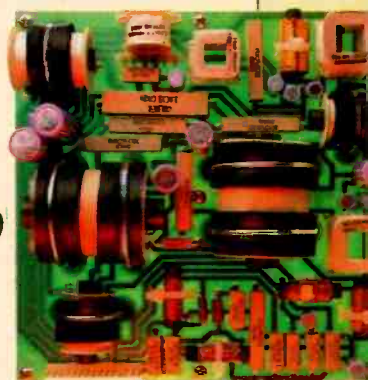
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by William Livingstone



DAVID GOLD

With mezzo-soprano Joanna Simon

I LOVE L.A.

THIS country has changed a lot since I was a kid. When I studied geography in grade school, the majority of the population lived east of the Mississippi, there were no active volcanoes in the continental United States, and in Southern California there was a large cultural desert called Los Angeles.

Now, according to the 1980 census, there are more Americans living west of the Mississippi than east of it, Mount St. Helens has proved that our crust is not as tough as we thought it was, and I am told that Los Angeles has replaced New York as the nation's number-one market for books. Furthermore, the art museums in and around Los Angeles are among the richest in the country, and L.A. has a thriving and varied musical life.

After a few years in New York, even transplanted Southern rustics like me get a little smug about being in the center of the artistic universe. New York isn't turning into a has-been city, but it is making me uneasy to see many musical "firsts" now taking place out West in Texas and Southern California.

This summer the English National Opera company is making its American debut in Texas. Then it comes to New York for a stint at the Metropolitan Opera House. The larger British company, the Royal Opera, Covent Garden, will be making *its* American debut this

month in Los Angeles, but it won't be stopping in New York at all!

The Royal Opera's visit is part of an arts festival staged in Los Angeles in conjunction with this summer's Olympic games, and it promises to reach epic proportions. Well known as a launching pad for muscular young athletes, Southern California has received insufficient credit for the music and musicians it has produced.

In 1981, Michael Tilson Thomas conducted the L.A. Philharmonic in a Festival of Music Made in Los Angeles. The compositions included works by George Antheil, John Cage, Erich Wolfgang Korngold, George Gershwin, Arnold Schoenberg, and Igor Stravinsky.

A principal guest conductor of the Philharmonic, Thomas grew up in Los Angeles and received his musical training there. The newly designated music director of the orchestra is another home-town boy who made good as an international conductor, André Previn.

Previn will succeed the glamorous Italian maestro Carlo Maria Giulini, and I think it shows considerable maturity on the part of the administrators of the Los Angeles Philharmonic that they can engage a music director who was trained right there in Southern California and began his musical career in the movie industry.

Previn has gone on to conduct the finest orchestras in the world. He is at present the music director of the Pittsburgh Symphony and next year will become music director of the Royal Philharmonic in London. The high quality of his work is documented on more than 150 recordings on various labels.

Southern California has long been a center of the hi-fi industry, and many record companies have their American headquarters in Los Angeles. I'm glad live music is flourishing there as well.

I congratulate Previn and the L.A. Philharmonic on their new relationship, and I send the city best wishes for the success of the Olympic Arts Festival. And if the people of Los Angeles want to turn what was once a cultural desert into the nation's number-one music center, my advice is to go for it. □

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Great digital debate

After having read the preposterous Con statements in May's "The Great Digital Debate," I must conclude that gentlemen like Doug Sax are either getting old enough to have some hearing loss or are afraid of losing their livelihoods to the new Compact Disc technology. Has Mr. Sax ever really listened to a good CD (one of the Telarc releases, for example) on a good system? Or then there's Anthony Gregory's 5,512-Hz square wave. None of the music I listen to has any such square-wave content. Is Mr. Gregory accustomed to listening to the unfiltered output of an Apple II's sound port?

As far as sampling rate is con-



ANDREA BARUFFI

cerned, how many of the gentlemen in question can hear a 10,000-Hz tone, let alone one at 20,000 Hz? I can hear ultrasonic alarm systems, and I find that CD's clearly reproduce all the necessary (and much of the unnecessary) parts of the sound spectrum. My CD player also reproduces the full and complete dynamic range of the music I'm listening to. No other medium, except perhaps a dbx-encoded tape, can do that. In short, I've given up buying "black discs." I'm tired of warped records, pops, ticks, hisses, inner-groove distortion, and "analog sound."

EARL ALLEN
Fort Worth, Tex.

One of the most essential criteria, for me at least, as to what constitutes true high-fidelity sound in a recording is reproduction of that lovely, silken sheen of the strings one hears in a live orchestral performance. Digital recording has not been able to capture it. In over forty years of record collecting, I have found only one that has: a Chalfont album of music by Vaughan Wil-

liams and Elgar (C77.005)—an analog recording.

PAUL ASCHERL
Sheffield Lake, Ohio

Is there any truth to the rumor that sticking your hand into the drawer of a Compact Disc player and pressing PLAY will result in a digital read-out of your elapsed lifetime and total life expectancy to the nearest second? Is it also true that the manufacturers are withholding this information because they're afraid a potential buyer might perform the experiment, find out he doesn't have long to live, and forgo the purchase?

BRAD GRUNNIWALDT
Custer, Wis.

William Burton's May article on the "Great Digital Debate" was an interesting cross-section of opinion, but not one shred of scientific evidence was presented by the participants to support their views. I single out the statement by Michael Tapes that "It's the emotion that digital takes out" as a prime example of purely superstitious audiophilia.

Those who believe it is "unmusical" or "unnatural" to represent a waveform as a series of numbers would do well to remember that all natural phenomena are governed by quantum mechanics. This means that there are no smooth, continuous functions in nature, only step-wise jumps from one physical state to another.

WARREN K. TENBROOK
Corvallis, Ore.

Time for XTC

Thank you to Steve Simels for his long-awaited high praise of XTC in his May review of "Mummer." This band's songwriting is imaginative enough to cover everything from life as a fly to military attitudes, and their arrangements are hooky yet maintain individuality. "Too smart for the room" is an apt description of why they are a well-kept secret. It would only take one commercially successful song to make newly acquired fans wonder where XTC had been all their lives and to grant them the recognition they deserve.

JOANNE OSSI
Hackensack, N.J.

Our new look

During the many years that I have subscribed to your fine magazine, I can't recall a single issue with the visual impact, sparkling format, and editorial excellence of the issue of May 1984. For the past several months I have noticed subtle changes in both the looks and feel of STEREO REVIEW. Now the fruits of your efforts are stunningly obvious. Kudos to your staff and especially to Sue Llewellyn, your new art director. You folks have solidified STEREO REVIEW's position as the premier publication of its type.

JASON A. BROOKS
Reedsport, Ore.

I find the gaudy, pastel colors of STEREO REVIEW's May issue to be visually offensive. But the biggest problem is with the "Bulletin." The former way it was presented, type-written on a bright yellow background, communicated a sense of urgency which commanded attention. Now it gives the impression of stale news several months old.

JAMES P. MARTIN
Atlanta, Ga.

Juice Newton

Alanna Nash missed the mark on several points in her March review of Juice Newton's "Dirty Looks" album. First of all, she says that "most of [Newton's] hits have been safe, pale reworkings of oldies-but-goodies." But only three hits out of nine have been remakes, and of these three, *Angel of the Morning* went gold in 1981, when the recording industry was in a major sales slump, and *Break It to Me Gently*

Newton: "pale reworkings"?



CHARLES BUSH/CAPITOL RECORDS

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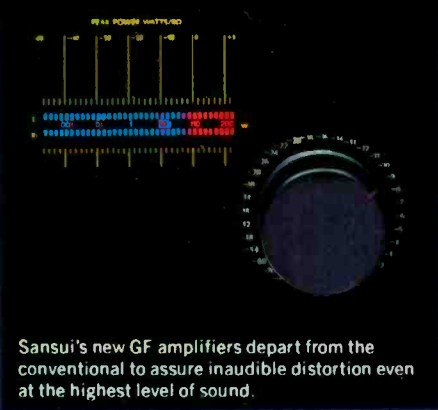
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won a Grammy award. Not bad for a couple of "pale reworkings."

Second, Ms. Nash's attempt at humor in regard to the lyrics of *Runaway Hearts* simply reveals how dense she is. The words mean that some people would rather live shorter, more adventurous lives than longer, more monotonous ones. Hardly a "dumb" sentiment.

About the only point I agree with Ms. Nash on is that she is "the only person in the Northern Hemisphere who doesn't find Juice Newton's voice very interesting."

BILL NELSON
Ithaca, N.Y.

Met centennial

William Livingstone's appreciation of the Metropolitan Opera's centennial (March "Speaking My Piece") should be applauded except for one error in fact. The "one American among the principal artists" during the first season was not Frank Nash, who was British. It seems to be established that the leading American artist at the Met in 1883-1884 was soprano Alwina Valleria, who was born in Baltimore in 1848. Her roles

included the *Trovatore* Leonora, Philine, Micaela, and Isabella in *Roberto il Diavolo*.

LOUIS SNYDER
Fairfield, Conn.

Involved with U2

I would like to commend Mark Peel on his rave review of U2's "Under a Blood Red Sky" in April. I also agree with him that guitarist Dave ("The Edge") Evans gives a performance that is "fiercely rhythmic, clean, and agile." A great record gets you involved and makes you feel like you're at the concert instead of listening to a recording. And U2's record does get you involved.

JEFF LAABS
Northfield, Minn.

Strauss texts

George Jellinek is, of course, right in noting that other record companies have "for decades" obtained the rights to print translations of the texts of Richard Strauss's *Four Last Songs*. Their absence in the recent Philips album sung by Jessye Norman (March "Best of the Month")

resulted from the discovery by the music's publishers, Boosey & Hawkes, that the rights to three of the texts, the poems by Hermann Hesse, lie with the literary publishers Suhrkamp Verlag of Frankfurt. All requests for reprint/translation permission are now being referred to Suhrkamp, which is taking a hard line and selling only one-shot reprint rights for the original German. As far as I know, we are the first record company to suffer under this new setup.

A. DAVID HOGARTH
Phonogram International
Baarn, The Netherlands

Amplification

We got a bit carried away last issue in our zeal to chastise some manufacturers of car stereo power amplifiers for their exaggerated power specifications ("SR Tests 19 Car Amplifiers"). The Philips EN2100 is said by the manufacturer to be a "200 watt" amplifier. The "600 watt" rating we ascribed to it actually refers to the unit's power-supply rating, not its output power. We regret the error.

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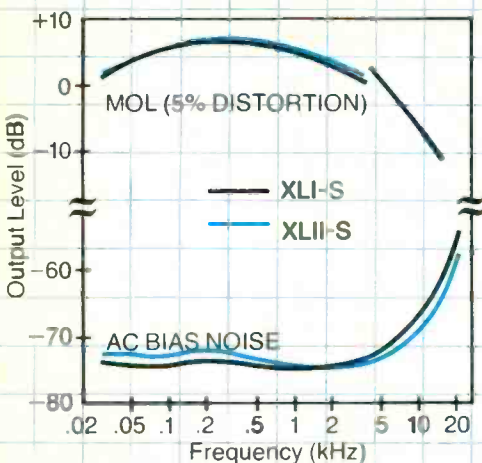
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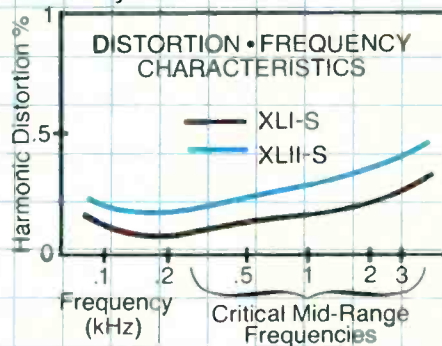


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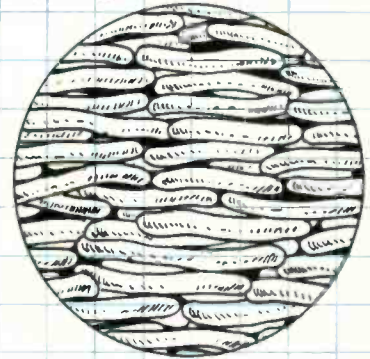
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There are two pairs of output connectors on the back of the unit as well as a pair of audio input jacks for FM simulcasts. There are sliding controls on the front panel for treble, bass, and balance. A headphone jack is included. The MLV-1100 measures 17 inches wide, 2 $\frac{1}{8}$ inches high, and 10 $\frac{3}{8}$ inches deep. Price: \$199.95. Sony Corp. of America, Dept. SR, Sony Drive, Park Ridge, N.J. 07656.

Circle 120 on reader service card

LEVINSON PREAMPS MATCH ANY PICKUP

Universal phono stages with user-adjustable gain and input-loading options enable two new preamplifiers from Mark Levinson to match any phono cartridge precisely. No head amps or pre-preamplifiers are needed. The ML-12A also has a line-level section with internally selectable gain to match it to other components. It requires a separate power supply, the PLS-124, unless it is used with the Levinson ML-11 power amplifier. Price: \$1,370; PLS-124 power supply, \$390.

The ML-10A preamplifier (shown) has a built-in power supply. The balance controls work by changing the closed-loop gain of the line-level stage independently for each channel, thereby avoiding the noise and distortion of ordinary balance controls. Levinson gives typical distortion figures for the phono circuit of 0.014 per cent total harmonic distortion and 0.005 percent intermodulation distortion at 6 volts output from 20 to 20,000 Hz with 63 dB of

gain. Signal-to-noise ratio is given as typically -72 dB from 20 to 80,000 Hz, referred to an input of 1 millivolt at 1,000 Hz with 63 dB of gain. Price: \$2,870. Mark Levinson Audio Systems, Dept. SR, Post Office Box 701, Middletown, Conn. 06457.

Circle 121 on reader service card

NAKAMICHI'S TWO-HEAD DECKS

Two new cassette decks from Nakamichi, the BX-100 and the BX-150, have two heads, three-motor transports, and single-capstan drive. They use the Nakamichi laminated-sandust record/play head. Both feature a dual-speed master fader, Dolby B noise reduction, defeatable MPX filter, and a headphone jack. Microprocessors permit switching easily between functions. AUTO REPEAT enables replay of an entire side or a selectable segment between zero on the



counter and the end of the tape. The BX-150 also has Dolby C noise reduction, an output-level control, and an LED tape counter.

Wow-and-flutter for both models is given as 0.06 per cent wrms, signal-to-noise ratio as better than 62 dB (with Dolby B). Separation is better than 36 dB, crosstalk better than 60 dB. The decks come in black or silver finishes. Both measure 16 $\frac{1}{16}$ inches wide, 4 $\frac{1}{16}$ inches high, and 9 $\frac{7}{8}$ inches deep. Weight is 12 $\frac{1}{8}$ pounds. Prices: BX-100, \$349; BX-150, \$495. Nakamichi USA, Dept. SR, 1101 Colorado Avenue, Santa Monica, Calif. 90401.

Circle 122 on reader service card

CONCORD CAR STEREO HAS LESS FM NOISE

Concord's HPL-520 car stereo cassette player/radio features FNR, a new noise-reduction system for FM that is said to reduce the effects of multipath and other interference with weak signals. FNR can be disengaged if not needed. Six AM and six FM station presets are included, along with LCD displays, auto-scan tuning, and a front/rear fader. The cassette section has Dolby B



and C noise reduction, a d.c. servo-controlled drive motor, and playback equalization for metal or chrome tape.

Power output is rated at 12 watts per channel into 4 ohms from 20 to 20,000 Hz with less than 0.8 per cent total harmonic distortion. The unit is only 4 $\frac{3}{4}$ inches deep. Price range: \$399 to \$449. Concord Electronics, Dept. SR, 6025 Yolanda Avenue, Tarzana, Calif. 91356.

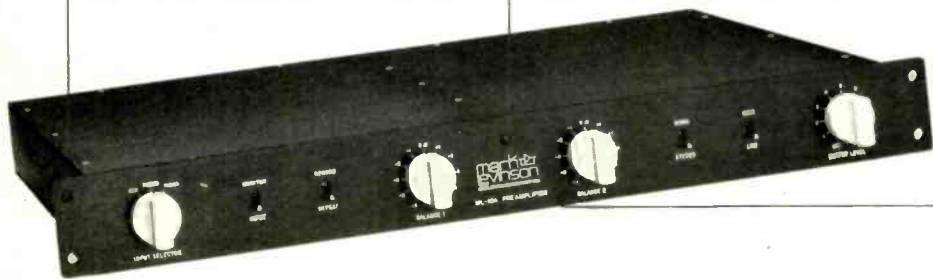
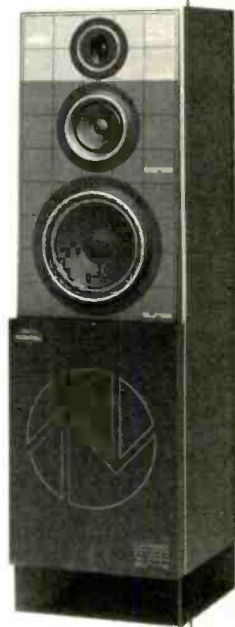
Circle 123 on reader service card

JAMO SPEAKER HAS SUBWOOFER

The PP 2504 tower speaker, the top of Jamo Hi-Fi's new Scan line, is a four-way, bass-reflex system with a built-in subwoofer. The subwoofer section has two 10-inch drivers operating as one in an antiphase (push-pull) configuration. They are mounted facing each other in the lower half of the tower, and the bass frequencies emerge from a slot at the bottom. Claimed advantages of the design are high sensitivity and greater power-handling capability.

The subwoofer drivers in the PP 2504 cross over at 400 Hz to an 8-inch woofer, which crosses at 1,400 Hz to a 5-inch midrange, which crosses at 4,500 Hz to a 1-inch dome tweeter. Tweeter overload is signaled by an LED indicator. The system can handle continuous power of 250 watts (rms) and peaks of 400 watts; rated sensitivity is 92.8 dB sound-pressure level at 1 meter with a 1-watt input. Frequency response is given as 20 to 20,000 Hz, impedance as 8 ohms. The tower measures 42 inches high, 14 inches wide, and 12 inches deep, and it weighs 67 pounds. Price: \$879.90 per pair. The Scan line also includes the two-way SL 60 minispeaker (\$151.80 per pair) and four other systems ranging upward in size and in price, from \$199.90 to \$439.90 per pair. Jamo Hi-Fi U.S.A., Inc., Dept. SR, 916 Ash Street, Winnetka, Ill. 60093.

Circle 124 on reader service card

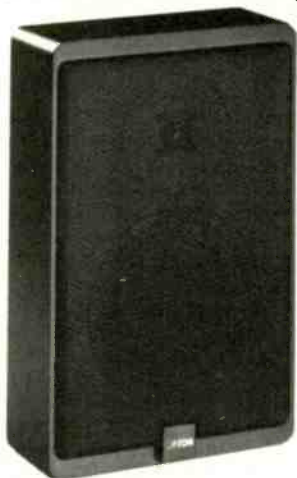


NEW PRODUCTS

SLIM-LINE TWO-WAY CANTON SPEAKERS

Measuring only 3½ inches deep, Canton's GL 300F two-way loudspeakers can be mounted on or even inside a wall. The 160-millimeter long-throw woofer and 25-mm dome tweeter are vertically aligned, with a crossover frequency of 1,700 Hz. Frequency response is given as 48 to 30,000 Hz, distortion as less than 1.5 per cent. The speakers are recommended for use with amplifiers rated up to 45 watts. The nominal impedance is 4 ohms.

The GL 300F speakers are available in black, white, or walnut finishes. The removable perforated-steel grille matches the cabinet finish. Height is

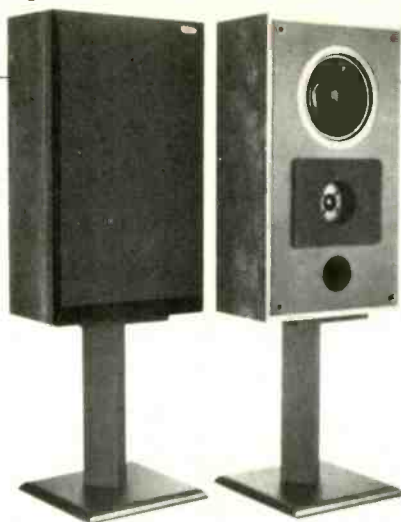


13¼ inches, width 8¾ inches. Weight is 10 pounds. Price: \$375 per pair, including 16-foot connecting cables and wall-mounting fixtures. Canton North America, Inc., Dept. SR, 254 First Avenue North, Minneapolis, Minn. 55401. **Circle 125 on reader service card**

WOOFER ON TOP IN PAISLEY SPEAKER

The two-way, vented Model 10 speaker system from Canada's Paisley Research has its woofer placed above its recessed tweeter. According to the manufacturer, this unusual configuration gives more accurate phase alignment for improved stereo imaging and clarity. The 8-inch polypropylene bass/mid-range driver has layered-cone damping for a smoother frequency response. The 1-inch tweeter has a soft polyester dome.

The system crossover is at 2,200 Hz. Sensitivity is given as 90.7 dB and the nominal impedance as 6 ohms. Frequency response is 35 to 23,000 Hz ±2.5 dB. The Model 10 is recommended for use with amplifiers rated



from 15 to 100 watts per channel. The enclosure measures 23 x 14 x 8 inches, and weight is 25½ pounds. The manufacturer recommends that the speakers be placed on 15-inch stands (as shown) so that the woofer is at the optimum height. Price: Model 10 speakers, \$359 per pair; stands, \$11 per pair. Paisley Research, Dept. SR, 135 Torbay Road, Markham, Ontario, Canada L3R 1G7. **Circle 126 on reader service card**

EQUALIZER IN AUDIOVOX ETR

The AVX-990 electronically tuned receiver/cassette player for cars from Audiovox includes a five-band graphic equalizer. The equalizer offers up to 12 dB boost or cut in bands centered at 60, 250, 1,000, 3,500, and 10,000 Hz. The AM/FM tuner can automatically scan up to twelve preset stations. A back-lit LCD panel indicates time, frequency, or function. The autoreverse cassette player has locking fast-forward and re-



wind controls and a music sensor to locate the next selection. There is a metal/chrome playback-equalization setting. Maximum output power is given as 50 watts. The chassis is 5½ inches deep. Price: \$390. Audiovox Corporation, Dept. SR, 150 Marcus Boulevard, Hauppauge, N.Y. 11788.

Circle 127 on reader service card

PROGRAMMABLE TOSHIBA CD PLAYER

The Toshiba XR-Z70 Compact Disc player can be programmed to play up to sixteen tracks in any order. Controls al-



low scanning in forward or reverse and skipping to the beginning or end of the current track. Displays show the number of the current track and one of three timings: from the start of the disc, from the start of the track, or to the end of the disc. The headphone output level is variable. The player, 16½ inches wide, 3¾ inches high, and 12¾ inches deep, has a wireless remote control. Price: \$749.95. Toshiba America, Dept. SR, 82 Totowa Road, Wayne, N.J. 07470. **Circle 128 on reader service card**

SUMO POLARIS CLASS-AB AMPLIFIER

The Sumo Polaris from All American Audio is a Class AB amplifier rated at 100 watts per channel into 8 ohms, 175 watts into 4 ohms, or 300 watts into 2 ohms. It has a power-MOSFET output stage, common-ground output, and claimed total harmonic distortion



(THD) of less than 0.1 per cent at rated power into 8 ohms. Rise time is given as 2 microseconds, and signal-to-noise ratio is 100 dB below rated power. Price: \$399; rack-mount panel and handles, \$80. All American Audio, Inc., Dept. SR, 31316 Via Colinas, Suite 103, Westlake Village, Calif. 91362.

Circle 129 on reader service card

LOWER-COST SONY CD PLAYER

Sony's new CDP-200 Compact Disc player has many of the same features as its more expensive CDP-101 at a retail price of only \$700. The drawer-loading CDP-200 includes Index Search to locate specific sections within individual tracks, Automatic Music Sensing to find the start of the current, previous, or subsequent track, and Fast Scan to search the disc at increased speed with the program still audible. The player can also repeat either one track or a selected section of a disc. Displays indicate the current track and index number and the elapsed or remaining time. The headphone output level is adjustable. In a brushed-silver finish, the CDP-200 measures 14 inches wide, 3¾ inches high, and 12¾ inches deep. Weight is 14 pounds, 9 ounces. Sony Consumer Products, Dept. SR, Sony Drive, Park Ridge, N.J. 07656.

Circle 130 on reader service card

Come to

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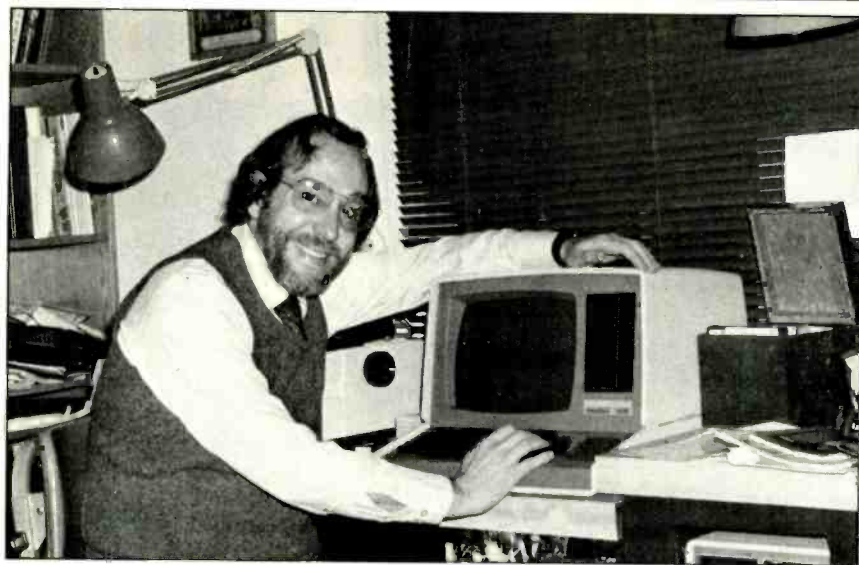


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ELEEN KLEIN

BY LARRY KLEIN

NOISE COLORS

Q *Would you please explain the difference between white noise and pink noise?*

LOUIS BERKHARDT
North Bergen, N.J.

A The term "white noise" was coined by analogy to white light. Just as white light has an equal mix of all colors in the visible frequency spectrum, white noise has an equal mix of all frequencies in the audible frequency spectrum. Actually, in white noise every frequency is not present simultaneously, but statistically every frequency averages out to having the same energy as every other frequency. (White noise is sometimes referred to as "random" noise since it is produced naturally by the random movements of free electrons in conductors and semiconductors.)

When white noise appears in an audio system—purposely or otherwise—it sounds very hissy because most of its energy falls in the area that the human ear perceives as the high-frequency part of the audio spectrum. (There are many more frequencies—and hence much more energy—between 1,000 and 20,000 Hz than there are between 20 and 1,000 Hz.) Because it is weighted so heavily toward the high-frequency end of the audio spectrum, white noise is less than ideal as a test signal.

The solution: feed the white noise through a shaping network—a specialized tone control, if you will—that attenuates the energy at the same rate that it naturally rises. The result (using the light analogy) is a "warmer"-sound-

ing noise that is balanced more toward the low-frequency "red" end of the spectrum. This so-called "pink noise" sounds warmer than white because its energy is distributed equally by octave rather than by frequency. In other words, there's as much energy in the lower five octaves, from 20 to 640 Hz, as there is in the upper five octaves, from 640 to 20,480 Hz.

TONE-ARM FRICTION

Q *I've been studying turntable specifications and have noticed that, while manufacturers almost always give the numbers for wow-and-flutter and rumble, there is seldom any mention of tone-arm friction. Isn't such friction important?*

GERALD FENNING
West Allis, Wis.

A Yes, tone-arm friction certainly is important. Fortunately—considering how difficult it is to measure precisely—Julian Hirsch reports that it has been negligible on every tone arm Hirsch-Houck Laboratories has tested for many years.

If arm friction is no more than 10 percent of the vertical tracking force, it will not greatly affect performance. That means that even a cartridge tracking at 1 gram should be able to tolerate 100 milligrams of tone-arm pivot friction without being in trouble. Considering that the few turntable manufacturers who do specify friction generally quote figures lower than 20 milligrams, I would consider pivot friction a problem long since solved—at least in high-fidelity turntables.

You can easily check the lateral friction of a pivoted tone arm. Disable its antiskating and set the tracking force to zero. When the arm is floating freely in

a balanced condition, blow gently on the side of the headshell. The arm should then drift slowly toward the turntable's center. If at any point in its drift across the playing surface it seems to drag or slow down suddenly, the pivots may be binding or there may be a problem with excessive friction. If in doubt, check with the tone-arm manufacturer for his suggestions.

Incidentally, none of the above applies to radial-tracking tone arms since, with only a couple of exceptions that I'm aware of, they are all driven by some sort of servo-control mechanism that easily overcomes any friction problem.

DIRTY AMPLIFIER

Q *I added two external cooling fans to my 700-watt amplifier. The fans are aimed to blow into the heat sinks of the amplifier. The problem is that the fans also blow dust and dirt onto the heat-sink fins and output-transistor covers. The dirt builds up to such an extent that I find it necessary to take my amplifier apart and clean it four or five times a year. Could this dirt damage the amplifier over time?*

JOHN SEKAN
Telluride, Colo.

A Dirt can cause damage if it is electrically conductive or thermally insulating. If the accumulation is as thick as you claim, you would probably do well to vacuum clean your amplifier on a regular basis. But do you really need to have the two fans operating all the time? Perhaps in your enthusiasm to prevent heat buildup, you are aggravating the dirt-buildup problem. My rule of thumb (actually, forefinger) is that if heat sinks don't get too hot to touch comfortably, they don't need forced-air cooling.

A.C. SWITCHING

Q *I have two accessory components, a time-delay unit and a noise reducer. In both owner's manuals it states that the units should be connected only to an amplifier's unswitched a.c. convenience outlet. I understand that to mean that the accessories will then never be turned off. I also have an equalizer connected to the unswitched a.c. outlet on my tape recorder, the a.c. cord of which is plugged into a switched outlet on my amplifier. Does all this affect the signal, and am I doing anything wrong?*

R. W. BIELSKI
Mt. View, Calif.

A Once you understand the reasons behind them, the manufacturers' a.c.-outlet recommendations make more sense than is obvious at first

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CIRCLE NO. 48 ON READER SERVICE CARD

glance. Keep in mind that an a.c. convenience outlet is meant to be just that—a convenience. Consider it merely an a.c. extension cord built into a component—it has nothing to do with the audio signal path.

The original reason for having both switched and unswitched a.c. outlets was simple: some electromechanical components (turntables and tape recorders) might be damaged by being left "in gear" if their power is suddenly switched off during play, so their line cords should be plugged into unswitched outlets. Those components

that can conveniently be switched on and off simultaneously with the amplifier are connected to switched outlets.

The advent of transistorized equipment modified this rule somewhat. Tubes have a slow warm-up time that allows circuits more or less to settle down before they start operating. Solid-state devices, however, come on instantly and—if precautions aren't taken—loud thumps and crackles are likely to be heard as the circuits start to operate before they stabilize. Although some solid-state configurations don't produce warm-up noises, many components re-

quire special built-in circuits to provide turn-on muting. But sometimes a designer of circuitry that is not naturally immune to noise may decide that it's not worth the trouble and expense to put in a muting circuit—and that, in any case, the equipment is most stable if left on constantly. The manual is then likely to instruct the user to plug the component into an unswitched a.c. outlet. I see nothing wrong with such advice, since most of the components for which it is offered draw no more current than a small night light.

DENTED DOME

Q I accidentally bumped the woofer in my speaker system, and its center dome is now dented. I can't tell whether this has caused any bass distortion, but will it ultimately result in either the dome or cone cracking?

GARRY SHIRING
Ford City, Pa.

A Unless you've damaged the central dome (also called a dust cap) so badly that it physically distorts the adjacent voice coil, I doubt that you will hear any sonic ill effects from the dent. And in regard to its effect on the life of the woofer, I don't think you have anything to worry about on that score either. Nevertheless, if you would like to try "pulling" the dent out, you can make an appropriate tool out of a large sewing needle. Heat it in a gas flame until it is red hot. This will allow you to bend about 1/4 inch of its tip at a right angle. Force the needle point through the dome in the dented area and pull the dome back into shape as best you can. Finally, seal the needle hole(s) with a spot of Elmer's white glue applied with your fingertip.

If the damaged dome is metal, the best I can suggest is that you wrap some duct tape around your finger, sticky side out, and try to pull the dent out through the power of adhesion. In any case, since the dented dome is far more likely to offend the eye than the ear, feel free not to do anything about it.

P-MOUNT ADAPTORS

Q Can I buy an adaptor that makes it possible to use a P-mount phono cartridge in a conventional tone arm?

JOHN HICKMAN
Dyersburg, Tenn.

A Yes, but why would you want to? As far as I know, most separately available P-mount cartridges come with adaptors that will fit them into standard tone arms, and at least one company makes an adaptor that plugs into an S-shaped arm with the standard bayonet socket. But P-mount cartridges have no special advantage in conventional arms and may even be at a disadvantage given some of their standardized parameters. And in any case, any worthwhile P-mount cartridge has a conventional-mounting equivalent.

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Electrical and Electronics Division

BY JULIAN HIRSCH AND
CHRISTOPHER GREENLEAF

AUDIA DTX-1000

PART of Clarion's new Audia line of high-performance car stereo equipment, the Audia DTX-1000 includes a cassette player and an AM/FM tuner featuring "diversity reception" for improved FM listening quality. The diversity-reception system uses two separately placed antennas—the Audia DTX-1000 has a separate FM-tuner section for each antenna—and fast-acting sensing and switching circuits to select the better signal at any moment. The rapid switching action is imper-

ceptible to the listener, but the system makes it possible to hear satisfactory FM sound in situations where conventional, single-antenna car receivers are unusable. Signal lights on the DTX-1000's front panel indicate which antenna is in use at any time. (A clear plastic window antenna, together with a connecting cable to the receiver, is provided for cars without a second installed antenna.)

ceptible to the listener, but the system makes it possible to hear satisfactory FM sound in situations where conventional, single-antenna car receivers are unusable. Signal lights on the DTX-1000's front panel indicate which antenna is in use at any time. (A clear plastic window antenna, together with a connecting cable to the receiver, is provided for cars without a second installed antenna.)

Besides the usual features you would expect to see on a car tuner/cassette player in the same price range (separate bass and treble controls, five AM and five FM presets, station scanning, tape program search, a digital clock, loudness compensation, Dolby B noise reduction, high/low tape equalization, and a front/rear fader), the DTX-1000 has a few we haven't seen before. One is the Acoustic Compensation Control, a notch filter that at-

tenuates the response around 180 Hz to reduce the effect of typical car-interior resonances. Another is a "Super SASC" circuit that reduces noise on weak FM signals (controlled with the Dolby B button). Still another is a radio/tape switch that permits changing from one source to the other without inserting or ejecting a cassette. The tape player is one-directional, not auto-reverse, so as to avoid, according to Clarion, the compromises in performance found in many autoreverse players.

The Audia DTX-1000 is designed to be used with separate power amplifiers and comes with output cables and adaptors for them. The chassis box dimensions are 7 $\frac{1}{8}$ x 2 x 4 $\frac{9}{16}$ inches, and the nosepiece is 4 $\frac{1}{8}$ x 1 $\frac{3}{4}$ inches. Price: \$670. Audia by

the circuit to confirm the better specs claimed by the company. The measured frequency response, channel separation, selectivity, and AM rejection were all good, however, and AM frequency response was satisfactory.

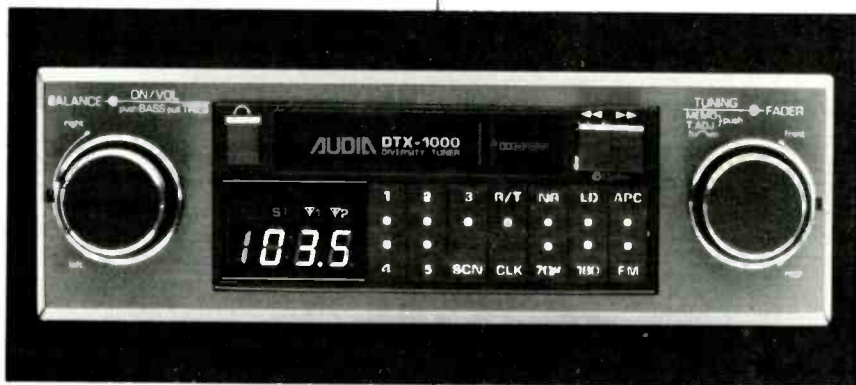
Clarion's installation literature refers to a number of FM-tuner features in the Audia DTX-1000 whose effect could not be measured on the bench because of the operation of the diversity-reception tuning system. These include a keyed AGC circuit to eliminate the need for a local/DX switch (used to prevent FM front-end overload) and a signal-actuated stereo control that blends the channels and reduces high-frequency response at low signal levels or when multipath distortion is detected. The effects of the latter system were not evident in our tests, which showed good stereo performance down to signal levels where noise and distortion became appreciable. The controls and loudness-compensation characteristics were good (the latter boosted both low and high frequencies considerably at reduced volume-control settings). The 180-Hz filter introduced a notch about 12 dB deep at 210 Hz, but it had little effect on frequencies above 400 or below 100 Hz.

Aside from a somewhat fast tape speed, the cassette player's performance was satisfactory. The tape frequency response was very similar for both equalization time constants, although the 70-microsecond response was slightly flatter and extended slightly further above 9,000 Hz. *J.H.*

ROAD TESTS

Three 150-mile round trips from Brooklyn to a recording job in New Haven, Connecticut, gave me a good opportunity to test the Audia DTX-1000's diversity-reception system. Half of the runs were at night and the others at various times of the day, thus giving me a pretty good impression of how the unit works under almost any reception conditions imaginable.

On one of the trips I disconnected the second antenna and confirmed that the system increases actual FM range only a tiny bit. It does, however, make virtually all receivable sig-



Clarion, Dept. SR, 5500 Rosecrans Avenue, Lawndale, Calif. 90260.

LAB TESTS

Our bench tests of the Audia DTX-1000 were made using only a single antenna input. When the unit was first turned on, its maximum audio output (which is adjustable) was 1.3 volts, but after a period of operation the output clipped asymmetrically at about 0.9 volt. Therefore, we kept the output voltage below the latter point for our measurements.

In the bench tests, the FM tuner section was not particularly sensitive, nor were its distortion, capture ratio, or image rejection as good as we would have expected. But, according to Clarion, the sensitivity and capture-ratio measurements are affected by the operation of the diversity-reception switching circuit, and it was impossible to disengage

nals listenable. If I could get stereo from 25 to 30 miles away using one antenna, with two antennas I could almost always get fully listenable

**THE DTX-1000'S
TAPE PLAYBACK
WAS VERY QUIET,
STEADY IN PITCH,
BROAD IN FREQUENCY
RESPONSE, AND
GENTLE ON TAPE.**

stereo at 35 miles. Occasionally I picked up clean stereo from 45 miles away at night, but I usually lost reasonable separation some time before the 40-mile mark. In mono (automatic and nonswitchable with the DTX-1000), the listening range sometimes extended as far as 60 miles, but usually it was slightly less than the 50-mile cutoff I'm used to.

As I drove past the old Brooklyn Navy Yard, invariably a rough place for FM radio, I noticed a few small sputters and one or two "foop-foop" sounds as the tuner tried to keep the signal clean. But I heard almost none of the incredible hash I am used to putting up with in this location. The same held true in most of the other trouble spots in our urban test route. There was nev-

er a hint of cross-modulation or signal overload, nor was there either pumping or fading as the tuner adjusted its sensitivity from spot to spot. Only at the Manhattan foot of the Brooklyn Bridge did I ever lose stations, and then only for brief instants. This is Manhattan's poorest signal area, so getting anything at all there was surprising.

Everywhere I was astonished at the constant flicker of the antenna indicator lights as the diversity system kept switching between them for the better signal. Even standing still, the system responds to passing cars, changing atmospheric conditions, and planes overhead. Rural driving well away from trees and buildings also showed a notable decrease in picket-fencing and other rude FM noises. The improvement was startling in places I have long associated with poor reception. There was some interference, of course, but at much lower levels than any non-diversity tuner has been able to provide. The operation of the noise-reduction circuits for FM was noticeable on weak signals and appeared to increase the effect of the high-blend circuitry.

Tape playback was very quiet, steady in pitch, broad in frequency response, and gentle on the tape. A bad stretch of granite-block streets did cause the tape transport to quiver slightly, but in general it was very well behaved. One day my old, old C-120 test cassette will come to grief in a tangle of dry, brown plastic wrapped around a locked-up cap-

stan, but nothing I did with the Audia DTX-1000's transport controls, including the automatic program search, bothered it a bit.

I was impressed by the tonal flexibility that the four quite simple tone controls gave me. I was able to fine-tune my car's acoustics without once feeling that I really needed a one-third-octave equalizer. Using the loudness control and the 180-Hz filter together with the bass control enabled me to get results I've never managed with any other car stereo, even those with integral five-band equalizers or bass center-frequency selectors. My sole objection was to the amount of hiss and noise in the treble with the loudness control switched in. I can't say whether this was a peculiarity of our test unit or a characteristic of the design, but the

**I WAS ASTONISHED
AT THE CONSTANT
FLICKER OF THE
ANTENNA LIGHTS
AS THE DIVERSITY
SYSTEM KEPT
SWITCHING FOR A
BETTER SIGNAL.**

effect was fairly audible even at high music levels.

The Audia DTX-1000 is a logically arrayed, convenient tuner/tape unit. The controls are easy to operate, the display easy to read both day and night, and the styling attractive. When the ignition is off the display is off, making the unit less attractive to thieves. I certainly didn't miss autoreverse because I have always felt better about using a machine's main direction of play. I'll gladly trade an autoreverse deck's convenience for greater reliability and treble performance.

The Audia DTX-1000 is an excellent overall performer, especially if you regularly drive in FM disaster areas as I do. Returning it after the test period was the only regrettable part of the experience!
**C.G.
Circle 145 on reader service card**

HIRSCH-HOUCK LAB MEASUREMENTS

FM mono usable sensitivity (75-ohm input): 24.7 dBf (4.7 μ V)
Mono 50-dB quieting sensitivity (75-ohm input): 26 dBf (5.5 μ V)
Stereo 50-dB quieting sensitivity (75-ohm input): 43.3 dBf (40 μ V)
Tuner signal-to-noise ratio at 65 dBf: 68 dB
Tuner distortion at 65 dBf: 0.7 per cent
FM frequency response (-3-dB limits): 20 to 16,500 Hz
Stereo separation at 100, 1,000, and 10,000 Hz: 30, 30, and 19 dB
Capture ratio at 65 dBf: 3.6 dB
AM rejection at 65 dBf: 61 dB
Alternate-channel selectivity: 63 dB
Adjacent-channel selectivity: 5.8 dB
Image rejection: 40 dB
AM frequency response (-6-dB limits): 30 to 2,700 Hz
Tape-playback frequency response (standard BASF test tapes, -3-dB

limits): 120- μ s EQ—31.5 to 9,000 Hz; 70- μ s EQ—31.5 to 13,000 Hz
Tape signal-to-noise ratio (referred to 250 nWb/m at 315 Hz): unweighted, 54 dB; with Dolby B and CCIR/ARM weighting, 64.5 dB (120- μ s EQ) and 66.5 dB (70 μ s EQ)
Flutter: \pm 0.15 per cent CCIR-weighted peak; 0.08 per cent JIS-weighted rms
Tape speed accuracy: \pm 1.6 per cent error at start of tape, \pm 1.3 per cent at end
Fast rewind time for C-60: 126 seconds
Tone-control range: \pm 10.5 dB at 100 Hz; \pm 9.5, -11.5 dB at 10,000 Hz
Loudness compensation (at -30-dB volume setting, referred to 1000-Hz output): \pm 12 dB at 100 Hz; \pm 9.5 dB at 10,000 Hz
Amplifier line output into IHF load at clipping (measured at 1,000 Hz): 1.3 volts cold; 0.9 volt warm

Warning: The Surgeon General Has Determined
That Cigarette Smoking Is Dangerous to Your Health.

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Excellence.
The best live up to it.



11 mg. "tar", 0.7 mg. nicotine av. per cigarette by FTC method.

PROTON 930 AM/FM RECEIVER

HIRSCH-HOUCK
LABORATORIES

THE Proton 930 stereo receiver combines a high-performance FM tuner section designed by Larry Schotz with an amplifier capable of driving load impedances as low as 2 ohms at high power levels without damage or excessive distortion. It is rated to deliver 30 watts per channel into 8 ohms. There is an "anti-clipping circuit" designed to reduce the audible consequences of waveform peak clipping and a BASS EQ circuit to correct for the bass-response limitations of many compact speaker systems. Dimensions are 4 x 16½ x 9¾ inches, weight 15¾ pounds. Price: \$360. Proton Corp., Dept. SR, 737 West Artesia Boulevard, Compton, Calif. 90220.

LAB TESTS

The Proton 930 demonstrated an exceptional output-current capability. Its measured 1,000-Hz output power at clipping was 44 watts into 8 ohms, 63 watts into 4 ohms, and 66 watts into 2 ohms. Its dynamic power output was even more impressive: about 54, 78, and 130 watts into 8, 4, and 2 ohms, respectively. Clearly, this is no ordinary "30-watt" receiver!

Our test unit, an early production sample, lacked a final instruction manual as well as any of the per-



PHOTOS BY ROY SCHNEIDER

Features

- Digital tuning (search and step modes)
- Five preset station memories, each usable for one AM and one FM channel
- LED radio signal-strength indicator
- Headphone jack
- Pushbutton control of loudness, tape monitoring for one deck, stereo/mono mode, BASS EQ, two pairs of speaker outputs
- Rear-panel switches for NORMAL or HI speaker load impedance, anti-clipping circuit, MM or MC phono-cartridge
- Two a.c. outlets, one switched
- 75- and 300-ohm FM antenna inputs; hinged, pivoted ferrite AM antenna
- Separate preamp outputs and main amplifier inputs with removable jumpers
- One pair of phono jacks (MM or MC), one pair of line-level VIDEO input jacks (audio signal from VCR, CD player, etc.), one tape loop

tinent performance specifications other than rated output. In a way, this made our tests more interesting, since each measurement showed this to be an even more unusual receiver than we could have expected.

The amplifier distortion of the Proton 930 was not only very low, but it remained low over the full audio range and at any power level up to the clipping point. The noise level was exceptionally low, the phono preamplifier overloaded at the same high level of 210 millivolts over the full audio range, the RIAA equalization was highly accurate and unaf-

ected by cartridge inductance, and so on. The amplifier did shut down as we approached the clipping level when driving 2-ohm loads. An audible click and lapse of a few seconds before the amplifier returned to service suggested that there was a thermal protection system in operation.

We were especially interested in the FM-tuner performance in view of the acknowledged talents of its designer and our previous experience with his products. We were not disappointed. The measured sensitivity was high, and the noise level was as low as we would expect to

find in any competitively priced receiver or tuner. The distortion in stereo was very low—lower, in fact, than we can recall having previously measured in an FM tuner. In only one respect did the FM tuner's performance disappoint us. Its image rejection was so unexpectedly low at 40 dB that we suspect it was only a defect in the early

HIRSCH-HOUCK LAB MEASUREMENTS

Audio Amplifier

1,000-Hz output power at clipping:

44.2 watts into 8 ohms, 63.2 watts into 4 ohms, 66.1 watts into 2 ohms

Dynamic power output: 53.8 watts into 8 ohms, 78 watts into 4 ohms, 130 watts into 2 ohms

Clipping headroom: 1.68 dB (8 ohms)

Dynamic headroom: 2.53 dB (8 ohms)

Maximum distortion from 20 to 20,000 Hz, 30 watts output: 0.0056 per cent

Sensitivity (1-watt output): video, 27 mV; phono (MM), 0.42 mV; phono (MC), 0.033 mV

Signal-to-noise ratio (1 watt):

video, 87.5 dB; phono (MM), 83.5 dB; phono (MC), 71.5 dB

Phono (MM) input overload: 210 mV

Phono (MM) input impedance: 52,000 ohms, 100 pF

Phono (MC) input impedance: 100 ohms

Slew factor: greater than 25

Tone-control range: +8.5, -9.5 dB at 100 Hz; +6.5, -7.5 dB at 10,000 Hz

FM Tuner Section

Usable sensitivity (mono): 11 dBf (2 µV)

50-dB quieting sensitivity: mono, 15 dBf (3.1 µV); stereo, 37.8 dBf (40 µV)

Stereo threshold: 35 dBf (30 µV)

Muting threshold: No muting

THD + noise at 65 dBf (1,000 µV): mono, 0.18 per cent; stereo, 0.1 per cent

Signal-to-noise ratio at 65 dBf: mono, 76 dB; stereo, 69 dB

Capture ratio: 1 dB at 45 dBf (100 µV)

AM rejection: 70 dB at 45 dBf

Image rejection: 40 dB

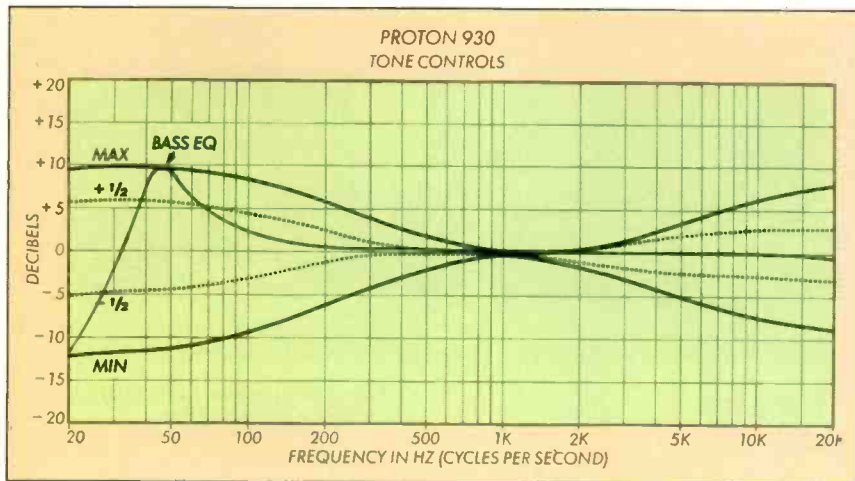
Selectivity: alternate-channel, 96 dB; adjacent-channel, 15.6 dB

19-kHz pilot-carrier leakage: -72 dB

Hum (60 Hz): -62 dB

Stereo channel separation: 31 dB at 30 Hz; 37 dB at 1,000 Hz; 32.5 dB at 10,000 Hz

TEST REPORTS



production sample that we tested. The selectivity of the Proton 930 was among the highest we have ever measured: 96 dB for alternate-channel spacing and almost 16 dB for adjacent-channel spacing. This was even more noteworthy in view of the tuner's low distortion, since distortion usually must be traded off for high selectivity.

Capture ratio and AM rejection were both much better than average. The stereo channel separation was more than adequate and quite uniform. The front-panel LED signal-strength indicators were well spaced, coming on unambiguously at input levels ranging from 23 to 72 dBf (when at least three lights are lit, the full tuner performance is realized). Even the AM tuner had a better than average frequency response, flat within 2.5 dB overall from 26 to 3,300 Hz and down 6 dB at 4,000 Hz.

COMMENTS

The Proton 930's anti-clipping circuit causes the waveform to clip more "softly" than is usually the case. Though in theory this is desirable, we are not necessarily convinced of its practical benefits. We prefer to operate an amplifier well below clipping, and the power reserves of the Proton 930 make clipping even less likely than with most receivers of considerably higher continuous-power ratings. But as far as we can tell, the circuit does no harm and has no detectable or measurable effect below the clipping point.

The BASS EQ is a useful feature that complements the bass rolloff of many compact and bookshelf-sized speaker systems. Its 10-dB peak at about 45 Hz and steep infrasonic rolloff below 30 Hz can greatly enhance the low-bass performance of such speakers (see graph). The BASS EQ response can give an actual reduction in audible rumble instead of the increase likely to result from the

use of a simple equalizer or tone-control circuit for that purpose. The boost frequency is so low that it has no significant effect on most reproduced sound, including voices. But when the program material calls for it, the BASS EQ gives a welcome solidity to the sound of a typical bookshelf-sized speaker system, though without any boominess.

The Proton 930 is conspicuously free of most of the gadgetry and glitter of other recent receivers, but it more than makes up for this by its stellar performance. Its relatively high short-term output power and high-current capability make it a much more "powerful" receiver than its 30-watt rating would suggest. The Schotz FM tuner is, in its own way, even more noteworthy than the amplifier section. Assuming that the somewhat low measured image rejection was a peculiarity of our sample and not typical of the design, this receiver easily outperforms anything we have seen at anywhere near its price.

Julian Hirsch

Circle 140 on reader service card



"The speaker demonstration room will be free in just a few moments, sir. Our manager uses it on occasion when he has to . . . uh . . . speak to one of our salesmen."

4 out of 5 Sony car stereo owners would go down the same road again.

It seems there is one road that most Sony owners would gladly travel again. The road to a Sony car stereo.

In a recent survey, an overwhelming majority of Sony car stereo owners contacted gave Sony the ultimate testimonial. They said they would be more than willing to buy a Sony again*. As one Sony owner, Ronald Dokken of Minneapolis, Minnesota, volunteered, "When there's a car stereo that sounds as good and works as well as a Sony, why would you want another one?"

In fact, most Sony car stereo owners when asked went so far as to say that they would keep their car stereos longer than they'd keep their cars. Or, in the words of Valerie Roussel of New Orleans, Louisiana: "My car was in the shop for a few weeks. I missed my car stereo a lot more than my car." And Mark Share of Tempe, Arizona, added, "I have two cars and two kinds of car stereos. I find myself driving the car with the better sounding one—the Sony."

Which is not at all surprising, considering the fact that Sony car stereos are not just engineered to perform reliably. They are also engineered to deliver brilliant high-fidelity stereo sound. Because they take advantage of the same experience and innovative technology that goes into Sony's home stereos.

So if you're in the market for a car stereo, it makes sense to go down the same road that 4 out of 5 Sony owners would travel.

Buy the Sony.

SONY
THE ONE AND ONLY.

* In an independent survey of 200 recent Sony car stereo purchasers who sent in warranty cards, 85% said they'd buy a Sony again. © 1984 Sony Corp. of America. Sony is a reg. trademark of the Sony Corp., 1 Sony Dr. Park Ridge, NJ 07656



**KENWOOD DP-1100B
CD PLAYER**

**HIRSCH-HOUCK
LABORATORIES**

KENWOOD'S second-generation digital Compact Disc player, the DP-1100B, offers an impressive array of performance and operating features in a low-profile package. It comes with a compact, battery-operated, infrared remote-control unit that not only duplicates the player's extensive front-panel control functions but also has a feature, called M-SCAN, that automatically samples the first 10 seconds of each programmed selection.

Many second-generation CD players have special provisions for improved tracking ability with damaged or defective discs, and the DP-1100B is no exception. Its Optimum Servo Control circuitry

is intended to reconcile two conflicting design goals for the servo-tracking system that makes the player's laser beam follow the spiral pattern of recorded information embedded in a Compact Disc. A high-gain servo tracking system is desirable to increase a player's

resistance to external vibration and shocks. But a high-gain system could also cause a player to be unduly sensitive to minor defects or damage on the discs themselves.

Kenwood's Optimum Servo Control is normally a high-gain system, but internal circuits sense the first signs of a potentially "untrackable" disc defect and temporarily reduce the servo gain so that the laser does not become "de-tracked" as the defect passes. Since damages and defects usually extend over several revolutions of a disc, the system also stores the location of the defect, and during the next revolution the



Features

- Front-loading, motorized disc drawer
- Optimum Servo Control for greater immunity to disc damage and external vibration or shock
- Cueing by track and index numbers
- MUSIC SEARCH controls skip from track to track
- Program audible in fast-forward and fast-reverse modes
- Programmed playback of up to sixteen selections from discs
- containing up to ninety-nine tracks
- Infrared remote control with M-SCAN
- Vacuum-fluorescent displays indicating a properly loaded disc, repeat, programmed playback, M-SCAN mode, track and index numbers
- Time display switchable to show time on current track, time from start of disc, or time from end of disc
- Switchable repeat playback of whole disc or single track
- Headphone output with volume control

servo gain is again lowered at the same point in anticipation of the passing damage.

The DP-1100B is finished in black and measures about 17⁵/₁₆ x 12³/₁₆ x 3¹/₂ inches. It weighs about 15 pounds. Price: \$899. Kenwood Electronics, Dept. SR, 1315 East Watsoncenter Road, Carson, Calif. 90745.

LAB TESTS

The performance of the Kenwood DP-1100B, like that of every other correctly functioning CD player we have tested, was superb, usually taxing the abilities of our test instruments to their utmost. The only departure from near-ideal audio per-

formance (and it was a trivial one) was a difference in the left- and right-channel output levels of just over 0.5 dB. This could easily have been a characteristic of our test sample alone. Besides, the inherent unbalance in just about any other program source, to say nothing of the rest of a stereo system, is likely to be at least this great.

There was a moderately high phase shift between the outputs of the two channels at the highest audio frequencies, less than a few degrees at 1,000 Hz and increasing to 43 degrees at 10,000 Hz and 75 degrees at 20,000 Hz. This phase shift has no audible significance that we are aware of. It merely suggests that a single digital-to-analog-converter

integrated circuit is being switched to supply both channels, an alternative to using a separate converter for each channel.

In our tests, the DP-1100B did a nearly perfect job of tracking the calibrated defects on the Philips TS4A test disc, failing only to track the largest (800-micrometer) black dot painted on the disc's

HIRSCH-HOUCK LAB MEASUREMENTS

- Maximum output level:** 1.88 volts
- Headphone output:** 8-ohm, 0.18 volt; 600-ohm, 4.9 volts
- Total harmonic distortion at 1,000 Hz:** 0.0011 per cent referred to 0 dB; 0.0019 per cent referred to -10 dB; 0.007 per cent referred to -20 dB
- Intermodulation distortion:** 0.003 per cent referred to 0 dB; 0.011 per cent referred to -20 dB
- Signal-to-noise ratio:** 90 dB unweighted; 94 dB A-weighted
- Channel separation:** 108 dB at 1,000 Hz; 73.5 dB at 20,000 Hz
- Frequency response:** +0.4, -0.1 dB from 20 to 20,000 Hz
- De-emphasis accuracy:** -0.04 dB at 1,000 Hz; -0.12 dB at 5,000 Hz; -0.15 dB at 16,000 Hz
- Cueing time:** 5.5 seconds
- Impact resistance:** top, A; side, A; front, A
- Cueing accuracy:** A -
- Defect tracking** (figures are size of the largest defect successfully tracked): signal-surface damage, 900 micrometers; painted dots, 600 micrometers; simulated fingerprint, pass



PERHAPS THE ONLY PIECE OF HOME ENTERTAINMENT EQUIPMENT THAT CAN'T BE CONTROLLED BY THE SX-V90 RECEIVER.

One look at the diagram to the right should convince you that the SX-V90 audio receiver isn't merely an audio receiver.

In fact, it might just be the most revolutionary piece of equipment in the entire home entertainment revolution.

Because it serves as a control center for more pieces of audio and video equipment than any other competitive product of its type.

Through the SX-V90, you can channel two VCRs (of any format), one TV monitor, one regular TV, one video disc, one compact disc, two cassette decks, two turntables, and one video game or one computer.

But not only does the SX-V90 have the best connections in the business, it also has ingenuity: Because as well as reproducing video sourced signals (such as MTV), it creates simulated-stereo imaging from any mono signal (such as regular TV).

In short, it turns your television into a stereo.

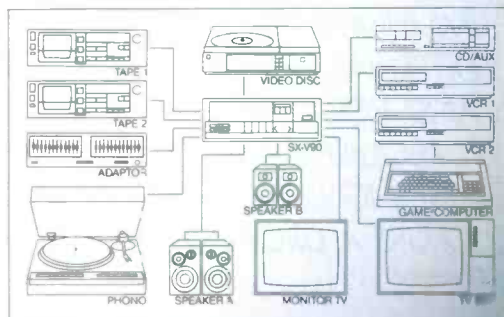
As for the quality of the stereo, with its advanced DDD tuner technology, and 125 watts of power

per channel minimum (at 8 ohms, from 20-20,000 Hz with no more than 0.005% THD), the

SX-V90 ranks at the top of audio receivers.

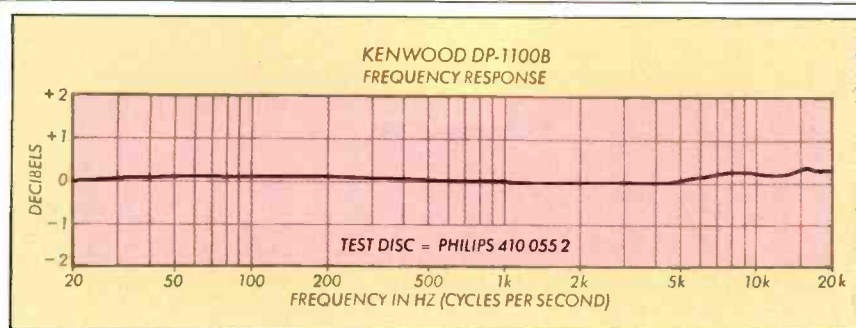
Which is a very important point.

Because there's no sense in investing in a control center, only to have it sound like it has a built-in popcorn popper.



PIONEER
Because the music matters.

TEST REPORTS



surface. And it was easily the best CD player we have yet tested in terms of immunity to external

IT WAS EASILY THE BEST CD PLAYER WE HAVE YET TESTED IN TERMS OF IMMUNITY TO EXTERNAL SHOCK AND VIBRATION. IT REQUIRED A STRONG BLOW TO CAUSE A DROPOUT.

shock and vibration. Not only did it ignore moderate blows to its external surfaces (any of which would have caused a phono stylus to leave the groove and jump about), but it actually required a strong blow, delivered with genuine effort, to cause a momentary dropout of the program. This is in striking contrast to most of the first-generation CD players we tested last year, which required rather careful handling to avoid such effects. Most CD players, however, are fairly resistant to common feedback effects.

We judge the cueing accuracy of a CD player by how effectively it handles the transition from Track 17 to Track 18 of the Philips TS4 sampler disc. There is no blank space between these two tracks, and the playback goes directly from the end of No. 17 to the vocal beginning of No. 18. Most players detectably clip the first syllable of Track 18, some

lose much of the first word, and a very few make the transition perfectly. The DP-1100B was *almost* perfect, rating an A- in this respect. Sometimes we could detect the loss of what we would guess to be a few milliseconds of Track 18, but on other tests the transition was perfect.

COMMENT

The Kenwood DP-1100B was a very easy player to use (although the manual should be read carefully if you want to take full advantage of its many features). The front panel presents a relatively uncluttered and nonformidable appearance, yet the only programming features available on the other players that it lacks are time cueing and phrase repeat.

The remote control worked well,

although it should not be too far from the player for most effective use. On the other hand, the range of the infrared system is considerably greater than the ability of most people to read the illuminated legends in the display window of the DP-1100B, without which one often cannot be certain of the operating status of the unit. We were surprised to find that the remote-control unit has an on/off switch, unlike all other similar units we have seen on other equipment.

The headphone output was excellent, more than adequate to drive any medium-impedance headset to a satisfactory listening volume. This feature is often omitted from CD players, but we would consider its inclusion well worth any modest added cost.

The Kenwood DP-1100B combines great programming flexibility with a straightforward, easy-to-use system of operation. A similarly effective compromise between divergent ideals is evidenced by its fine disc-tracking ability combined with outstanding resistance to external shock and vibration. This product is yet another example of the genuine (as opposed to merely cosmetic) improvements available in second-generation CD players.

Julian Hirsch

Circle 141 on reader service card



"... Of course, sir, you understand it will sound different in your home. The bales of peat moss tend to make this a rather 'dead' area. . . ."



You've got what it takes.
Salem Spirit

*Share the spirit.
Share the refreshment.*

Warning: The Surgeon General Has Determined
That Cigarette Smoking Is Dangerous to Your Health.



**DENON DR-M44
CASSETTE DECK**

**HIRSCH-HOUCK
LABORATORIES**

DENON, a division of Nippon Columbia, is probably best known to audiophiles in the U.S. for its high-quality turntables and digitally mastered LP's and Compact Discs. The company is very active in the tape field also, as exemplified by the DR-M44 cassette deck. A three-head, dual-capstan model, the DR-M44 includes an automatic tape-optimizing circuit and both Dolby B and Dolby C noise reduction.

A d.c. servomotor directly drives the main capstan. A second servomotor belt-drives the second capstan, which differs slightly from the first in diameter and rotational speed. This design feature isolates the tape as it passes across the heads and thus helps minimize wow and flutter. The separate record and playback heads (mounted in a common case) permit immediate monitoring of the recorded signal and enable each head's magnetic gap to be sized optimally for its function.

The DR-M44's conventional cassette well is illuminated from the rear to show the tape remaining. Its door is transparent, affording full label visibility, and removable for head cleaning and demagnetizing. Sensors inside the well detect the cutouts on the rear of the cassette shell and automatically switch the bias and equalization for the fac-



Features

- Four-digit fluorescent tape counter
- Memory rewind to 0000 on counter
- Selectors for Dolby B, Dolby C, or no noise reduction
- Twelve-segment-per-channel fluorescent peak-reading record-level indicators, -20 to +8 dB
- Playback level control
- External timer-activated record or playback switch
- Pause/record mute switch
- Switchable FM-multiplex filter
- Front-panel headphone jack
- Rear-panel connector for optional remote control

tory-reference ferric, CrO₂-type, and metal tape formulations. The selections cannot be overridden. When tape types are changed, an illuminated rectangle beneath the fluorescent record-level indicators changes position to show the recommended maximum peak-input levels.

To optimize the deck's internal adjustments for the slightly different needs of various tape brands, there is an AUTO TUNING START button that activates a built-in microprocessor program. This recalibrates the deck's bias and tape-sensitivity adjustments, stores the new settings in memory, and rewinds the tape to the point where the fine-tuning process began. The procedure takes only 7 or 8 seconds. Repeated-

ly pressing the MEMORY/REFERENCE switch during recording permits instant comparisons between the factory-reference and optimized settings. While many decks have tape-optimizing systems, no other within our recollection permits a user to monitor their effects directly.

The DR-M44's dimensions are 18 1/4 x 4 1/2 x 11 1/4 inches, and it weighs about 14 pounds. There are no microphone inputs. Price: \$599.95. Denon America, Inc., Dept. SR, 27 Law Drive, Fairfield, N.J. 07006.

MEASUREMENTS

The playback frequency response of the DR-M44, as measured with our IEC-standard tapes, was very smooth. With the ferric (120-microsecond) test tape it fell within +1.5, -3 dB over the 31.5- to 18,000-Hz calibrated range. With the CrO₂ (70-microsecond) tape the variation was even smaller: +2, -0 dB. There was no sign of fluctuations in low-frequency response (so-called "head bumps").

HIRSCH-HOUCK LAB MEASUREMENTS

Fast-forward time (C-60): 92 seconds

Rewind time (C-60): 91 seconds

Speed error: +0.5 per cent

Dolby tracking error: +0, -1 dB with Dolby B; +2, -1.5 dB with Dolby C

Wow-and-flutter: 0.023 per cent wrms; 0.036 per cent DIN peak-weighted

Line input for indicated 0-dB: 76 mV

Line output at indicated 0-dB: 0.76 volt

Meter indication at IEC-standard 0-dB: +1 dB

Tape used: Denon DX4 (Type I, ferric)

IEC 0-dB distortion: 0.67 per cent

Meter indication at 3 per cent

third-harmonic distortion: +4.5 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR/ ARM
NR off	52.1	55.2	54.4
Dolby B	59.6	66.4	64.7
Dolby C	62.5	73.2	74.2

Tape used: Denon DX7 (Type II, chrome-equivalent)

IEC 0-dB distortion: 1.75 per cent

Meter indication at 3 per cent

third-harmonic distortion: +3 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR/ ARM
NR off	52.5	57.5	54.9
Dolby B	58.6	66.0	65.1
Dolby C	61.0	73.3	74.3

Tape used: Denon DXM (Type IV, metal)

IEC 0-dB distortion: 1.1 per cent

Meter indication at 3 per cent third-harmonic distortion: +5.1 dB

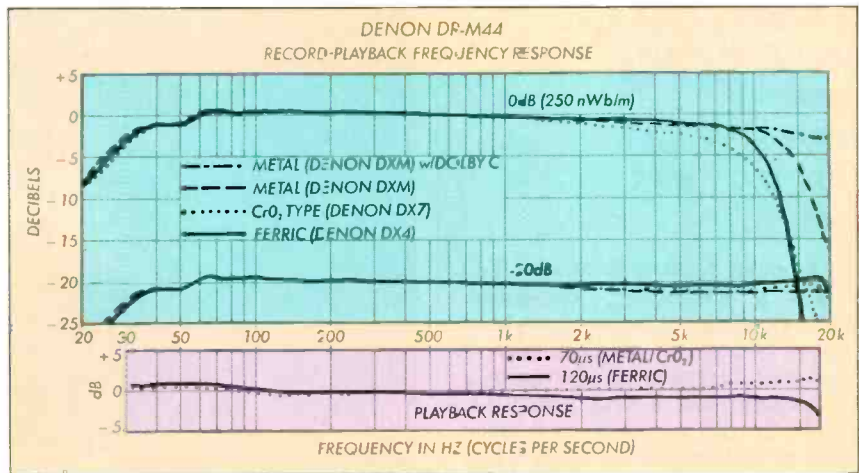
Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR/ ARM
NR off	53.8	58.4	55.7
Dolby B	59.8	66.7	65.9
Dolby C	62.2	74.4	75.3

Overall record-playback measurements were made using the Denon DX4 (ferric), DX7 (CrO₂-equivalent), and DXM (metal) tapes for which the DR-M44 was factory adjusted. We also checked the deck's performance with a number of more readily available tapes from Maxell, TDK, BASF, and Scotch. The automatic optimizing system was especially useful in this regard, taming an excessive (+6-dB) treble peak we found with Maxell XLI-S and properly increasing (by 2 dB) the tape sensitivity for BASF Pro II Chrome. Scotch XS I and XS II were extremely similar to the corresponding Denon formulations, and TDK SA was so close that the effect of optimizing, though measurable, was inaudible.

Using the Denon tapes, frequency response at the customary -20-dB level measured ± 1.5 dB from 40 to 20,000 Hz with all three tape types. Below 40 Hz the response dropped sharply, a characteristic of many cassette decks. The IEC reference level of 0 dB (250 nanowebers/meter) registered +1 on the DR-M44's indicators. At these levels the superior treble storage capacity of the metal tape is evident from the graph. Because Dolby C reduces the normal record treble pre-emphasis, the metal-tape response extended out to 20,000 Hz -3 dB.

The signal-to-noise ratios of the Denon DR-M44 were very good, as



The upper curves indicate overall record-playback response at the manufacturer's indicated 0-dB recording level using the tapes designated on the graph. In the center are the same measurements recorded at -20 dB relative to the upper curves, a level used for frequency-response measurements. Bottom curves show playback response with calibrated test tapes and indicate performance with prerecorded tapes.

were the wow-and-flutter measurements. Tape speed error was about average. Fast-winding times were on the slow side, but not exceptionally so, and the line input and output levels were entirely normal.

COMMENT

We found that the DR-M44 did an excellent job playing prerecorded cassettes and in dubbing and playing back material from both LP's and CD's. Wow-and-flutter was notable only for its absence, and with Dolby C hiss was noticeable only

against the virtually silent background of a wide-range digital source.

We have had occasion to criticize a number of automatic tape-opti-

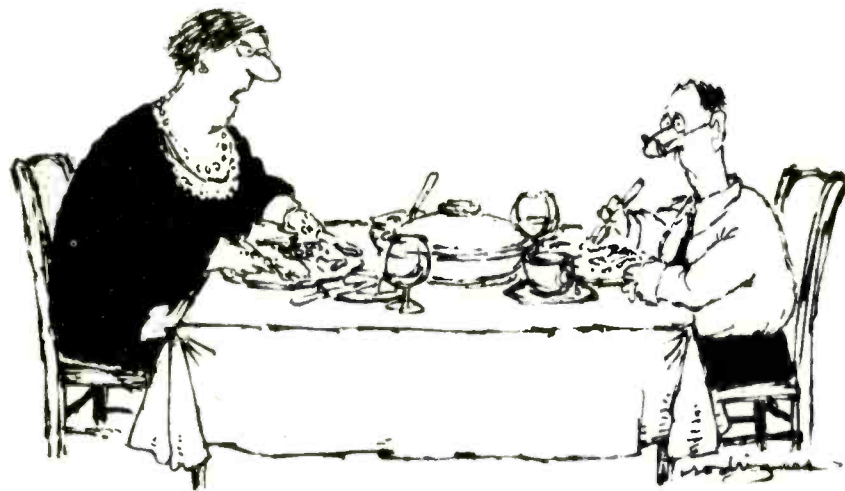
WE FOUND THAT THE DENON DR-M44 DID AN EXCELLENT JOB PLAYING PRERECORDED TAPES AND DUBBING FROM BOTH LP'S AND CD'S.

mizing systems, but the one in the DR-M44 did its job properly. We were particularly pleased at the ability to make direct comparisons between optimized and factory-set performance—one feature we would like to see widely emulated.

Nor could we fault the human engineering of the deck, except perhaps for its somewhat slow rewind speed. Others might find a single-memory rewind-to-stop insufficient automation, but we did not.

In short, the Denon DR-M44 has the features and performance we like to find in a cassette deck, and we can recommend it without hesitation.

Craig Stark
Circle 142 on reader service card



"I said 'No' and I mean 'No,' Robert! You are not going to purchase a tuner that has rhodium-plated jacks, and if I hear one more word about Bill Hoffman's tuner with the rhodium-plated jacks, you can leave the table!"

HARMAN KARDON
T60 TURNTABLE

HIRSCH-HOUCK
LABORATORIES

HARMAN KARDON'S Model T60 is a single-play, two-speed, semiautomatic turntable whose heavy (4-pound) die-cast aluminum-alloy platter is belt-driven by a servo-controlled, quartz-locked d.c. motor. Special measures have been taken to reduce the turntable's susceptibility to external vibrations.

The T60's base is made of high-density particle board chosen for its acoustical damping properties. The platter and tone arm are rigidly mounted on a floating subchassis that is suspended as a unit from the base on compliant isolation springs. The center of gravity of the suspended system is located on the center axis of the platter to improve the stability of the subchassis. Four large feet support the base, each one adjustable for leveling the turntable.

The relatively thin rubber mat that covers the platter of the T60 is said to have only a few thousandths of the rebound coefficient of the typical rubber turntable mat. In other words, it forms an acoustically absorbent "dead" layer that minimizes the transmission of vibrations from the platter to the stylus tip. Also assisting in this regard is a 1-pound disc "stabilizer" that comes with the turntable. When placed on the spindle, it presses the disc firmly against the mat.

The tone arm's cueing lever operates with a definite toggle action, remaining either up or down and causing the arm to lift or descend at a fixed rate virtually independent of the rate at which the lever is moved. Lifting the arm from its rest starts the motor. During play, the arm is not coupled to any internal mechanism, but it can be set to lift automatically at the end of play



Features

- Vernier speed control
- Weighted disc stabilizer with stroboscope markings for 33 1/3- and 45-rpm speeds and 50- and 60-Hz line frequencies
- Low-mass tubular tone arm with plug-in headshell
- Highly damped rubber platter mat
- Defeatable auto-lift function at end of play
- Arm capacitance-trim control, which adds 100 or 200 pF to basic arm and cable capacitance
- Gold-plated signal jacks and cable plugs
- Operating controls that are accessible when dust cover is lowered

(this also shuts off the motor but does not return the arm to its rest).

Other unusual features of the HK T60 include a three-position cartridge-load capacitance switch and separate 1-meter-long low-capacitance cables for connecting the turntable to an amplifier. The complete unit weighs 20 pounds, counting the disc stabilizer, and measures 17 1/2 inches wide, 15 1/4 inches deep, and 5 3/8 inches high. Price: \$440. Har-

man Kardon, Dept. SR, 240 Crossways Park West, Woodbury, N.Y. 11797.

MEASUREMENTS

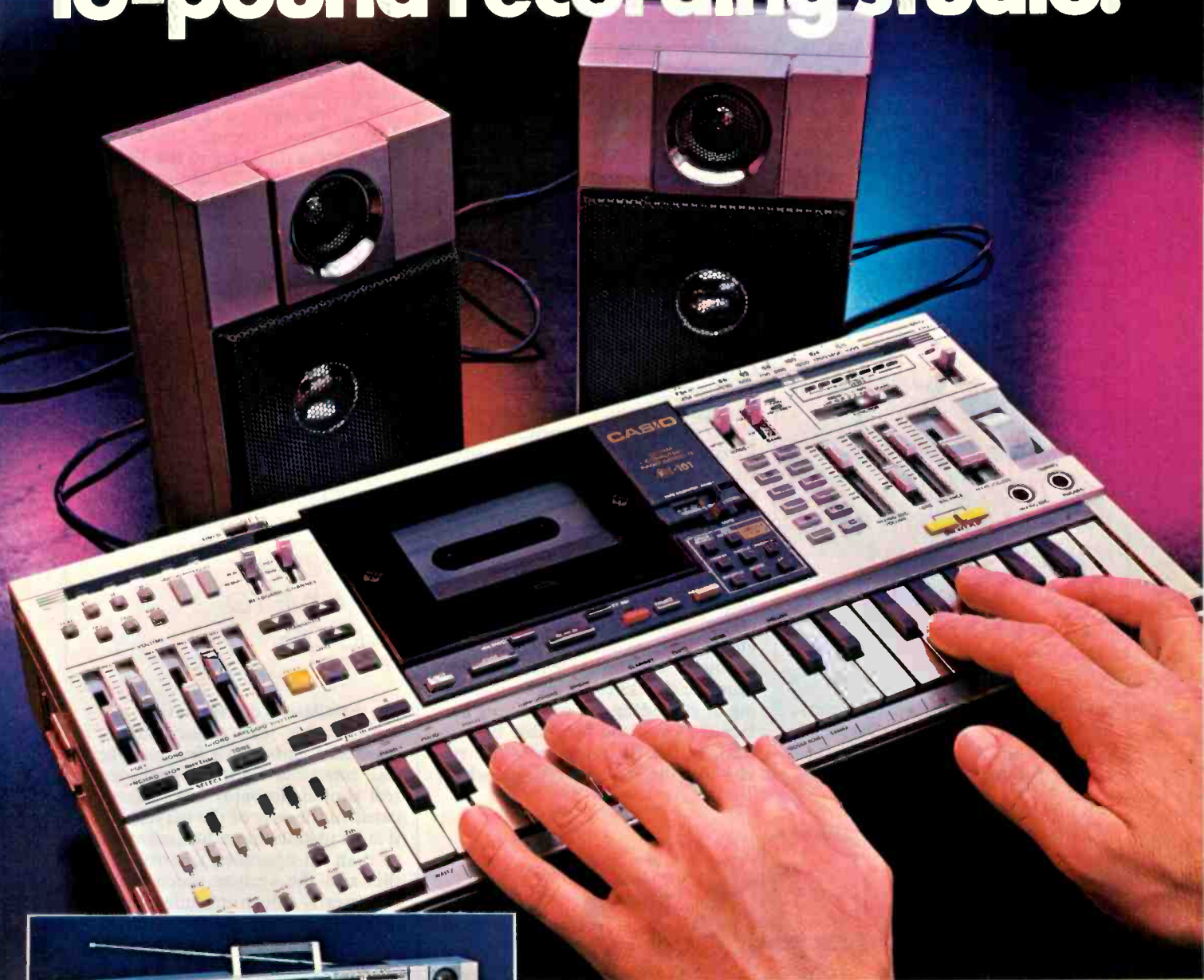
We installed a cartridge in the arm of the T60 with the help of a template and tracking-error protractor supplied by Harman Kardon. When adjusted according to the instructions, the tracking-error and stylus-

force calibrations are very accurate. The antiskating adjustment, as in most tone arms we have tested, gave optimum correction when set a few tenths of a gram higher than the indicated tracking force. Unlike most other turntables, the T60's antiskating compensation did not cause a significant out-

HIRSCH-HOUCK LAB MEASUREMENTS

- Flutter:** 0.075 per cent JIS-weighted rms; ± 0.1 per cent DIN peak
- Principal flutter frequencies:** under 5 Hz with a 20-Hz component about 15 dB lower in level
- Rumble:** -40 dB unweighted; -62 dB ARLI weighted
- Tracking-angle error:** maximum of 0.25 degree per inch at 4-inch radius
- Effective tone-arm mass:** 10 grams
- Tracking-force calibration error:** none from 0.5 to 1.5 grams; 0.05 grams low at 2- and 2.5-grams settings
- Capacitance of connecting cable:** 25 picofarads (pF)
- Total capacitance of arm and cable:** 100 pF
- Added switched capacitance:** 100 or 200 pF, as marked
- Speed adjustment range:** +4 to -3.6 per cent at 33 1/3-rpm setting; +5.8 to -4.6 per cent at 45-rpm setting
- Warp tracking ability:** about average

Casio introduces the 16-pound recording studio.



The Casio KX-101.

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ward drift of the arm when the cueing device was used. The 10-gram net effective mass of the tone arm was slightly less than average, and we would describe it as a low-medium-mass arm. With our test cartridge, it resonated at a nearly ideal 8 Hz.

The unweighted rumble of the T60 was among the lowest we have yet encountered, although the relatively high motor speed—compared to that of a direct-drive motor, for

THE UNWEIGHTED RUMBLE OF THE HARMAN KARDON T60 TURNTABLE WAS AMONG THE LOWEST WE HAVE YET ENCOUNTERED IN TESTING.

example—placed the principal rumble component around 9 Hz. This prevented the ARLI-weighted rumble measurement from being as out-

standing as the unweighted measurement. Nevertheless, the ARLI reading of -62 dB was considerably better than most of the measurements we have obtained from other turntables.

Considering the T60's very compliant turntable suspension, which appeared to resonate at a few hertz, the transmission of audio frequencies through the mounting feet was surprisingly high. Although there was no measurable transmission above 100 Hz, the major modes at 10 to 25 Hz and at 45 to 55 Hz were comparable to those we have measured on many conventionally suspended turntables. As usually happens, operating the turntable with its cover raised greatly increased its susceptibility to base-conducted vibration.

COMMENT

The Harman Kardon T60 is a very solidly built, smoothly operating record player. If it is placed on a rigid surface, as the instructions recommend, the turntable is nearly immune to shocks resulting from striking or pounding the supporting surface (or even the turntable base itself). But if the support is *not* rigid—like the steel shelves on which

we placed the unit—even a slow, gentle pressure on the supporting surface can rock the turntable on its soft mountings and cause mistracking or groove skipping. This is not a fault, nor is it unique to the T60—it is characteristic of any turntable suspension with a lightly damped or totally undamped infrasonic resonance frequency—but it is a possi-

THE T60 IS A VERY SOLIDLY BUILT, SMOOTHLY OPERATING RECORD PLAYER. IF IT IS PLACED ON A RIGID SURFACE, IT IS NEARLY IMMUNE TO SHOCKS.

ble installation consideration.

Switchable load capacitance is a good idea, although a few amplifiers also offer this feature, but the control should probably have been located in the rear of the player, since it is an installation adjustment rather than an operating control. Both this and the vernier speed control are nearly flush-mounted knobs meant to be turned with a coin.

The operation of the T60 could hardly be simpler, and we found the automatic motor turn-on when the arm is lifted an ideal arrangement. It eliminates the need for a power switch, which we did not miss for an instant. Even when the automatic end-of-play arm lift is activated, the pickup can be cued to the inner grooves of almost any record *without* triggering the lift mechanism, a felicitous touch not always found on automatic turntables.

All things considered, our experience with the Harman Kardon T60 showed it to be an excellent turntable—easy to set up and use, attractively styled, and reasonably priced.

Julian Hirsch
Circle 143 on reader service card



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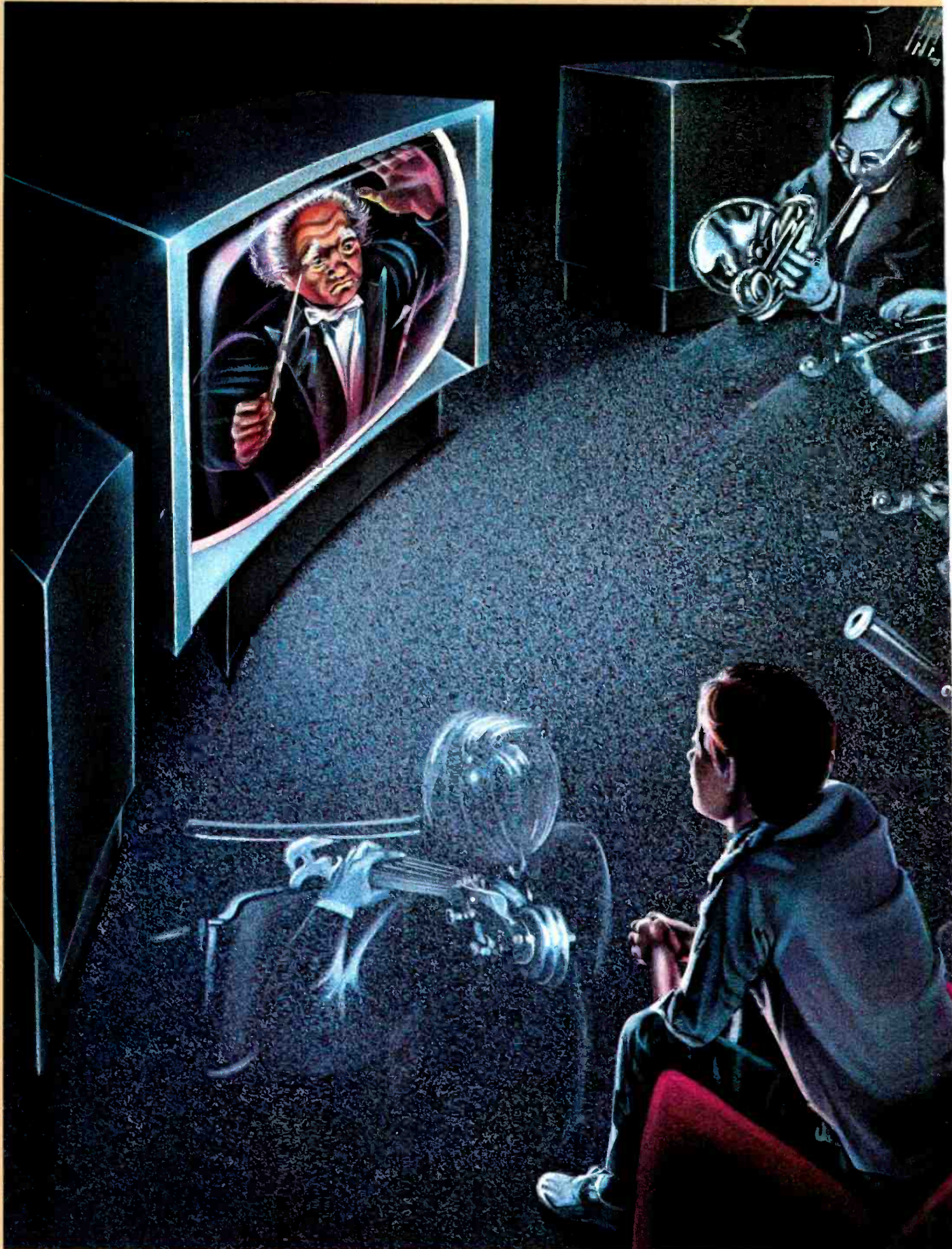
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9 mg "tar," 0.6 mg nicotine av. per cigarette, FTC Report Mar '84







STEREO TV HERE AT LAST

EXTENDING SOUND BEYOND THE
SCREEN ADDS GREATLY TO THE
ENJOYMENT OF MUSIC ON TELEVISION.

BY LEN FELDMAN

IT'S been available in Japan for more than five years, in West Germany for more than three. Now, after lengthy and exhaustive testing, it is finally available in the U.S. "It" is stereo TV—or, as the industry prefers to call it, "multichannel sound for TV."

The difference in terminology reflects the fact that in the United States interest in multichannel sound for TV broadcasts extends beyond just stereo music. There are many areas of the country populated by Spanish-speaking groups, for instance, and having multiple audio channels available for TV also means being able to transmit a second-language soundtrack for network TV programs or being able to broadcast foreign films with soundtracks in both English and the original language.

While the Japanese and German systems give broadcasters the option of either stereo or dual-language mono sound, the system being launched in the U.S. makes provision for high-fidelity stereo audio and a simultaneous second language in lower-fidelity mono.

GENESIS

Way back in 1959, when the Federal Communications Commission was considering systems for stereo FM broadcasting, the question of stereo sound for TV was also raised. At

that time, however, the consensus was that stereo sound mated with the small-screen pictures of a typical TV set would be distracting and unsatisfying, and further consideration of two-channel sound for TV was dropped.

But since then the viewing and listening public has become familiar with simulcasts (TV for picture, stereo FM radio for sound) of concerts, operas, and other musical fare. We have learned that stereo sound adds to the enjoyment of video concerts even though the sonic image often extends well beyond the TV screen.

THE CHANGEOVER

By the late Seventies, strong interest in multichannel TV sound, particularly on the part of broadcasters seeking second-language capability, led to the establishment of a subcommittee of the Electronic Industries Association (EIA) for the purpose of testing and evaluating means of providing it. After nearly five years of intensive effort and many laboratory, broadcast, and listening tests, the committee published two large volumes of data intended to assist representatives of the electronics and broadcasting industries in voting on a single standard for multichannel sound.

It was determined early on that all the proposed transmission systems

would entail an unavoidable and unacceptable increase in noise level from mono to stereo of about 15 dB. While not as bad as the 23-dB or so noise difference between mono and stereo FM radio, this effect was found to result in poor sound quality for listeners in suburban weak-signal areas. Therefore, the search for a transmission or modulation system compatible with present-day mono TV sound was expanded to include tests for audio noise-reduction systems that could maintain high-fidelity audio quality in stereo TV sound.

To avoid altering TV sound for those who would still be listening in mono, it was decided that noise reduction would be applied only to the stereo "difference channel," not to the mono "sum channel," which mono listeners would continue to receive as before. Noise reduction, or companding, would also be applied to the second-language channel, or "secondary audio program" (SAP), which has a rather poor signal-to-noise ratio without it.



Mitsubishi's CM-2501 component color monitor includes stereo inputs and speakers for use with a stereo VCR or TV tuner.

The winning modulation system was proposed by Zenith, and the chosen companding system came from dbx. Once the industry vote for a single standard system was taken, the results were submitted to the FCC. And at the end of last March, the FCC issued a limited "free-market" decision—saying in effect that any stereo-TV transmission system could be used as long as it was compatible with a specific set of technical parameters. Those parameters match the parameters of the Zenith/dbx system.

Most of the legal impediments having been cleared up by this ruling, both broadcasters and equipment makers have begun gearing up for the arrival of stereo and bilingual TV. The ABC TV network even announced tentative plans (which have since been shelved, we understand) to televise this summer's Olympic Games from Los Angeles using stereo and bilingual sound channels.

The coming of stereo TV and bilingual broadcasting will have a profound effect both on the way we use our audio and video equipment and on the types of components we'll be able to buy in the future. To begin with, you can expect TV/FM simulcasts gradually to disappear. The FCC has tolerated such duplication of audio programming on TV and FM only because until now there was no other way to obtain stereo sound for TV programs.

But the chosen system for stereo/bilingual TV sound in no way makes anyone's present TV set "obsolete." The many millions of mono

THE TECHNICAL DETAILS OF STEREO TV

A broadcast television signal is a very complex waveform that has to carry a great deal of information. It can be analyzed as two separate signals mixed together: a video carrier and an audio carrier. Most of the broadcast signal's energy is in the video carrier, which carries the TV picture and the signals

radio broadcast. But in order to transmit stereo sound and bilingual programming, subcarriers have been added. In the stereo TV system developed by Zenith, the modulation of the main audio channel consists of a left-plus-right (L + R) audio signal summing the two stereo audio channels. This makes it compatible with mono TV's.

The channel-difference audio signal (L - R) causes double-sideband, suppressed-carrier amplitude modulation of a subcarrier at twice the TV horizontal scanning-line rate (which is 15.734 kHz). The bandwidths of both the sum and difference audio signals extend to 1.5 kHz (as in stereo FM radio broadcasting), and the pre-emphasis of the main signal (L + R) during transmission remains 75 microseconds (also as in FM radio). The pre-emphasis of the L - R signal, however, is controlled by the companding noise-reduction system.

The subcarrier for the secondary

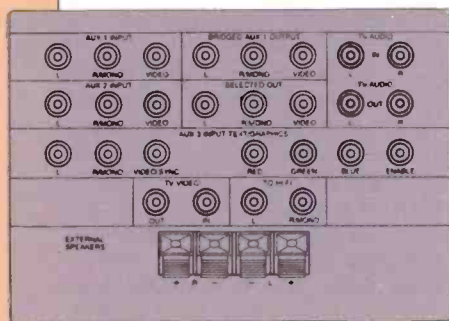
audio program (SAP) is five times the horizontal line rate, and it is frequency-modulated by an audio signal limited in bandwidth to 10 kHz. The SAP channel's pre-emphasis is also part of the companding system.

Still another subcarrier is provided for in the Zenith stereo TV system. Known as the "professional subchannel," this is intended for transmitting data or low-fidelity voice programs. Its frequency is six and a half times the horizontal line rate, and the audio bandwidth is limited to 3.4 kHz.

Finally, to supply a synchronizing signal to the stereo TV decoding circuitry, there is a pilot tone at the horizontal line rate. Its function is similar to that of the 19-kHz pilot tone in stereo FM radio.

NOISE REDUCTION

Some sort of audio compression during transmission and equivalent



Rear panel of RCA's first stereo TV

devoted to turning a black-and-white scene into one in full color.

The audio carrier used to be a fairly simple signal, like a mono FM

TV sets currently in use will continue to receive a monophonic signal even when stereo is broadcast, just as you can hear a stereo FM broadcast on a mono radio. Of course, you won't be able to receive any second-language broadcast on your old TV set unless it is one of the few that are "stereo-ready." But the companies selling stereo-ready sets (usually using some form of multiplex-output jack) will surely offer adaptors to convert them to full stereo/bilingual operation. (Sony and General Electric have already introduced such devices for their stereo-ready sets.)

If your set *isn't* stereo-ready, you can, of course, wait for the introduction of all-in-one stereo TV sets equipped with twin integral or detachable speakers, but that will mean discarding your present TV or moving it to another, secondary viewing location. If you own a good stereo component system, you probably won't want to convert to stereo TV via an all-in-one set. Rather, taking the same component approach that works so well for high-fidelity audio systems, you will want to integrate stereo TV sound into your existing stereo system and use your present amplifier or receiver

THE COMING OF STEREO TV WILL HAVE A PROFOUND EFFECT ON THE WAY WE USE OUR AUDIO AND VIDEO EQUIPMENT AND ON THE TYPES OF COMPONENTS WE'LL BE ABLE TO BUY.

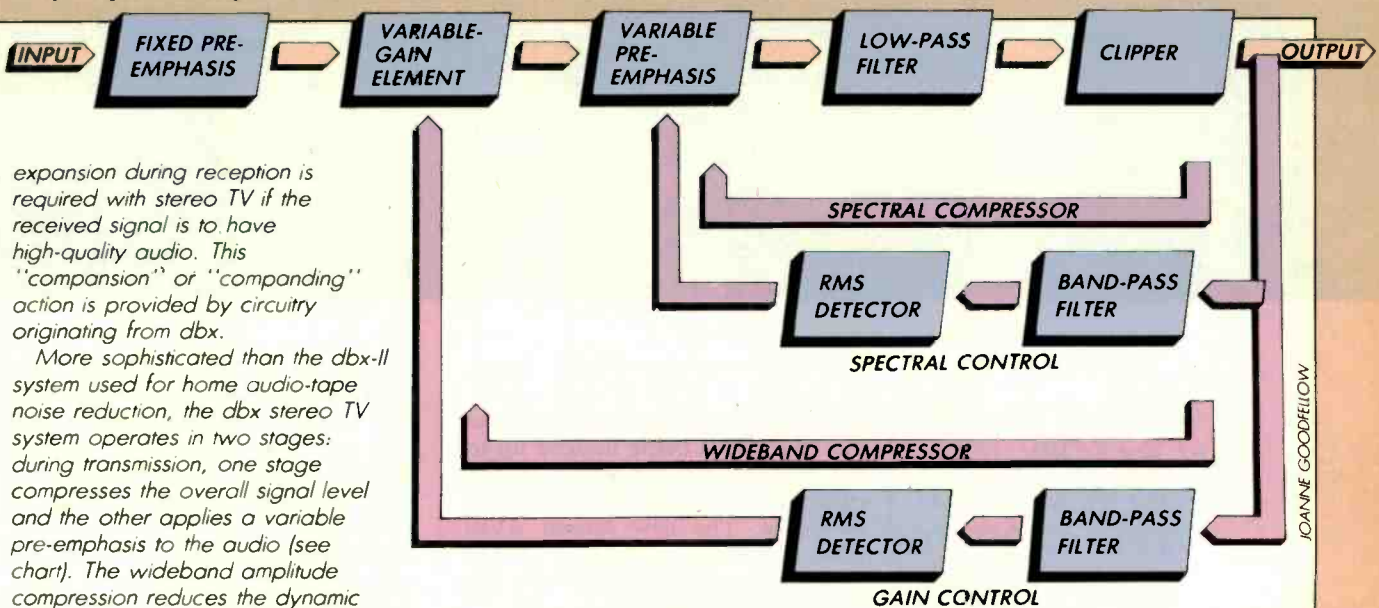
er and loudspeakers, which are bound to be better than those supplied with almost any television set or monitor.

For some years now, leading manufacturers of video products have offered video components as well as complete television receivers. A video system usually consists of a TV tuner and a separate TV monitor. The TV tuner resembles an audio tuner or receiver. Before long, manufacturers will be offering stereo TV tuners whose audio output jacks can be fed into any unused

high-level input (aux, tape, or tuner) on an audio amplifier or receiver.

Such tuners will have the required decoding circuitry built in, and switches will select either stereo audio or bilingual outputs. The more elaborate models may also have video outputs, for feeding a TV monitor, or stereo FM radio outputs. If you already own a good color TV set, though, you may prefer to buy a tuner that provides only the audio signals broadcast with the video. Then you can continue to watch your present set, but with the volume turned all the way down, and listen either to high-quality stereo-TV sound or a secondary audio program through your stereo sound system.

The beginning of stereo TV broadcasting is the most significant step taken yet toward the final integration of audio and video. More than likely, this new service will have as profound an effect on the future of audio in the home as did the coming of stereo FM more than twenty-three years ago. Like the more recent introduction of the digital Compact Disc, stereo TV promises to bring us closer to you-are-there realism in electronic home entertainment. □



expansion during reception is required with stereo TV if the received signal is to have high-quality audio. This "compansion" or "comanding" action is provided by circuitry originating from dbx.

More sophisticated than the dbx-II system used for home audio-tape noise reduction, the dbx stereo TV system operates in two stages: during transmission, one stage compresses the overall signal level and the other applies a variable pre-emphasis to the audio (see chart). The wideband amplitude compression reduces the dynamic range required in the transmission channels (the L - R difference signal and the SAP channel). The variable pre-emphasis system is a spectral compressor able to boost or cut high-frequency levels depending on the spectrum of the audio signals. A stereo TV receiver or tuner undoes all this compression with equivalent but opposite expansion.

The spectral- and wideband-compressor loops in dbx's noise-reduction encoder for stereo TV act to reduce the dynamic range of the transmitted signal.

Special rms detectors control both amplitude and spectral compansion circuitry in order to minimize sensitivity to interfering impulse noises while maintaining appropriate reaction times for music signals to prevent noise "pumping" and "breathing."

A limiter is provided within the dbx TV encoder for preventing transmission-channel overload without introducing compressor/expander tracking errors. A sum-channel filter corrects for phase shifts added by the companding.

VHS HI-FI:



*AUDIO COMES OUT
ON TOP IN OUR
LABORATORY TESTS
OF NEW VHS HI-FI
VIDEO CASSETTE
RECORDERS FROM
JENSEN AND RCA*

*A SPECIAL TEST REPORT
BY JULIAN HIRSCH*

AUDIOPHILES have been "listening" to a lot of video lately. We see more and more audio equipment being hooked up to video systems and more video equipment with fantastic audio performance. The new Jensen AVS-6200 and RCA VKT-550 VHS Hi-Fi video cassette recorders certainly belong in that category.

Until recently the sound quality available from home VCR's was generally poor or worse. A few models had stereo, and some also included Dolby B noise reduction. But 45-dB signal-to-noise ratios, 8-kHz frequency responses, and annoyingly audible wow and flutter barred them from consideration as serious products for the audiophile. About a year and a half ago, Sony

announced the development of the Beta Hi-Fi system, with which a Beta-format VCR could record and play sound of exceptional quality with or without an accompanying video program. In general, the Beta Hi-Fi decks have lived up to the claims made for them. Their sound quality nearly matches that of digital audio recording, and it is certainly better than that of the finest analog tape recorders used at home.

Shortly after the introduction of Beta Hi-Fi, JVC responded by announcing the development of VHS Hi-Fi with similar performance specifications. The first VHS Hi-Fi VCR's have reached the market, and we took advantage of the opportunity to test and compare two of them. Our sample of the RCA

FIRST TEST



VKT-550 (\$1,000) was from an early production run. The Jensen AVS-6200 (approximately \$1,200) was a preproduction sample said to meet the performance standards of the production models but possibly having minor differences in circuitry and appearance. These two models are at or near the top of their manufacturers' VCR lines and include all the operating features one would expect in premium videocassette recorders. The Jensen unit, in keeping with the company's high-fidelity tradition, has quite a few features designed to appeal to audiophiles as well as videophiles.

The key to the high-fidelity VCR's is frequency modulation. Frequency-modulated signals are relatively immune to interfering

noises, which is why FM radio can sound as good as it does. Like the Beta Hi-Fi system, VHS Hi-Fi frequency-modulates high-frequency carriers with the two audio signals. Aside from this, however, the two systems have little in common.

HOW IT WORKS

In Beta Hi-Fi, the FM carriers are mixed with the video signal and recorded on the video tape simultaneously through the same set of rotating heads. In the VHS method, the frequency-modulated audio signals are recorded and played back using what JVC calls "depth multiplexing." Separate audio heads on the rotating video-head drum record the stereo information rela-

tively deep into the tape's magnetic coating. The video signal is recorded *over* it on the same portion of the tape, but much closer to the surface of the coating so that it does not completely erase the audio carriers. Crosstalk or interference between the audio and video signals is avoided by using very different azimuth angles for the FM-audio and video recording heads, which makes the upper (video) layer of the recording effectively transparent to the VHS Hi-Fi heads during playback. The audio heads respond only to the FM carriers below the video signal layer.

The basic modulation schemes used in both the Beta Hi-Fi and VHS Hi-Fi formats lead to audio playback with a relatively poor sig-

RCA

FEATURES COMMON TO BOTH RECORDERS

- Wireless infrared remote control
- Unattended timer recording for up to fourteen days (five events for RCA, eight events for Jensen)
- Input for video camera
- Sound recording from TV broadcast, camera, TV/FM simulcast, or any external high-level audio source
- Electronic four-digit index counter (displays time when recorder is off or when switched)
- Twin-slider audio recording-level controls
- Separate peak-reading LED audio-level indicators for each channel (marked from -20 to +8 dB, red above 0 dB)



SPECIAL FEATURES OF RCA VKT-550

- Selectable automatic level control (ALC) for normal-mode audio recording on longitudinal soundtracks
- Instant-recording mode (single-button selection of 30-minute recording periods for up to 4 hours)
- All usual VCR features, including fast forward and rewind, pause, high-speed search, single-frame viewing, digital-synthesis TV tuner including cable channels, etc.
- Records and plays back at all three VHS speeds (SP, LP, SLP)
- Peak-hold option on recording-level display
- Remote control has "double speed" mode to speed up picture advance (sound is inaudible in this mode)
- Dimensions: 17 1/8 inches wide, 14 1/2 inches deep, 4 3/4 inches high
- Weight: 22 pounds, 6 ounces

nal-to-noise ratio. Therefore, both systems use proprietary encode-decode noise-reduction circuits that are similar in concept, if not execution, to the Dolby and dbx systems found in home audio-cassette decks. Also, in both systems, conventional longitudinal analog soundtracks are recorded simultaneously with the FM audio signals so that tapes can be played on conventional VCR's as well as those equipped with hi-fi sound.

LAB MEASUREMENTS

Our laboratory tests of these machines were limited to their audio performance (principally in the Hi-Fi mode, although we also checked some aspects of their longitudinal-soundtrack performance). For listening comparisons, we dubbed Compact Discs onto both VCR's for A/B comparisons during playback. Their video qualities were judged subjectively, by recording TV broadcasts and viewing the playback pictures.

The frequency response was measured by recording a sweeping sine-wave signal from a CD test disc. This signal was flat within 0.5 dB from 20 to 20,000 Hz. The playback from the VCR was displayed on our UREI automatic plotter, using an expanded amplitude scale. (Note: Our earlier tests of the Beta

RCA VKT-550

Frequency response in Hi-Fi mode (referred to 1,000-Hz level): 20 to 20,000 Hz +0.2, -1.7 dB

Frequency response in normal mode (at -3-dB response points): 60 to 11,000 Hz at SP speed; 58 to 2,700 Hz at SLP speed

Harmonic distortion (at 1,000 Hz in Hi-Fi mode): 0.32 per cent at 0 dB; 0.29 per cent at +10 dB

Signal-to-noise ratio (A-weighted, referred to 0-dB signal level): 71.5 dB in Hi-Fi mode; 45 dB in normal mode

Flutter in Hi-Fi mode: 0.005 per cent JIS-weighted; ±0.008 per cent CCIR-weighted

Flutter in normal mode: 0.1 per cent JIS-weighted, ±0.17 per cent CCIR-weighted at SP speed; 0.2 per cent JIS, ±0.4 CCIR at SLP speed

Speed error: +0.4 per cent

Input sensitivity for 0-dB recorded level: 100 millivolts

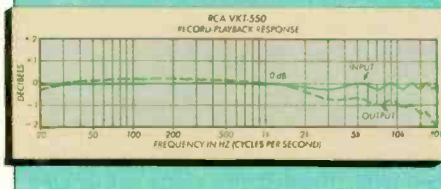
Input overload level: 4.2 volts

Playback level from 0-dB signal: 0.45 volt

Fast-forward/reverse time for T120

cassette: 4 minutes, 17 seconds

Stereo channel separation at 1,000 Hz: not measurable (see text)



Hi-Fi system were done using the regular scale, and thus the graphs cannot be directly compared with those given here.)

The 1,000-Hz playback distortion was measured for various recorded

input levels, all referred to the "0-dB" LED of the recorder's scale. The A-weighted playback noise level was measured relative to the output from a 0-dB recorded signal at 1,000 Hz. A 3,000-Hz signal was recorded from our flutter meter and the playback signal returned to the meter for measurement. These tests were made at both the standard (fastest) and the slowest speed of each machine. Several types of video cassettes were used, including Maxell HGX, BASF Chrome, and 3M HGX Plus, but no differences between them could be detected. We measured the playback channel separation at 1,000 Hz for the Jensen recorder, but this was not possible with the RCA unit since a signal applied to only one input jack was automatically recorded on both channels (it performed properly with stereo programs, however).

HOW IT SOUNDS

In their audio performance, the similarities of the Jensen and RCA machines were much more striking than their differences. For most purposes, in fact, they could be considered audibly equivalent. And even the measurable differences would probably not be heard without a direct A/B comparison.

Most of the differences we found could well stem from inevitable

JENSEN

SPECIAL FEATURES OF JENSEN AVS-6200

- Records and plays back at two speeds (SP and EP)
- Separate pairs of audio outputs for Hi-Fi audio and mixed Hi-Fi/normal audio (continuously variable front-panel mixer control)
- Audio outputs switchable for stereo or one channel only through both output jacks
- Switchable Dolby B noise reduction for normal audio soundtracks
- Stereo or mono normal audio output
- Switch-selectable audio and video inputs
- Stereo headphone jack
- Separate microphone input jacks



for each channel (plugging in a mike disconnects other audio signals from that channel)

- Picture-sharpness control
- Search mode selects eight speeds in either direction, from one-fortieth normal to seven times normal (no sound is heard in search mode)
- Index counter can be switched to show remaining playing or recording time (T120 and T160 lengths only)

- Insert editing permits changing a limited audio/video segment of a recorded tape
- Audio dubbing permits normal audio tracks to be rerecorded without affecting video program
- Cue switch can be set to stop tape automatically in fast-wind mode at the beginning of a recording made on the AVS-6200
- Remote control provides direct entry of TV channels
- Dimensions: 17 ³/₁₆ inches wide, 14 ⁵/₈ inches deep, 4 ³/₁₆ inches high
- Weight: 21 pounds, 8 ounces

sample-to-sample variations as well as the fact that our samples were very early production or preproduction units (which, in our experience, do not perform as well as later full-production units). Besides, because the circuitry and tape transports are so thoroughly standardized, the design of the VHS Hi-Fi system leads us to expect very little audible difference between any two correctly operating VHS Hi-Fi VCR's.

How good, then, was the audio performance? In a word, excellent. For example, unlike conventional analog audio recorders, the VHS Hi-Fi units are not subject to high-frequency tape saturation, which usually requires the frequency response of a cassette deck to be measured at a -20-dB level. On the VHS Hi-Fi decks, the overall frequency-response curves made at the indicated 0-dB levels were virtually identical to the ones made at -20 dB. And those curves were so flat that they can be displayed as curves only with the expanded-amplitude scale we have adopted for digital CD player measurements—they would appear as straight lines otherwise! (The Jensen unit showed a "bump" of about 1 dB in the 70- to 80-Hz region and a rolloff of low-frequency response when measured at -20 dB. But we've been told that the latter effect can be caused by misadjusted VHS Hi-Fi circuits.)

JENSEN AVS-6200

Frequency response in Hi-Fi mode (referred to 1,000-Hz level): 20 to 20,000 Hz +0.5, -1.5 dB

Frequency response in normal mode (at -3-dB response points): 70 to 8,000 Hz at SP speed; 90 to 2,300 Hz at EP speed

Harmonic distortion (at 1,000 Hz in Hi-Fi mode): 0.05 per cent at 0 dB; 1.3 per cent at +13 dB

Signal-to-noise ratio (A-weighted, referred to 0-dB signal level): 80 dB in Hi-Fi mode; 38.5 dB in normal mode, Dolby off; 45 dB in normal mode, Dolby on

Flutter: 0.007 per cent JIS-weighted, ±0.1 per cent CCIR-weighted in Hi-Fi mode; 0.24 per cent JIS, ±0.4 per cent CCIR in normal mode (either speed)

Speed error: -0.15 per cent

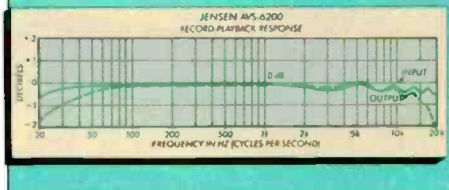
Input sensitivity for 0-dB recorded level: 120 millivolts at line inputs; 0.52 millivolt at microphone inputs

Input overload level: 6.1 volts at line inputs; 25 millivolts at microphone inputs

Playback level from 0-dB signal: 0.4 volt

Fast-forward/reverse time for T120 cassette: 3 minutes, 17 seconds

Stereo channel separation at 1,000 Hz: 77 dB



These VHS Hi-Fi machines have a headroom above their marked 0-dB levels of at least 13 dB before waveform distortion becomes appreciable, and even then the distortion does not take the form of the

third-harmonic distortion commonly used as the basis for setting the upper limit in analog tape recording. Therefore, we specified the signal-to-noise ratio (S/N) of these machines relative to their 0-dB levels. When defined in this ultraconservative manner, the noise performance of both decks was excellent: 71.5- and 80-dB S/N's, respectively, for the RCA and Jensen units. Since the distortion does not become significant until the level is considerably higher, one might well be justified in adding 13 dB to these figures, yielding S/N's of 84.5 and 93 dB—figures that rival those of CD players and digital-audio recorders. The same could be said for the almost unmeasurable—and certainly inaudible—flutter figures (between 0.007 and 0.01 per cent).

Listening tests for noise reduction misbehavior revealed a little noise pumping or breathing when we dubbed a digitally mastered piano recording from a Compact Disc. The effect was no different from what occurs when Beta Hi-Fi decks attempt the same task. Since the audibility of the effect seems to vary with the setting of the tracking control and with the tape speed employed, this might be another result influenced by our test units' being early samples. You might want to listen carefully for this effect (using

(Continued on page 84)



SYSTEMS

A FIRST-CLASS COMBINATION
OF HOME AUDIO WITH VIDEO

BY GORDON SELL

The idea of a unified audio and video system was very appealing to Malcolm Rutledge, a New England investment banker. "But at heart I'm a tweak," he says. "It seemed almost sacrilegious to play my audio system (Linn Sondek, Dynavector, Kyocera, Revox, and Magnepan) in the same room with a projection TV." So he decided to build what he calls a "screening room."

Rutledge got rid of his floor-standing projection TV and mounted an Inflight Services V Star 4 in the ceiling. The V Star 4 is a \$13,000 consumer version of the video projector used on commercial airliners. Also in the system are a Magnavox video-disc player, a Panasonic VCR, and a Jensen AV-1500 audio and video receiver. On the audio side are a Mark Levinson ML-9 preamp and ML-10 power amp, a Sony CDP-200 Compact Disc player, Cabasse Clipper speakers, and a Niles A/V Patch Bay. Most of the system is operable by various remote controls. The walls and cabinetry are finished with seven coats of hand-rubbed lacquer. The color is Money Green. □



PHOTOS BY IZZIE HIMMEL

TOP MUSIC VIDEOS





10

VIDEO CLASSICS: A BASIC LIBRARY OF **ROCK-&-ROLL**

BY LOUIS MEREDITH

As little as two years ago, compiling a reasonable Hall of Fame list of home rock videos would have been an iffy proposition. There wasn't much out there, and a lot of it was terrible. This situation has changed with surprising speed, probably thanks to MTV. Right now, in fact, we may be only weeks away from the time when every rock-related film or TV clip ever made will be available for home consumption.

In compiling this admittedly subjective All Time Top Ten, I've used three secondary criteria to narrow the field. First, the programs had to be above-ground commercial releases. Second, when in doubt, I opted for videos whose home versions differ from theater or broadcast versions. And, finally, I tried to maintain some historical perspective.

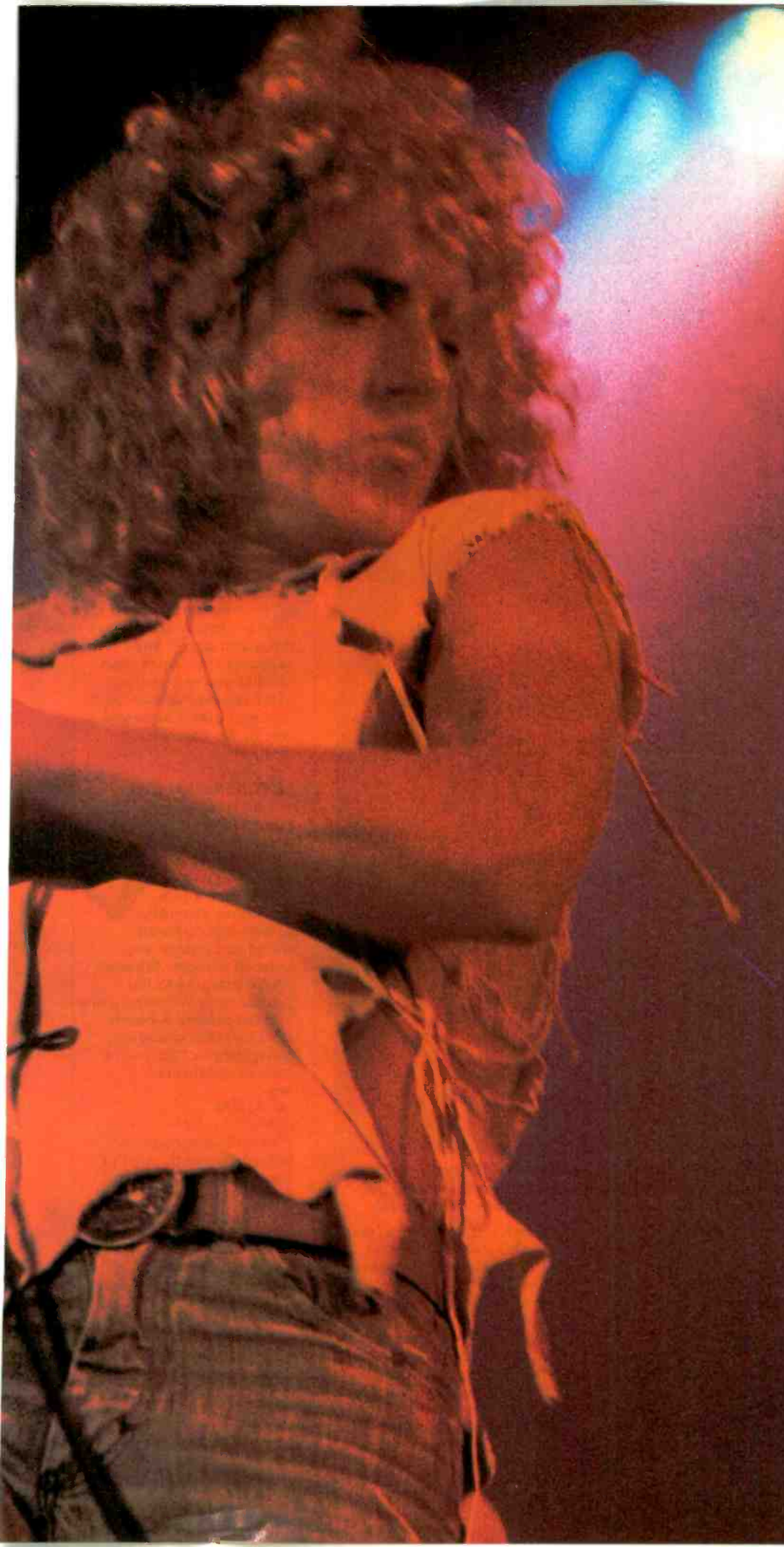
Unless otherwise indicated, all of the following are video tapes available in both the VHS and Beta formats.



1 THE KIDS ARE ALRIGHT

(RCA tape and CED disc). A love letter from a fan, director Jeff Stein, to a

Left, Roger Daltrey in the early Seventies (photo, Michael Putland/Retna). Inset photos, from top: Sixties Who (Retna); Queen today (Capitol); early Tina Turner, far left (Capitol); early Seventies Mick Jagger (Stephen Morley/Retna).





10

MOVIE CLASSICS:
A BASIC LIBRARY OF
SONIC
SPECTACULARS

BY LOUIS MEREDITH

Belatedly, it seems to be dawning on everybody that half the fun of home video is aural. That being the case, here's a personal sampling of some of the best-sounding video movies you can get at the moment. I've selected them both for their demo value, as old-fashioned sonic spectaculars to show off your equipment, and for their aesthetic value, where the sound significantly enhances your enjoyment of what you're watching. Most are available on both tape and disc. The sound is best in the LaserDisc versions.

1 SUPERMAN (THE MOVIE)

(Warner Bros.). Another spectacle that loses something on the tube and a marvelous example of how sophisticated sound can restore your sense of wonder. Whether you're listening to the fustian John Williams score or a detonating A-bomb, the LaserDisc sound can convince you that you're back in the theater.



2 ALIEN

(CBS/Fox). Sigourney Weaver's incomparable behind excepted, most of the visual impact of this outer-space spook show is lost on the small screen. The cacophonous stereo sound on my disc version did much to restore the shudders to director Ridley Scott's stylish Lovecraftian horrors.

3 APOCALYPSE NOW

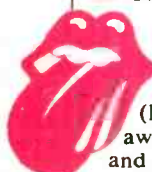
(Paramount). Notwithstanding Marlon Brando's peculiar performance as a beached
(Continued on page 88)

band, the Who. From *My Generation to Won't Get Fooled Again*, from performances on the TV show *Ready Steady Go* to the final concert with Keith Moon, this remains the most comprehensive, exhilarating, and affectionate rock documentary of them all, and no band deserved it more. Available in mono on tape, but don't throw away your CED version because RCA's video disc has a spectacular stereo soundtrack.

2 GIMME SHELTER

(RCA/Columbia).

On tour with the Rolling Stones at their performing peak (Keith Richards was awake most of the time) and culminating with the horrific violence and murder of the Altamont Festival. If rock-and-roll ever produced a Greek tragedy, this is it. Just released on LaserDisc, its first appearance in stereo.



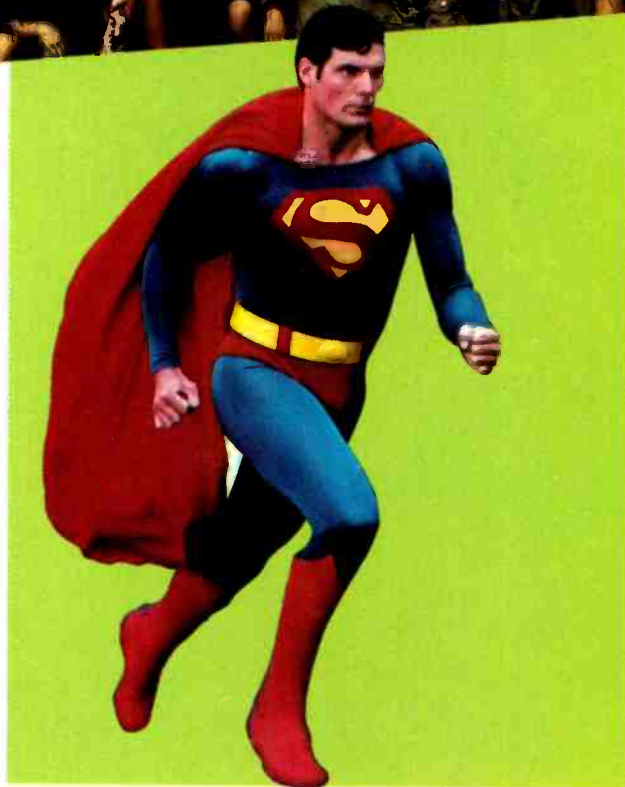
3 QUADROPHENIA

(Thorn/EMI). Another Who product, this gritty, kitchen-sink-realist account of growing up Mod in the mid-Sixties is a sort of *English Graffiti*, with a running musical narration based on Pete Townshend's grand, ambitious follow-up to *Tommy*. It's still the best dramatic film ever made with rock as a subtext. The dance-hall scenes, featuring Sting of the Police, have more kinetic excitement than a week's worth of MTV. Not yet available in stereo.



4 A HARD DAY'S NIGHT

(Maljack). Four lovable Liverpool lads frolicking through a black-and-white wonderland while making infectious, affecting rock-and-roll music. Showing the Beatles as all



Top, Sigourney Weaver in *Alien* (photo, Sygma); middle, a scene from *Apocalypse Now* (photo, Sygma); bottom, Christopher Reeve in *Superman II* (photo, DC Comics)

of us remember them (and as they probably never were), this has taken on added poignancy since December 8, 1980. John Lennon couldn't have a nicer memorial.

5 THIS WAS ROCK

(Media Home Entertainment). Edited down from two famous drive-in-movie rock concert

classics of the Sixties (the *TAMI* and *TNT* shows), this is probably the most exciting live video you'll ever see, with a talent roster including nearly everybody who was making music at the time except the Beatles. High points: James Brown's *Night Train* on one foot and the Stones' game efforts to upstage him.

(Continued on page 88)



LOOKING AT MUSIC

10

VIDEO CLASSICS: A BASIC LIBRARY OF **BALLET** **& OPERA**

BY CHRIS ALBERTSON

For the longest time, producers of video software for the home market stayed clear of classical music, but with VCR's going stereo and the release of video discs escalating, that situation is getting better. Naturally, the concentration is on the more visually interesting genres, ballet and opera, although a few symphonic works have also appeared.

The ballet and opera video catalogs offer a varied repertoire, ranging from a British production of *H.M.S. Pinafore* with American game-show host Peter Marshall to a Russian documentary on prima ballerina Maya Plisetskaya.

Except for Franco Zeffirelli's *La Traviata*, which I viewed on cassette but which is also available on LaserDisc, all the tapes I considered came from one source, Video Arts International (mono VHS or Beta), and all the discs were from Pioneer.

In making my selections, I focused on the artistic merits of the performances, but I also took into account the audio and video quality, direction, scenic design, and general appearance. I made special allowances only for material of historical value whose artistic strength is simply overpowering. (If you have trouble finding the VAI tapes, write to Video Arts International, Inc., P.O. Box 153, Ansonia Station, New York, N.Y. 10023.)

*Maya Plisetskaya
as Odette in
Tchaikovsky's
Swan Lake*

1 SWAN LAKE
(Video Arts International).
An extraordinary 1957
Bolshoi production of

Tchaikovsky's classic ballet with Plisetskaya in the twin roles of Odette and Odile and with Fadeychev as a masculine Prince Siegfried. Although forty-seven minutes shorter and less remarkable technically, this performance has a dramatic flair unmatched on the otherwise superb Pioneer LaserDisc version of a 1980 Royal Ballet performance at Covent Garden with Natalia Makarova.

2 CARMEN BALET (Video Arts International). This seventy-three-minute tape of the legendary Maya Plisetskaya also includes very brief excerpts from *Dying Swan*, *Raymonda*, and (with Vladimir Vasiliev) a Bach prelude. But consider these little bonuses attached to an extraordinary full-length performance choreographed by Alberto Alonso to music by Russian composer Rodion Shchedrin after Bizet's opera *Carmen*. The cinematic treatment is rife with memorable imagery and superb dancing. As in the other Russian ballet films, the production leaves something to be desired technically, but it is an artistic triumph that should not be missed by any lover of dance.



Cotrubas and Domingo in Tales of Hoffmann (photo, Pioneer)

3 THE TALES OF HOFFMANN (Pioneer LaserDisc). One of the first classical LaserDisc releases, this 1981 Royal Opera House performance of Offenbach's opera remains one of the best. Sir John Gielgud introduces each segment, and Placido Domingo is the poet who gets progressively drunker as he tells three tales of past heartbreaks and thus brings about a fourth. His fanciful stories come wonderfully alive in this fine production, with a splendid supporting cast, including Ileana Cotrubas and Agnes Balisa, conducted by Colin Davis.

4 AIDA (Pioneer LaserDisc). The vastness of the 25,000-seat arena in Verona, Italy, is in itself impressive, but it is

doubtful that in its 2,000-year history the site has seen a more spectacular production than this 1981 staging of Verdi's *Aida*. Conducted by Anton Guadagno, with sets and costumes by Vittoria Rossi and featuring singers Maria Chiara, Fiorenza Cossotto, Nicola Martinucci, and Giuseppe Scandola, this is grand opera at its grandest. The sound is astonishingly good when you consider the immense problems that must have faced the engineers in trying to capture it.

5 THE NUTCRACKER (Pioneer LaserDisc). This American Ballet Theatre version of Tchaikovsky's Christmas perennial was produced, conceived, directed, and almost entirely choreographed by Mikhail Baryshnikov.

score is faithfully adhered to by conductor James Levine and the Metropolitan Opera Orchestra and Chorus. Flora's ball is beautifully staged, and Teresa Stratas and Placido Domingo are splendid as Violetta and Alfredo. No opera video collection should be without this gem.

7 THE MIKADO (Pioneer LaserDisc). The campy goings-on in Gilbert and Sullivan's *The Mikado* hammer home the American musical theater's debt to the famous nineteenth-century writing team. Pish-Tush, Pooh-Bah, Nanki-Poo—the names alone are irresistible, but this studio production, with William Conrad (star of TV's *Cannon*) in the title role, has a special charm and is



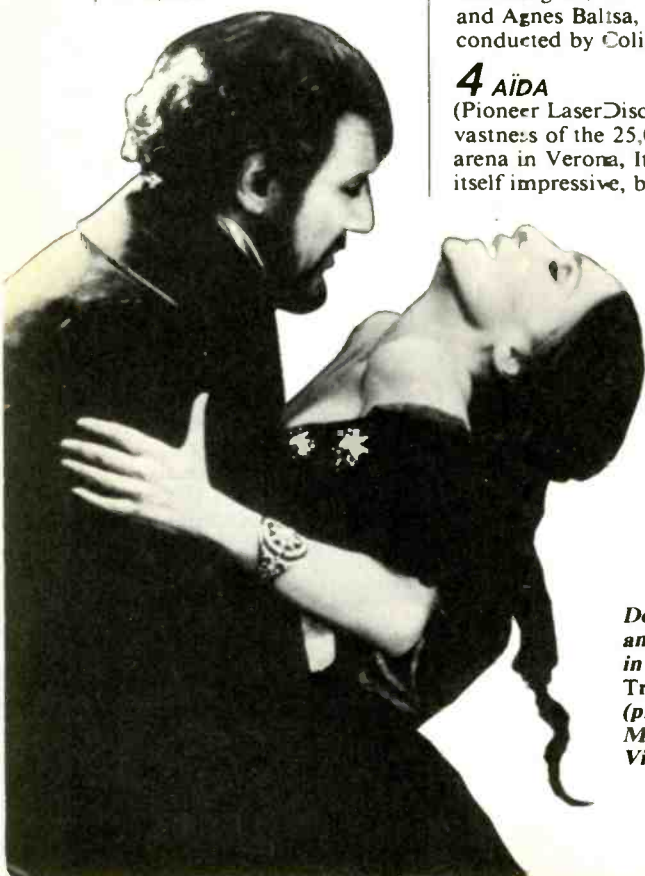
William Conrad as the Mikado (photo, Pioneer Artists)

He also dances, together with Gelsey Kirkland and Alexander Minz. The studio recording takes advantage of the video medium for special effects. The entire production is a joy—even the mice are lovable. Add to that the superb sound and picture quality of a well-pressed LaserDisc, and you have an hour and nineteen minutes of solid family entertainment that can delight the year round.

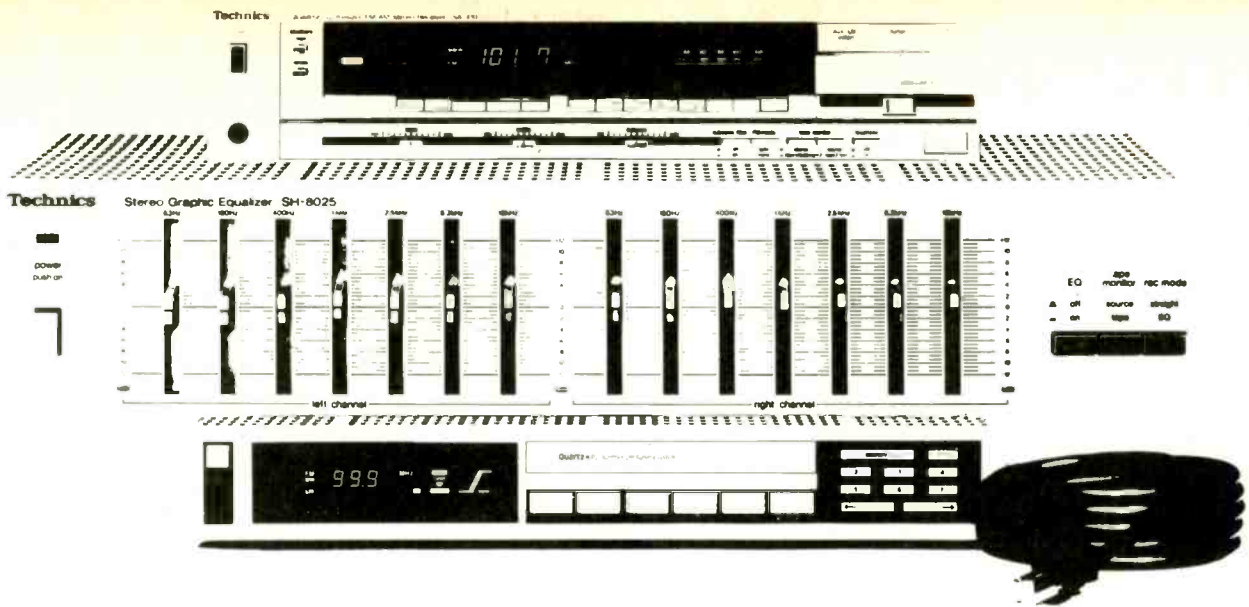
excellently engineered. The soloists, London Symphony Orchestra, and Ambrosian Chorus are conducted by Alexander Faris.

6 LA TRAVIATA (MCA Home Video VHS and LaserDisc). Franco Zeffirelli's feature-film version of *La Traviata* takes Verdi's haunting opera out of the confines of the stage and lets it romp in magnificent outdoor settings and opulent interiors. Only the look is different from an ordinary opera production, for the

8 THE SLEEPING BEAUTY (Pioneer LaserDisc). This performance of the Tchaikovsky ballet by the Kirov Ballet was taped last year at Leningrad's Kirov Theater, but the production's lineage traces back to 1890, when the work was first performed on the same stage. Back then, the city was known as St. Petersburg, the hall was the Maryinsky Theater, and the resident corps was, of course, the Imperial Russian Ballet. Only the names have changed, and on these four LaserDisc sides the tradition continues with all the brilliance of old. Irina (Continued on page 89)



Domingo and Stratas in La Traviata (photo, MCA Home Video)



COMPONENT COMPATIBILITY

SOME COMPONENTS WORK WELL TOGETHER,
SOME DON'T. WHAT SHOULD YOU WATCH
OUT FOR WHEN MAKING HI-FI MATCHES?

BY JULIAN HIRSCH

ONE of the great advantages of building a music system from separate components is that you can select each part with an eye to your own special needs, taste, and budget. But it is also necessary to consider how well the various components will work together in a system.

There are some component combinations that simply will not work very well. They may produce an unsatisfying sound quality or even result in damage to one or more of the components involved. On the other hand, you don't have to worry about *every* link in the high-fidelity reproduction chain. Compatibility problems arise with only a few of those links, and they can be avoided by following a few guidelines.

CARTRIDGE/TONE ARM

At first glance, you'd think there was nothing to worry about in matching a phono cartridge with a turntable's tone arm. After all, except for P-mount units, every tone

arm can accept cartridges whose mounting holes are spaced half an inch apart, and every cartridge has mounting provisions for that spacing. Can it be that we don't have to be concerned with compatibility problems in record players?

Unfortunately, the answer is no. This is one of the crucial match-ups in a hi-fi system, and it requires extreme precision in order to realize the full performance potential of both cartridge and arm.

The first point to consider regarding the compatibility of a given cartridge with a given tone arm is *mass*. Some tone arms are specifically designed for use with a relatively massive, low-compliance cartridge, and others are intended for use only with very lightweight cartridges. In any case, check these specifications before buying.

A cartridge that is too light *can* be weighted down to meet a tone arm's minimum requirements, but adding mass to the counterweight to balance a heavy cartridge upsets the tracking-force calibration. In gener-



al, adding *any* mass to the pickup system is undesirable, so it is better to make a good match in the first place. Regardless of specifications, an inability to balance the arm with the cartridge in place is prima-facie evidence of incompatibility.

Related to the question of tone-arm and cartridge mass is the problem of tone-arm/cartridge *resonance*. The compliance (springiness) of the cartridge's stylus-holding cantilever assembly will resonate at some low frequency with the combined "moving mass" of the cartridge and tone arm. It is desirable to have this resonance occur around 12 Hz, which is high enough to avoid groove-skipping problems with warped records and low enough to avoid a peak in the low end of the audible range.

You can predict whether you will have problems with tone-arm/cartridge resonance by taking a look at either the recommended tracking-force range of the cartridge or its compliance specification. A lighter tracking force or a higher compliance means that the cartridge should be used in a lighter tone arm. Some tone arms are electronically servo-controlled to eliminate resonance problems, and certain cartridges have attachments that damp out most low-frequency resonance.

Once you have a compatible cartridge and tone arm, you must be careful to install the cartridge correctly. Installing a conventional cartridge is, as I have often noted in these pages, a tedious, exacting, and yet critically important job in setting up a record player. While minor errors are not usually as serious as many people would have you believe, large ones can not only cause substantially increased distortion but also degrade channel separation and stereo imaging.



Fortunately, questions of compatibility as well as all problems of installation are neatly resolved by the increasingly popular P-mount system. Designed several years ago by



Technics and now licensed to several other turntable manufacturers, the P-mount system eliminates *every* cartridge installation and set-up adjustment.

SOURCE/AMPLIFIER

With any line-level (or high-level) signal source—a tuner, a cassette deck, an equalizer, a Compact Disc player, etc.—the only issue in equipment matching is *impedance*, and with modern equipment it is very unlikely to be a problem. The object is to have a low-impedance output drive a high-impedance input so as to prevent an undesirable loading of the signal source. All the usual line-level sources have output impedances of a few thousand ohms or less (often only a few hundred ohms), and the line- or high-level input impedance of today's preamplifiers (or the preamplifier inputs of receivers or integrated amplifiers) is rarely less than 47,000 ohms and typically at least 100,000 ohms. A mismatch between source and preamp is theoretically possible, but it is not a practical concern.

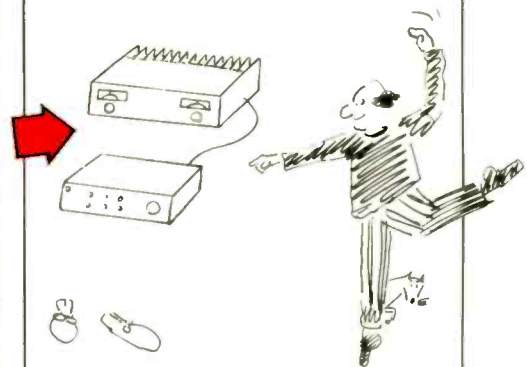
Similarly, there is almost no possibility that a preamplifier and a power amplifier of recent vintage will be incompatible. The input sensitivity of power amplifiers is typically on the order of 15 to 50 millivolts for a 1-watt output, and almost any amplifier can be driven to its full output by a signal of no more than about 2 volts. This suggests that a preamplifier needs a maximum output of at least 2 volts and a noise level at least 70 to 80 dB below that in order to drive a power amplifier to its full output without contributing audible noise at normal listening volumes. Just about any name-brand preamplifier avail-

able today surpasses these requirements by a healthy margin.

AMPLIFIER/SPEAKER

An amplifier's ratings are usually based on the power it can deliver to a pair of 8-ohm resistor loads over the full audio frequency range with less than a specified maximum distortion percentage. That is fine as far as it goes. But real speakers do not seem much like 8-ohm resistors to an amplifier. They are a complex combination of resistance, capacitance, and inductance, and all of these change with frequency and to some extent with signal level.

A speaker's highly variable impedance causes it to draw from the amplifier a *current* whose amplitude and phase, relative to the amplifier's output *voltage*, can vary over a wide range even with a constant-amplitude input signal. If the amplifier can deliver the required current at the required voltage without dis-



ortion, all will be well. The trouble is, most real amplifiers do not behave this way except under rather narrowly defined conditions, and none of them have infinite current capability.

If the amplifier balks at giving the speaker the amount of current that it requires, the result will be some form of distortion since the waveform of the acoustic output will not match that of the input signal. This departure from ideal conditions may take place at frequencies outside the usual audio range, either below or above it, but that does not mean that its effects go unheard. If the amplifier itself becomes nonlinear because of an overload at some inaudible frequency, it will not be able to do a proper job *within* the audio band. The results can certainly be heard, and they are not pleasant.

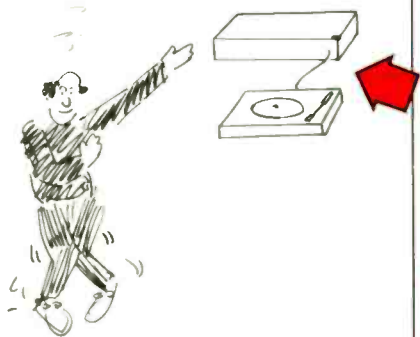
Some amplifiers are more susceptible to this effect (current limiting)

than others because of their overload protection systems or their limited power ratings. If the speaker impedance is reasonably constant throughout the audio band and does not become too low or too reactive for the amplifier to drive, there should be no problem with amplifier output-current limiting. The actual impedance of most "8-ohm" speakers drops to lower values at some frequencies, sometimes to less than 4 ohms, but almost any good amplifier can drive 4-ohm loads without difficulty.

Problems can arise, however, from using two pairs of nominally 8-ohm speakers in parallel or (the worst case) two pairs of "4-ohm" speakers, the combined impedance of which may be less than 2 ohms. Few amplifiers will perform at their best under such conditions. Most will distort or shut down at a fraction of their rated power output, though a few can develop more power output into 2 ohms than with 4- or 8-ohm loads. If tests show that an amplifier can deliver at least as much power into 2-ohm loads as it can into 8-ohm loads, there is little chance that it will have any difficulty driving real speaker loads.

SPEAKER/ROOM

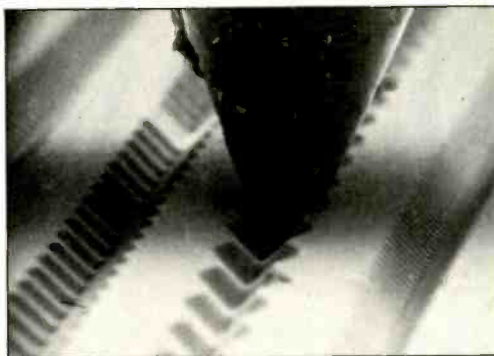
A major interface in a music system is the one between the speakers and the listening room. In this case, "compatibility" involves very complex (and largely unpredictable) interrelationships among the speakers, the room boundaries, the furnishings and wall, ceiling, floor, and window treatments, and the position of the listeners. Together these factors are likely to have a greater



effect on the sound of a system than all other factors combined.

You'll have to experiment to get the best results from your installation—which may not necessarily be the best sound that your system
(Continued on page 85)

PHONO CARTRIDGE/PREAMP COMPATIBILITY



Among all the signal sources that may be used in a music system, the phono cartridge is the most likely candidate for a preamplifier-interface problem. But even with cartridges these problems tend to be small and easily avoidable with typical high-fidelity products today.

Almost all moving-magnet (MM) cartridges are designed to deliver their rated performance when loaded by a resistance of 47,000 ohms and shunted by a total capacitance (including that of the preamplifier, the tone arm, and the connecting cables) on the order of 100 to 500 picofarads. As a rule, neither of these values is critical, and a resistance of at least 47,000 ohms is a de facto standard in hi-fi preamplifier design these days. The capacitance component of the cartridge load is less easily determined, but with most cartridges the effect of even a large error in capacitive termination will be a relatively minor change in high-frequency response—rarely enough to be audible without some sort of A/B comparison.

A problem that was prevalent a decade ago but rather rare today concerns the RIAA equalization accuracy of the phono preamplifier. Some designs can be affected by the inductance of an MM phono cartridge connected to them. The result is usually a slight alteration (a couple of decibels) of the response above several kilohertz.

More than impedance considerations is involved in the cartridge/amplifier interface. The available maximum signal level must be sufficient to drive the amplifier to its full output—or at least a sufficiently high one. (No great harm will result if your 200-watt amplifier puts out "only" 100 watts when driven by the peak output of your cartridge!) On the other hand, too high a cartridge output level might overdrive the preamplifier and produce distortion.

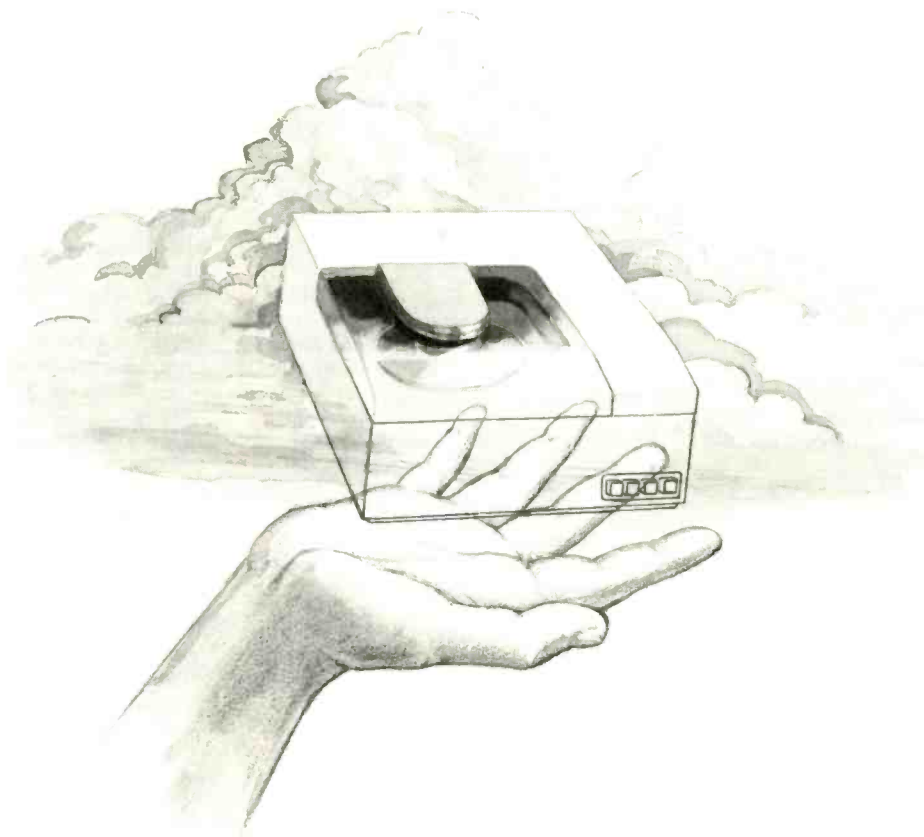
In the past, some phono cartridges could deliver very high outputs, as much as 50 millivolts or more, when

playing high-level passages. The result could be an overload of the preamplifier, even at low listening levels, clipping the waveform before it reached the power amplifier. That problem has been effectively eliminated by the expanded headroom of today's phono preamplifiers. Almost all can handle signal inputs of more than 100 millivolts without clipping. In some amplifiers, increased phono headroom has assumed overkill proportions, reaching 300 or more millivolts, although even a 50-millivolt peak output from any modern cartridge and record is unusual.

There is also a potential compatibility problem at the low end of the amplitude scale. Moving-coil (MC) cartridges have become quite popular in recent years, and most of them develop a rather small output voltage in comparison to MM cartridges. A fraction of a millivolt is typical, and in some cases the output is best expressed in microvolts. Additional gain is needed in the phono preamplifier to raise this signal to the level of an MM cartridge output. Sometimes this gain is built into the preamplifier, or even into an integrated amplifier or receiver, but many people prefer to use an external transformer, "head amplifier," or "pre-preamplifier" between an MC cartridge and a standard MM phono input.

There are also a number of high-output MC cartridges available. Typically, they are able to deliver up to 1 to 2 millivolts from most records. They are designed to interface with a regular preamplifier MM phono input with its 47,000-ohm resistance. It is usually necessary to set the volume control higher than normal when you are using an MC cartridge, but its low resistance is an effective short circuit on the preamplifier's phono input, reducing its noise. The overall system signal-to-noise ratio can be better with an MC cartridge and high volume settings than with an MM cartridge operated at lower settings.

The COMPACT DISC TAKEOVER



*DIGITAL AUDIO TECHNOLOGY IS CHANGING, AND
NOT JUST IN THE DIRECTIONS YOU MIGHT THINK*

BY DAVID RANADA

THE digital-audio Compact Disc system will succeed. Sales of some record companies' CD's already exceed those of their equivalent black-disc LP's (Telarc claims a seven-to-three ratio in favor of its CD's). Consequently, there seems to be little doubt that the system will fulfill its inventors' expectations: parity in production with the LP within ten years.

A NEW MEDIUM

Critics of the system, however, claim that it is in its infancy, that further development will have to

take place before the technology can be called mature. They are right. Compact Disc technology is brand new, as the ages of information media are measured, and it will undergo vast changes as it develops.

From the start of the combined research and development work on the CD system by Philips and Sony, it has been hoped that the system would eventually supplant all playback-only audio media (specifically LP's and prerecorded cassettes). With CD player prices starting at \$500 and player sizes at least as large as mini-components, there seemed little chance that the CD

system would ever get into automobiles, or that there would ever be digital-disc equivalents of Walkman portable players. Until now, that is. When I was in Japan on a recent trip, Sony engineers showed me the future of CD technology and it includes exactly those devices.

SHRUNKEN CIRCUITS

The best way to reduce the size and cost of any stereo component, without sacrificing features or performance, is somehow to reduce the number and size of the parts needed to make it. In this digital age, that

usually means putting as much as possible in one integrated circuit. An IC can perform the functions of thousands of transistors and other electronic components in what is essentially one part. Not only is that part smaller than the components it replaces, it is also more rugged and reliable, it simplifies the design of circuits around it, and—in the long run—it is less expensive.

A ONE-CHIP PLAYER

What Sony has done (and, to judge by the date code stamped on the sample chip I saw, has been doing since early this year) is to integrate a substantial portion of the circuitry needed to run a CD player onto one IC (part No. CX23035). Included on this small chip of silicon are the servo speed control for the disc motor, sync detection for the digital bit stream, the error-correction circuits, time-base correction, and data-interpolation circuits. These functions were formerly performed by three separate IC's and a fair number of discrete components. The older chips themselves were equivalent to about 27,000 discrete transistors.

The new integrated circuit, along with a newly developed miniaturized laser "pickup," allows a substantial reduction in CD player size. The CMOS (complementary metal-oxide semiconductor) process from which the chip is made leads to a substantial reduction in power consumption—which implies, of course, battery-operated players. In fact, the first Sony products that will use this chip are those in which small size and low power consumption are an absolute necessity: car CD players and portable, Walkman-like CD players (for around \$500). Both have been demonstrated in laboratory prototype form, and production versions will probably appear in audio stores this fall.

Sony is by no means the only company working to extend CD technology. Matsushita (Technics and Panasonic) is also working on reducing the size and number of CD-player parts. They are developing car and portable players as well as some interesting home units, including a CD changer. Philips and Pioneer, among others, are also known to be developing new CD products for the home and car.

Although the potential audio quality of the CD system is mathematically limited by the present audio-encoding standard, there are other aspects to the CD standard

that are only now being exploited. For example, the storage of pictures and text information—along with the music—on a Compact Disc pressing for playback on a TV or computer-monitor screen was envisioned in the early development work on the CD. That is why the CD bit stream contains as yet unused room for picture and text data (in the form of "subcode symbols"). A standard for encoding text and video-game-like pictures is only now being reached, but soon the liner notes for an album may appear not on paper but on your TV screen or computer monitor.

Such screen-output players are the first stage after car and portable players. Then will come the big move of CD technology into the computer biz: "optical data storage." Work is well along at Technics, Sony, Philips, and other research labs on the storage and distribution of computer data recorded on Compact Discs.

BIG BYTES

A typical home-computer floppy disc can hold about 500 thousand bytes of information (one byte is essentially equivalent in information content to one letter or numeral). Sony's proposed digital-data encoding scheme could preserve as much as 500 million bytes of information on one disc, which is why the technology might become very attractive to the computer industry. Encyclopedias, maps, books, computer data bases, dictionaries, and even magazines may eventually be published on CD's. Several companies recently demonstrated working pro-

totypes of such a system, which Sony calls the CD-ROM (for Compact Disc Read-Only Memory).

MIX AND MATCH

And that's only the beginning. DRAW technology (for Direct Read After Write) permits digital recording on a CD-like substrate. That digital data could turn out to be a digitally encoded audio signal. Even more exciting are developments in "magneto-optical" disc technology. A magneto-optical disc recorder will not only record on a CD-like medium, but it will also permit immediate playback or, unlike a DRAW disc, erasure of the recorded material. With this technology a true CD audio recorder is possible; it would record discs playable on future car CD players and CD personal portables. And magneto-optical storage is just what is needed for computers: a relatively inexpensive, reliable, rugged, and transportable mass-storage medium capable of holding, on a single optical disc, more computer information than the average person will ever use in a lifetime.

If Sony and Philips get their way—and they control CD licensing agreements—all these media (audio CD, CD-ROM, DRAW, and the magneto-optical disc) will be compatible. A fully equipped CD player of the future will be able to record magneto-optical or DRAW discs and to play a CD-ROM into your home computer or an audio CD into a stereo system. The important aspects of disc compatibility (track pitch, disc speeds, laser wavelength and intensity, etc.) will have been standardized.

If you think this is all idle "futurologist" speculation, take a close look at the functions performed by that Sony all-in-one chip. Not one of the functions it performs is specifically limited to audio. Turning a CX23035 chip into a CD player still requires the addition of a digital-to-analog converter and analog output circuitry. The chip's own output is only digital data. Digital data could be anything digitally encoded: audio, text, computer graphics, computer programs, or video signals. Sony and others obviously intend to use this chip (or its relatives or descendants) as the central circuit in a family of CD-related technologies. Yes, the CD age is just beginning, and the technology will prove to be more useful and versatile than we can presently imagine. □



THE dbx SOUNDFIELD ONE SPEAKER SYSTEM

*THE FIRST dbx SPEAKER HAS FOURTEEN DRIVERS
AND ALMOST UNBELIEVABLE STEREO IMAGING*

A SPECIAL TEST REPORT BY JULIAN HIRSCH

WIDELY known for its disc and tape noise-reduction systems and related signal-processing accessories, dbx has now developed its first speaker system, and it is as distinctively different in design and operation as the company's other products. Called the Soundfield One, or SFX-1, the system was designed to provide optimized stereo imaging throughout a listening room, freeing listeners from the usual need to remain in a closely defined area in order to obtain the intended stereo effect.

Each speaker in the Soundfield One system takes the form of a large, free-standing square column—42 inches high and 16 inches on a side. Finished in walnut, *each* side of the speaker has two drivers mounted in it, a 10-inch acoustic-suspension woofer and a 4-inch midrange, covered by a removable brown grille. On top of the 80-pound column is another removable grille that covers a hexagonal array of six ½-inch tweeters. The comprehensive, well-written instruction manual recommends against placing the speakers next to a wall or in corners but says that otherwise they aren't terribly sensitive to room position (with which we would agree).

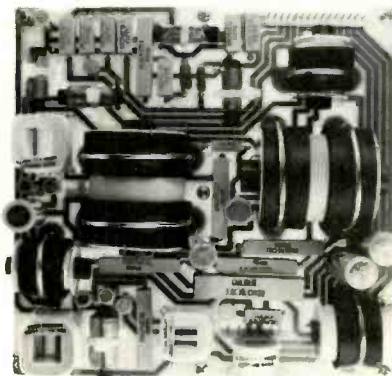
So that the fourteen (!) drivers in each speaker cabinet will produce the desired

radiation pattern, the key to the SFX-1's sound quality, their input signals are individually equalized in phase as well as amplitude. Because of some parallel internal driver connections, each speaker unit requires "only" ten sets of individually corrected signals, which are derived from an unusually complex passive crossover network. This network has also been designed to give a relatively flat and resistive average system impedance of 4.5 ohms (± 1.5) over the entire audio range.

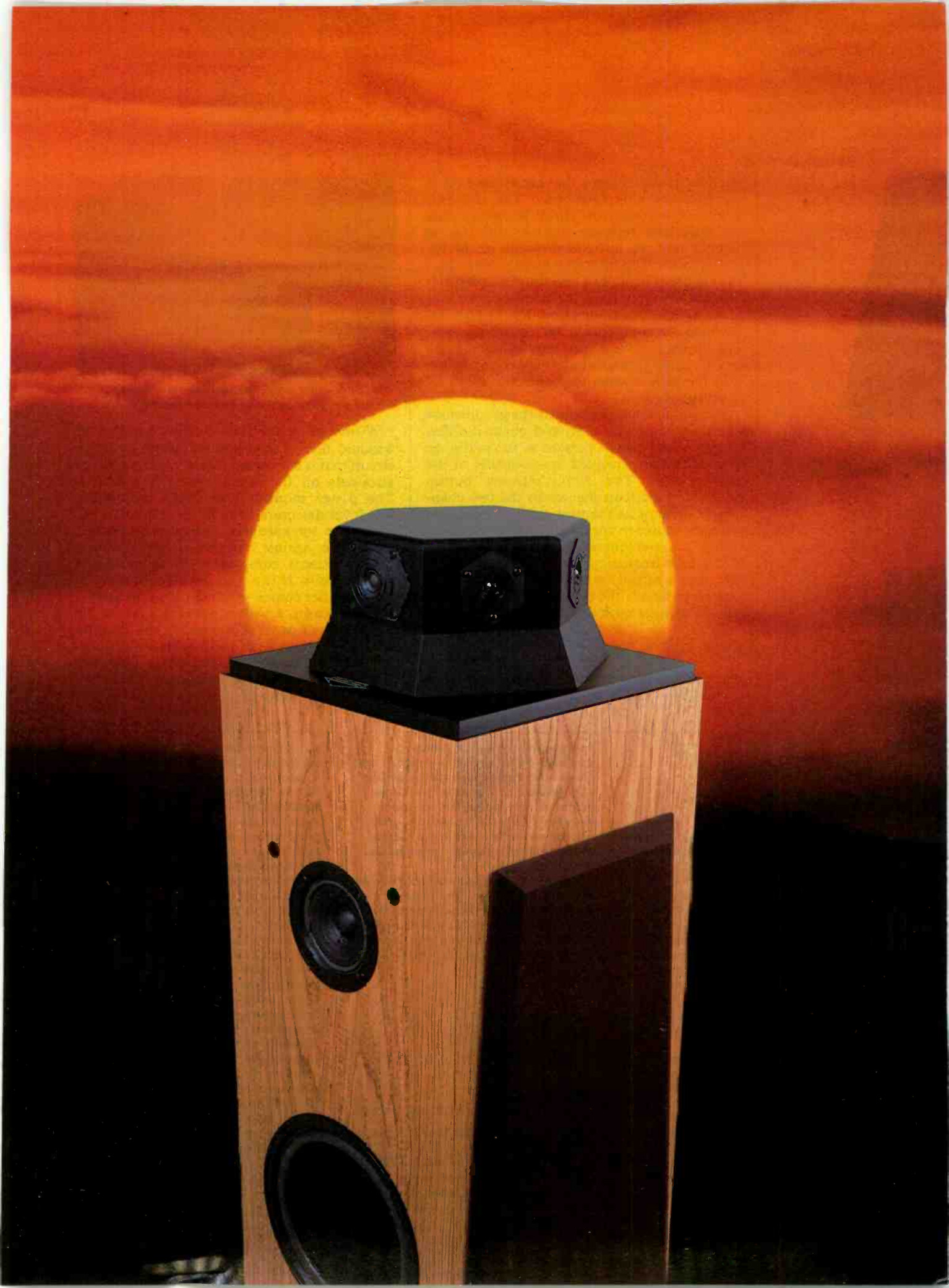
Since the crossover network mainly provides the required phase and amplitude characteristics for each driver, additional equalization is necessary to produce a reasonably uniform overall output throughout the audio range. This equalization is provided by the external control unit, the SFC-1, that comes with the Soundfield One system. Normally connected into the signal path via a tape-monitor loop or between the preamplifier and power amplifier, the SFC-1 permits system response to be tailored to the room or listener.

Measuring 17½ x 8½ x 1¾ inches and finished in black with silver trim (optional wood side panels are included), the SFC-1's appearance matches that of other dbx electronic components. But the control options it

Left, the complex crossover used in the dbx SFX-1.



PHOTOS BY JOOK IELUNG. BACKGROUND PHOTO BY IMAGE BANK



provides includes some that are as unusual as the speakers it is used with. The LOW-FREQUENCY COMPENSATION slider boosts or cuts the deep-bass response (below 100 Hz) to complement the low-end response of the listening room. The HIGH-FREQUENCY COMPENSATION slider is actually a spectral-tilt control. It can progressively slant the frequency balance of the system downward from low to high frequencies to compensate for recordings that were made to sound spectrally balanced with conventional speakers but sound overly bright with the SFX-1 when the controller is set for flat response.

The AMBIENCE slider adjusts the proportions of channel-sum (L + R) and channel-difference (L - R) signals present in the midrange to control the perceived spaciousness of the sonic image. The AUTO BALANCE button switches in a circuit that keeps the two channels in balance as the user changes from one program source to another. The SFC-1 also includes a low-frequency filter (-3 dB at 32 Hz), a high-frequency filter (-3 dB at 18,000 Hz), and a RUMBLE SUPPRESS circuit that progressively blends the channels below 100 Hz. All of these are switchable.

SELF-DEFENSE

Because of its enormous boost capability (more than 35 dB at 20 Hz relative to the



The SFC-1 not only equalizes the response of the SFX-1 but also contains unusual control features.

1,000-Hz gain), the SFC-1 includes a fixed infrasonic filter and a unique power-monitor circuit that is connected directly to the speaker terminals on the music system's amplifier. The power monitor uses dbx's proprietary rms-level detectors to monitor the levels delivered to the speakers. Intended to protect the drivers against burnout, it has operating time constants comparable to those of the speaker coils. If the time-averaged output of the amplifier comes within 5 dB of the speakers' safe limits, a yellow warning light on the SFC-1's front panel comes on. At the absolute maximum limit, a red LED lights and the signal level is slowly reduced (it is gradually restored when the potentially dangerous power levels have ceased).

BACK TO BASICS: THE DESIGN PROCESS

Strange as it may seem, it is rare to find an audio product designed from the start to interact synergistically with properties of the human hearing system. Time-delay systems are one example of the genre, and the dbx SFX-1 speaker system is another. Instead of concentrating on what might be called the engineering trivia of loudspeaker design—driver materials or shape, exotic forms of distortion, and the like—Dr. Mark Davis, psychoacoustician and designer of the SFX-1, had only one basic goal: "the design of a stereophonic loudspeaker system whose radiation pattern has been optimized to maintain constant imaging throughout most of the listening room."

Note that the traditional audio parameters of high fidelity (frequency response, distortion, etc.) are absent from this goal. Why? Because there were more important things to worry about. "The overall sound quality of a

loudspeaker system is primarily mediated by its radiation pattern" was Davis's fundamental hypothesis. Not only frontal, or "on-axis," response has to be considered, but all the so-called "off-axis" responses must also be controlled, not simply left to chance once the frontal response has been made flat.

When listening to speakers "you do not hear the drivers, you hear the radiation pattern," according to Davis. A speaker's "sound" is a composite of the frontal radiation and what bounces off the walls, ceiling, and floor. Get the

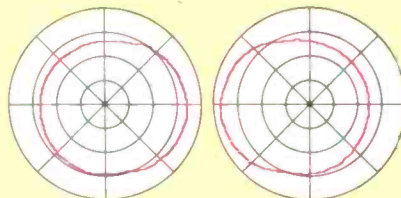


Figure 1: the desired radiation pattern. radiation pattern right, and the rest will fall into place.

The derivation of the ideal radiation pattern was the first task in the design of the SFX-1 and the point where

psychoacoustics first stepped in. The optimum pattern was determined by an experiment, a controlled listening test on the "psychoacoustics of horizontal localization"—that is, how we hear stereo images. It was found that the ideal pattern is moderately directional, with about a 10-dB difference between the levels in the loudest and softest directions of radiation (Figure 1). What's truly unusual is that the loudest axis points toward the other speaker.

A stereo image is formed by the ears' analysis of the comparative arrival times and intensities of the signals from each speaker. When you are standing closer to, say, the left-channel speaker, its sound arrives at your ears before that of the right channel, which would normally collapse the image into the left speaker. To maintain a stereo image between the speakers, the perceived level of the right-channel speaker has to be higher when the listener is standing closer to the left speaker, thus "pulling" the image toward the center. Davis's radiation pattern trades off differences in sound-arrival time for differences in sound intensity.

The most significant feature of the dbx Soundfield One system is not its unusual design or fine measured performance, but how it sounds. Regarding that, let me say first of all that the imaging qualities of this system lived up to the manufacturer's claims in full measure. With programs that placed perceived sound sources at distinct points between the speakers, it was possible to walk around the room, and even up to the speakers themselves, with little or no apparent change in position or volume of the program components. It was disconcerting, in fact, to find that standing close to the front of one speaker sometimes caused it virtually to disappear sonically, apparently leaving the other speaker to carry the program alone. In general, however, the apparent volume and stereo-stage configuration were practically independent of the listening location. This quality alone would be sufficient to set the SFX-1 apart from conventional speakers—and, in our opinion, above most of those on the market.

VANISHING SPEAKERS

What about the sound quality itself as distinguished from the imaging properties? We soon discovered that listening to the Soundfield One can be very addictive. Once suitable control settings on the SFC-1 have been established, these rather large speakers seem to

vanish, leaving the listener gratefully immersed in a sea of music. Almost any complimentary adjective could be applied to the sound of these speakers without undue exaggeration. Still, it must be remembered that the system's control flexibility permits considerable variation in the overall sound. These speakers can be made to sound just as good (or bad) as the listener prefers—or as the program material itself may merit.

POWERFUL IMPRESSION

Listening to music on both Compact Discs and dbx-encoded LP records, we were able to put the controller's power monitor to the test. The red warning LED lighted at approximately the clipping point of our 200-watt amplifier with such dynamic material as Telarc's CD recording of Stravinsky's *Firebird*. The sound reproduction at this high level was superb in its stereo spread and impact, and the speakers withstood this treatment easily. It is apparent that even more powerful amplifiers could be used to advantage with the SFX-1 system since dynamic peaks can far exceed the average power output to the speakers without overheating or damaging the drivers. Together, the twenty-eight drivers in a pair of SFX-1 speakers can safely absorb surprisingly large amounts of power.

(Continued on page 86)

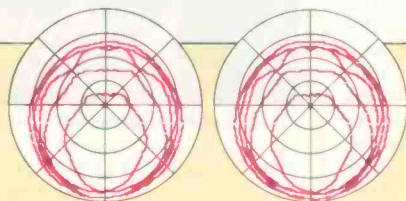


Figure 2: a typical speaker's pattern.

Davis also discovered that in order to maintain a "fused" image with music, the radiation pattern had to be held "across substantially the entire audio band." The frequency response, in other words, had to be flat regardless of the horizontal angle of radiation from the speaker. This was the hard part.

A typical front-firing speaker system (like most speakers on the market today) has a radiation pattern that looks something like that in Figure 2, which shows the radiation pattern in five frequency bands of one highly regarded front-firing three-way system. As the frequency changes, so does the radiation pattern, becoming narrower as the frequency rises. Although the frontal response is flat (all the curves meet on the front axis), the off-axis responses are definitely not. This behavior is typical of front-firing

speakers, and Davis believes it is responsible for their characteristic "boxy" sound quality.

The problems in designing the dbx SFX-1, then, were how to create the desired radiation pattern, an unusual one to begin with, and how to maintain it over a wide range of frequencies using cost-effective, rugged, and proven dynamic drivers—which would ordinarily produce radiation patterns like those in Figure 2. The solution was to adopt a technique used in advanced radar and sonar systems: the phased array. A phased array is a multidriver system in which the frequency and phase response of each driver is manipulated so that the combined responses from all the drivers results in the desired radiation pattern. The drivers "interfere" with each other deliberately in a specific, controlled fashion.

In dbx's SFX-1, the fourteen drivers in each speaker are in a phased array. The complex signal conditioning necessary is performed by a very complicated crossover circuit. Nearly every driver must receive a signal that differs even from the other drivers covering the same frequency range.

The crossover circuit—and the acoustical analysis needed to specify the necessary crossover characteristics—could only have been designed with the aid of a computer, though in this case it was nothing more advanced than a bank of Apple home computers.

The outcome is the radiation pattern shown in Figure 3, measured from the finished SFX-1. It closely matches the ideal pattern, at least above 150 Hz (lower frequencies are emitted almost omnidirectionally but have little effect on the stereo image). It's nice to see

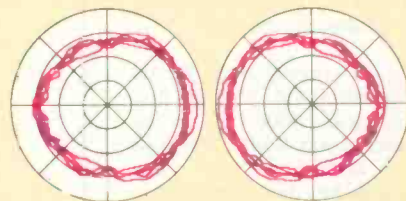


Figure 3: the SFX-1's radiation pattern.

psychoacoustical research and audio practice come together in a product that can accurately be described as unprecedented. It's also gratifying that it sounds so glorious. David Ranada

RECORD MAKERS

BY CHRISTIE BARTER
AND STEVE SIMELS

BBRITAIN'S Royal Opera, from Covent Garden in London, will make its first trip to America when it visits Los Angeles this month as part of that city's Olympic Arts Festival. Led by its music director, Sir Colin Davis, the company will present three operas, including its celebrated production of Benjamin Britten's *Peter Grimes* with Jon Vickers in the title role.

Davis, Vickers, and the company recorded *Grimes* for Philips Records in 1978. A later performance of the work with the same artists is available in video on Pioneer LaserDisc.

The Royal Opera opens at the Dorothy Chandler Pavilion in Los Angeles on July 9



Hairy Gary Glitter

with a new production of Puccini's *Turandot*. Gwyneth Jones and Plácido Domingo will sing the leading roles. The third opera in the company's repertoire for L.A. is Mozart's *The Magic Flute*. Davis's new recording of that work will be released by Philips in the fall. □

ALSO coming from across the Pond for his first American tour is British rocker Gary Glitter. No less an authority than Boy George has described Glitter as "pure entertainment on all levels," proving that chest hair still has a place in rock-and-roll.

Although Glitter has never appeared in the United States before, his records



PHILIPS RECORDS

Jon Vickers as *Grimes* in L.A. Olympic Arts Festival

have—most recently as one of Epic's ill-fated ten-inch NuDisks of a few years ago. His early Seventies singles were among the purest pop music ever made by Western man, and they influenced a number of American performers (ask Joan Jett, for instance).

It's a fairly safe bet that Glitter will not be doing any Britten operas on his American tour. He will be bringing his original back-up, the Glitter Band, and a new album, "The Leader," which contains all eleven of his U.K. chart singles, including *Rock and Roll (Parts 1 & 2)*.

Big Question: Will Gary, who is known for mammoth weight problems, be able to squeeze back into that ridiculous suit? □

GUITARS for bars? It's not a scene from a rock-and-roll remake of *20,000 Years in Sing Sing*, but just Pete Townshend in a pose from his soon-to-be-released Sony Video LP, called simply "Pete Townshend." (They're clever, those Brits.) Originally made for MTV, the tape features seven video clips done to accompany the audio album "All the Best Cowboys Have Chinese Eyes." It will be available in Beta Hi-Fi and VHS stereo.

Also due and noteworthy from Sony, through a new leasing arrangement with MTV, are excellent Video LP live concerts by Graham Parker and Warren Zevon, and, on a slightly less exalted aesthetic level, sets by Kansas and the Outlaws. □

Townshend behind guitars, soon to be a major Video LP



SONY CORP.

BACK in Romania they may have laughed when young Gheorghe Zamfir sat down to play the accordion, but when he switched to the panpipes, or panflute, it became serious business. Now that he is the King of the Panflute, it is very serious business indeed. His international record sales are so big that in ten countries they have won him all of nineteen Platinum and twelve Gold records.

Even in the United States, where Zamfir made his first solo appearances only recently, his record sales have topped 200,000. He appeared at the classiest West Coast halls in the spring, and he will return in the fall to play at the Kennedy Center in Washington and at Avery Fisher Hall at Lincoln Center in New York.

A multimedia performer,



PHILIPS RECORDS

Zamfir goes Hollywood

Zamfir has taken to U.S. radio and television (including the Merv Griffin Show). He composed the score for John Avildsen's film *The Karate Kid*, released in June. The soundtrack is a current PolyGram release from which a single is being pulled.

His other recent film credits include the scores for Robert Duvall's *Angelo, My Love* and Peter Weir's cult picture *Picnic at Hanging Rock*. Zamfir's panpipes are also featured on the soundtrack for Sergio Leone's *Once Upon a Time in America* starring Robert de Niro.

Zamfir has not neglected his classical career, however. His latest Philips release (412 221-1) features his own *Rhapsodie du printemps* and Concerto No. 1, which he performs with the Monte Carlo Orchestra! □

RECORD MAKERS

Mel Brooks shakes his booty in the brilliant video version of *The Hitler Rap*, his hilarious dance record "inspired" by his remake of Ernst Lubitsch's 1942 film *To Be or Not to Be*. As you may know, MTV has refused to air the five-minute parody (allegedly for "tastelessness," which is mildly astonishing given the sex-and-violence MTV peddles routinely), but have no fear. Soon you'll be able to catch the video in movie theaters. In a canny marketing move, 20th Century Fox has decided to re-release *To Be* with *The Hitler Rap* as an accompanying short subject (the record, by the way, is still available as an Antilles twelve-inch). □

American concert music is no longer the wallflower of the arts. Flutist Ransom Wilson's album of works by Steve Reich, Philip Glass, and Frank Becker, released by Angel Records in 1982, sold well enough that Angel had Wilson back in the studio this year to record more of the same.

The new album, "Meet the Minimalists," is scheduled for September release. It contains Reich's *Eight Lines*



It's dance time for Hitler, but not on MTV

albums, says, "I feel very good about the renaissance in American composing. For too long it was academic and reached only a few people. The minimalists have something that reaches young people, and it's exciting to see these composers drawing large, enthusiastic, young audiences." □

Verdi's *Un ballo in maschera*. The musicians for the record were members of the Orchestre de la Suisse Romande, but to assure an idiomatic sound the back-up choristers were bussed over the Alps from Italy. Sales of "Mamma" are sure to peak in this country later this summer when Pavarotti appears at major American arenas in New York, Dallas, Chicago, San Francisco, and Los Angeles. □



Minimalist Reich, conductor Wilson, producer Laursen

and the première recording of John Adams's *Grand Piano*. Wilson performs here not as flutist, but as the conductor of his orchestra, the Solisti New York.

Angel's Patti Laursen, who produced both of these

THE new recording of popular Italian songs sung by Luciano Pavarotti and collected under the title "Mamma" on London Records was recorded in Geneva while the great tenor was singing in performances of

"Jump" album he adopted a musical-comedy sound. Martin Fyodor Kipper's lyrics are hopping good fun, and the music is as hummable as anything coming out of Broadway this season. *F.R.*

THE name of Los Angeles-born soprano Arleen Augér is familiar to American classical record collectors because her discography consists of more than one hundred titles. But since she has spent almost all of her singing career to date in Europe, Augér is virtually unknown to concertgoers in her native country. This year she is changing all that and is shifting her base of operations back to the U.S.

Unable to make up her mind between the East and West Coasts, she is still shopping for a new home. But she will be appearing



Augér comes home

frequently on the American festival circuit this summer and in concert halls from coast to coast next season. Her latest record release is a major one, and it is on an American label. It's Brahms's German Requiem conducted by Robert Shaw for Telarc. □

Van Dyke Parks has put together a charming set of twelve songs for his new album, "Jump." Together the compositions form a song cycle based on Joel Chandler Harris's classic children's book, *Tales of Uncle Remus*. The adventures of Brer Rabbit, Brer Fox, and company may be pretty far out for a pop artist, but Parks has never been exactly conventional. His recent projects have ranged from calypso music ("The Clang of the Yankee Reaper") to film scores ("Popeye"). For the



THE Rolling Stones have settled their nearly decade-old legal dispute with former manager Allen Klein. This clears the way for Klein to release a home-video version of *Ladies and Gentlemen*, the Rolling Stones, the band's 1974 live concert film. Unfortunately, the deal doesn't cover the Stones' never-aired *Rock and Roll Circus* TV special. □

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JOE JACKSON'S
"BODY AND SOUL":
INTELLIGENT
ROMANTIC BALLADS
THAT LEGITIMIZE
NAKED EMOTION



Joe Jackson: affecting vocals, flickering piano chords, honest lyrics

ANYONE without the kind of "New Music" credentials Joe Jackson has would be hooted off to Las Vegas—or, worse, the Grammys—for making music as unapologetically romantic as that on his new "Body and Soul" album. But Jackson's honesty and intelligence let him get away with it.

Apart from legitimizing naked emotion, Joe Jackson has done another wonderful thing with "Body and Soul"—revived the lost art of liner notes. The ones here were written by the album's producer, David Kershenbaum, and they are informative and insightful in the tradition of Leonard Feather, Nat Hentoff, and Ralph Gleason. In fact, the entire package—patterned exactly after a Sonny Rollins series on Blue Note records, right down to the duotone cover, liner typography, and thicker-than-average disc in-

side—has the look and feel of Fifties jazz.

But, except for the larger ensemble used here, which includes muted trumpet and flugelhorn, saxophone, flute, and jazz guitar, the music itself retains the Latin/light-jazz flavor of Jackson's "Night and Day" and "Mike's Murder," with an emphasis on ballads and slow-to-moderate dance tempos.

This is not to suggest that Joe Jackson hasn't progressed with this album: he has. Lyrically, he's less cleverly circumspect about the emotional content. It's right out in the open this time. And "Body and Soul" can claim three of the best things he's ever done—*The Verdict*, *Loisaida*, and *Heart of Ice*. *The Verdict* is a song of powerful contrasts—majestic drum and brass

fanfares alternate with the hushed tone of Jackson's piano accompaniment and fragile vocal, all the more affecting because it scrapes against the very top of his range. *Loisaida* and *Heart of Ice* are, interestingly, instrumentals. The former is a mournful theme for sax and trumpet, which plumb the deepest lamp-lit sorrows while Jackson's piano chords flicker above like a starry night. *Heart of Ice* starts with just a steady rhythm in the high-hat, then adds trumpet and flute, bass, tenor and alto sax, piano, synthesizer and guitar—each combination restating, amplifying, and embellishing the song's luminous theme. It's capped with a chorus—sung by Jackson,

BEST OF THE MONTH

Elaine Caswell, and Ellen Foley—that's so jubilant it's impossible not to feel better after hearing it.

While Jackson's muse isn't always that sharp—*Go for It* is a good idea awkwardly executed—"Body and Soul" has so much heart you hardly notice. It's the kind of album that can carry emotions and attach itself to a time, a place, or a feeling like a favorite hat—or an old Sonny Rollins ballad.

Mark Peel

JOE JACKSON: *Body and Soul*. Joe Jackson (vocals, piano, saxophone); vocal and instrumental accompaniment. *The Verdict; Cha Cha Loco; Not Here, Not Now; You Can't Get What You Want (Till You Know What You Want); Go for It; Loisa; Happy Ending; Be My Number Two; Heart of Ice*. A&M SP 5000 \$8.98, © CS 5000 \$8.98; © CD 5000, no list price.

FRESH, GRIPPING RACHMANINOFF SHOWPIECES

JUST when you think you've had your fill of Rachmaninoff war-horses, the C Minor Piano Concerto especially, along comes a performance that seizes and holds your attention from first note to last. So it is with the new album of the concerto and the Paganini Rhapsody by Cecile Licad, the Manila-born 1981 Levintritt Award winner, with Clau-

dio Abbado conducting the Chicago Symphony in the first recording CBS has done with this orchestra in a good many years.

Theirs is no razzle-dazzle treatment of the much-played and sometimes abused Second Concerto. Throughout the first movement in particular there is a feeling of warmth and intelligence at work on the part of both pianist and conductor. Both seem intent on bringing out the symphonic quality of the music without slighting its sentiment and brilliance. The hallmark of the finale is stated in the crispness of the quiet orchestral opening, and the celebrated horn solo later on emerges with unusual loveliness.

In the Paganini Rhapsody, Licad cuts loose with all the virtuosity at her command, but never at the expense of musicality. And Abbado, too, takes great care to achieve a perfect integration of balance, color, and textural detail throughout. The digitally mastered sonics are up to the highest CBS standard. This disc is a winner!

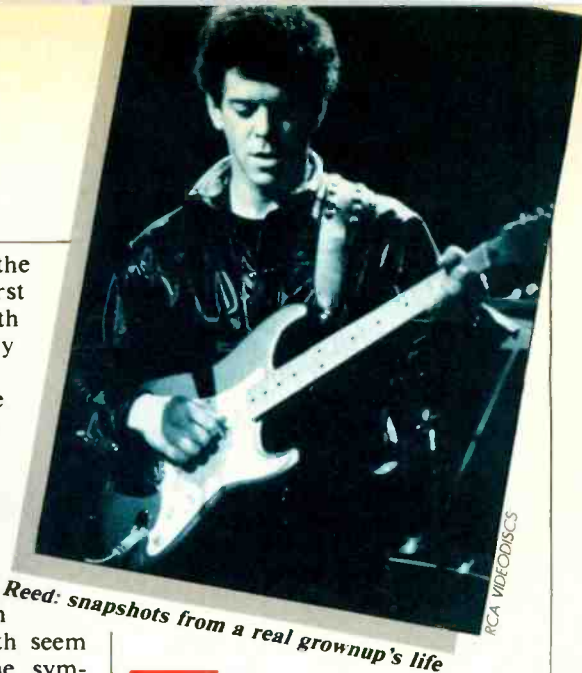
David Hall

RACHMANINOFF: *Piano Concerto No. 2, in C Minor; Rhapsody on a Theme of Paganini*. Cecile Licad (piano); Chicago Symphony Orchestra, Claudio Abbado cond. CBS ◉ IM 38672, © IMT 38672; © MK 38672, no list price.

Claudio Abbado and Cecile Licad: warmth, intelligence, and virtuosity



CBS RECORDS



Reed: snapshots from a real grownup's life

LOU REED'S TUNEFUL, ACCESSIBLE "NEW SENSATIONS"

"NEW SENSATIONS," among other things, just might be the Lou Reed album for people who've never liked Lou Reed. Though it's as smart and moving and (occasionally) abrasive as anything he's done in the past, it's also tuneful, beautifully produced, and (obviously deliberately) accessible. And yet, oddly, it's of a piece with his other recent efforts, "The Blue Mask" and "Legendary Hearts," which were made with the same instrumental forces but recorded more or less live.

Some of the album finds the former avatar of punk in an extremely sunny, even jocular mood. *Turn to Me*, for example, initially sounds like the raunchiest sleaze-rocker since the Stones' *Honky-Tonk Women* (Reed plays his own guitar, by the way), but on closer examination it turns out to be a hilarious deadpan mock-urban blues. Other times, the humor is blacker. In *Endlessly Jealous*, for example, Reed is fighting with his girl friend and begs his fingers, "Please don't break her arm."

Mostly, though, this is a (gasp!) serious record. The songs, by and large, are poetic snapshots from a real life—sometimes passionate, sometimes matter-of-fact musings by an actual grownup who hasn't quite given up on pop culture but who knows, as John Lennon once observed, that there's more to life than the *Billboard* charts.

Add to all that a very fine recording, lots of felicitous little touches in

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Great Taste
with Low Tar.
That's Success!



the arrangements (the real rather than synthesized strings that creep in at the end of *Endlessly Jealous*, Lou's brief, witty guitar solos), and the powerful jazz-tinged bass work of Fernando Saunders, and what you have is, if not the best, certainly the most consistent solo album of Reed's career. As he himself observes in one of the songs, "New Sensations" is rooted in the Fifties, but its heart is right here in 1984. Don't miss it. *Steve Simels*

LOU REED: *New Sensations*. Lou Reed (vocals, guitars); Peter Wood (keyboards); Fernando Saunders (bass); Fred Maher (drums); other musicians. *I Love You, Suzanne; Endlessly Jealous; Red Joystick; Turn to Me; New Sensations; Doin' the Things That We Want To; Legend; Fly into the Sun; My Friend George; High in the City; Arcade*. RCA AFL1-4998 \$8.98, © AFK1-4998 \$8.98.



Ghiaurov: fearsome presence

**DISTINGUISHED CAST
IN AN OUTSTANDING
DIGITAL MEFISTOFELE**

THE first digital recording of Boïto's *Mefistofele*, on London, is outstanding, an imposingly captured, consistently well-balanced performance. There is depth as well as richness to the sound, and the wide dynamic range serves this in-

termittently awkward but frequently exciting opera magnificently. A large share of the credit for the album's success surely belongs to the veteran conductor Oliviero de Fabritiis, who died before this crowning achievement of his recording career could be released.

Nicolai Ghiaurov has long been associated with the formidable title role. While he cannot now sustain the demonic energy of "*Son lo spirito che nega*" without audible signs of fatigue, he still projects a fearsome presence and dominates all his scenes with a fierce authority. In addition, there is the real luxury of having Mirella Freni and Montserrat Caballé as the opera's two heroines. Freni sings poignantly and is touching in her realization of Margherita's tragic predicament.

The dramatic requirements of Caballé's role are not great, but the vocal ones could hardly be fulfilled more lusciously. Luciano Pavarotti's singing as Faust cannot be seriously faulted, and he is absolutely melting in the Garden Scene. But he shows a growing tendency to overinflect his much-acclaimed tones, to phrase with a certain self-conscious artiness.

All the supporting singers are fine, especially the remarkable Piero de Palma as Wagner, the same role he sang in London's first recording of *Mefistofele* (withdrawn, alas) some twenty-

five years ago. The choral tone and precision are good, though the pronunciation could use more definition at times, and Julian Budden's notes are a mine of pertinent information. *George Jellinek*

BOÏTO: *Mefistofele*. Nicolai Ghiaurov (bass), Mefistofele; Luciano Pavarotti (tenor), Faust; Mirella Freni (soprano), Margherita; Montserrat Caballé (soprano), Elena; Piero de Palma (tenor), Wagner; others. London Opera Chorus; National Philharmonic Orchestra. Oliviero de Fabritiis cond. LONDON ● LDR 73010 three discs \$32.94, ©LDR5 73010 two cassettes \$32.94; © 410 175-2 three discs, no list price.

NEW ON CD
*Recent releases of
previously recommended
recordings*

POPULAR

- **Jeff Beck:** *Wired*. COLUMBIA EK 33849. "Taste, though, and delicacy." (October 1976)
- **Thomas Dolby:** *The Flat Earth*. CAPITOL CDP 46028-2. "Flashes of inspiration." (June 1984)
- **Dream Girls.** Original Broadway cast. GEFEN 2007-2. "Jennifer Holliday clearly reveals an impressive voice...." (October 1982)
- **The Fantasticks.** Original Off-Broadway cast. POLYGRAM 821 943-2. "...fantastick." (November 1979)
- **42nd Street.** Original Broadway cast. RCA RCD1-3891. "Demonically tap-happy." (April 1981)
- **Emmylou Harris:** *White Shoes*. WARNER BROS. 23961-2. "Real rock energy." (March 1984)
- **The Jacksons:** *Triumph*. COLUMBIA EK 36424. "An impressive array of hits." (February 1981)
- **Christine McVie.** WARNER BROS. 25059-2. "Sterling music, a rare achievement." (May 1984)

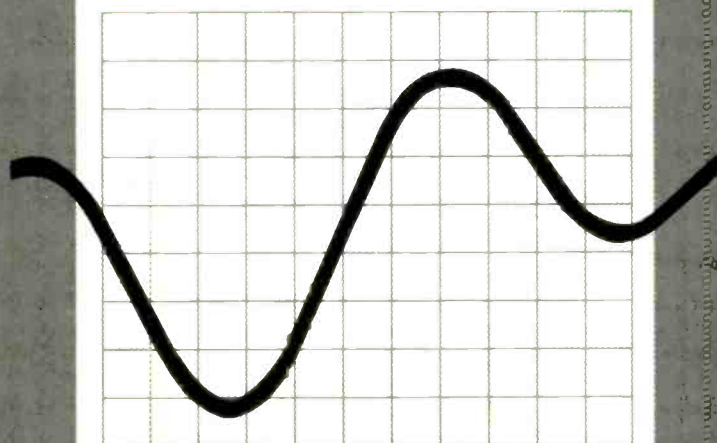
CLASSICAL

- **Bach:** *Mass in B Minor*. Rifkin. NONESUCH 79036-2. "Fascinating." (January 1983)
- **Britten:** *War Requiem*. Rattle. ANGEL CDC 47027. "A beautiful, stirring performance." (May 1984)
- **Charpentier:** *Acteon*. Christie. HARMONIA MUNDI HM 90.1095. "Contagious rowdiness." (February 1984)
- **Chausson:** *Concert in D*. Perlman, Bolet. CBS MK 37814. "A loving performance of a little-known masterwork." (October 1981)
- **Mahler:** *Symphony No. 9, in D Major*. Karajan. DG 410 726-2. "Stunning orchestral execution." (October 1981)
- **Mozart:** *The Magic Flute*. Karajan. DG 410 967-2. "A beauty." (November 1980)
- **Ravel:** *Gaspard de la nuit*. Prokofiev: *Piano Sonata No. 6*. Pogorelich. DG 410 363-2. "Awesome splendor." (November 1983)
- **Rimsky-Korsakov:** *Scheherazade*. Muti. ANGEL CDC 47028. "A refreshing account." (June 1983)

REG WILSON/DECCA

S T E R E O

H I G H
T E C H

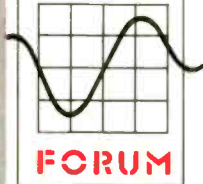


FORUM

HIGH TECH FORUM was created so that you and the manufacturers could share the ideas, concepts and philosophies behind their most advanced products.

In HIGH TECH FORUM you'll get in on behind-the-scenes manufacturing processes that make for a superior audio component or line of components. Learn from company engineers how they achieved the desired sonic quality. In short, learn what makes these products meet your high standards of music reproduction.

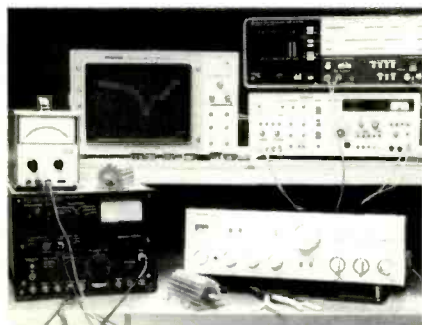
R E V I E W



Test Bench vs Real World: The Difference Can Be Heard

Considering the many different design concepts and technologies available, choosing an audio component can be a complicated matter. Manufacturers attempt to ease the task by providing performance specifications on their various models. The implication is that by simply comparing the specifications of a number of components, an audiophile can choose the desired caliber of performance in a given price range.

While specifications can reveal something of a particular product's technical capabilities, they may not accurately reflect that unit's performance in an actual use situation. Our test bench photo shows a component surrounded by testing equipment—and it clearly illustrates the difference between a laboratory and a music listening room.



Onkyo products have long reflected leadership in innovative technological design coupled with precision manufacture. Our design approach embodies our concern with both the laboratory and the actual listening environment, and our components possess technical virtues that are clearly audible. Here are just a few examples of Onkyo's technological/musical approach to the problems of sonic fidelity.

AMPLIFIERS FOR MUSIC.

Our two proprietary amplifier circuits—Delta Power Supply and Dual Super Servo—provide outstanding performance because they were designed based on an understanding of what actually occurs in a listening environment, when musical signals and not test tones are the program source. Conventional amplifier power supplies use bridge rectifiers. Unfortunately, the 120 Hz ripple voltage in the bridge output produces modulation noise in music signals that

are near or at the same frequency. This limits the dynamic range of the amplifier and causes bass "smear." The Onkyo Delta Power Supply incorporates a special rectifier topology that provides clean DC and prevents any intermodulation effects.

Super Servo circuitry, found in Onkyo's power amplifier sections, provides a special feedback loop that operates from 5 Hz down to 0 Hz (DC). This loop eliminates unwanted DC offsets and spurious infrasonic AC components while maintaining the benefits of direct-coupled amplifier performance. The audible result is deep, taut bass reproduction, with rock-steady stereo imaging.

CASSETTE DECK MOTORS AND SOLENOIDS.

In ordinary cassette decks, the tape transport section is operated by a single motor. This motor drives the capstan that moves the tape past the heads, and in addition, drives the tape supply and take-up hubs. This can present a problem as it is impossible to optimize a one-motor mechanism for a multiplicity of tasks. The problems are alleviated somewhat by adding a second motor. One motor serves the capstan, and the other drives the cassette hubs during play and fast wind. Three-motor designs usually provide a motor for the capstan and separate motors for each cassette hub. This provides good tape speed stability plus fast wind and rewind times.

However, with most three-motor transports, solenoids are used to reposition the tape head block assembly when switching from play/record to fast wind or off. Solenoids are moving-core electromagnets that are fast and abrupt in their action, and the normal repeated repositioning of the head block can easily shock it out of alignment. The azimuth alignment of the tape head to the tape is extremely critical, in that a fraction of a degree of misalignment causes severe high frequency loss, and Dolby mistracking.

Onkyo's approach to maintaining head alignment is a special three-motor transport configuration: one motor drives the capstan, a second motor drives the take-up and supply hubs, and a third dedicated motor and gear-reduction

assembly provides smoothly controlled, shock-free positioning of the head block. This ensures stable long-term azimuth alignment and maximum tape fidelity.

COMPUTER-ASSISTED FM.

Our new Automatic Precision Reception (APR) system takes the guesswork out of FM tuning with microcomputer controlled automatic circuit optimization. As each new station is tuned in, critical tuner parameters are adjusted automatically to the actual demands of the signal being received, thus ensuring maximum fidelity, even under poor reception conditions.

TURNTABLE ISOLATION.

A phono cartridge is designed to be an extremely sensitive vibration transducer. Unfortunately, the stylus also responds to whatever non-musical vibrations impinge on it, such as turntable rumble and external shock and vibration. The result can be a constant low-frequency background noise, a blurring or ringing quality in the sound—or even a loud howling if the volume or bass controls are turned up too high.

The techniques for dealing with turntable rumble are well known, and Onkyo has applied them in full measure. However, the problems of external shock and vibration have not been addressed successfully by most turntable manufacturers. Onkyo developed a three-step turntable decoupling system that thoroughly isolates the playing mechanism from unwanted acoustical and mechanical interference. The Onkyo Triple Stage Isolation system provides a greater degree of protection from external vibrations, including acoustic feedback, and thereby provides cleaner sound with wider dynamic range:

These design concepts, developed by Onkyo, provide maximum audio fidelity in the actual listening environment, in addition to superb test bench specifications. Your Onkyo dealer can show you how our advanced engineering can provide an incredible listening experience and demonstrate why... Nobody Knows More About Audio Than Onkyo.

ONKYO

200 Williams Drive, Ramsey, NJ 07446 (201) 825-7950

HIGH
TECH



FORUM

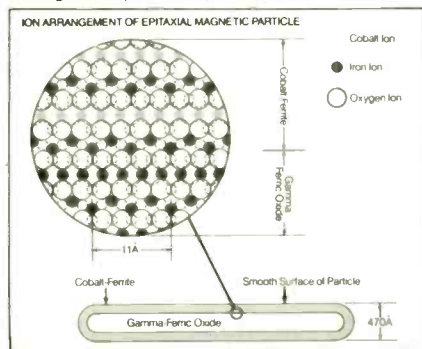
Introducing Maxell XL-S Cassettes— Two Paths to Recording Perfection

Many recording engineers believe the single most important element in accurate sound reproduction is dynamic range. And that area, above all, is where Maxell's new XLI-S and XLII-S cassettes are overachievers. The truth of the experts' belief can be heard: When a cassette can capture and play back the dynamics of an original performance, you do hear the difference. And the improvement in quality is astounding.

As technical support for the improved dynamic range, we've also provided higher sensitivity, higher output levels, greater signal-to-noise ratios, and greatly reduced distortion, and then housed that tape in cassette shells made to tolerate five times stricter than industry standards. The result is Maxell XLI-S and XLII-S Audio Cassettes—clear superiority at the leading edge of recording technology.

IMPROVED MAGNETIC PARTICLES.

A unique new High Epitaxial particle is the basis for the unexcelled performance of the XL-Series. Maxell engineers literally grow these two-layer particles under tightly controlled conditions that enable them to consistently meet a variety of special requirements. Because they are ultra-fine in size, and completely uniform in shape, the particles can be packed smoothly onto the tape in unprecedented density. That, in turn, translates into higher output and greater sensitivity at high frequencies, with lower noise.



You'll also find you can set the recording levels higher than with other cassettes. That's because XL-S cassettes have remarkable resistance to tape saturation or overload, the bugaboo that causes distortion and loss of highs when more signal is fed to the tape than it can hold.

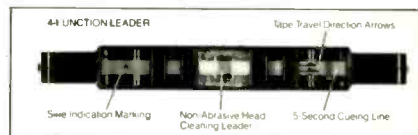
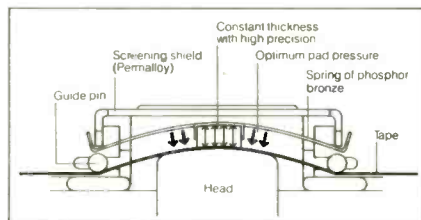
On playback, output will be higher, yet with lower distortion and noise.

ADVANCED BINDER TECHNOLOGY.

Maxell has long understood that creating a superior magnetic particle is only one step in the process of making a superior recording tape. Equally important are the methods used to apply and fix that oxide onto the tape's base film. Maxell engineers created an entirely new binder technology for XL-S, the Molecular Fusion system that offers several important advantages. For one, the high polymer resin that's used is self-curing. This eliminates the need for adhesive-type binders—and the plasticizer oozing that often accompanies them. The oxide-to-base bond is stronger, more durable, and more uniform, thus providing significant improvements in the uniformity of packing density, thickness, and dispersion. The result is a flatter tape—from one end to the other—and a tape with dramatically reduced modulation noise.

NEW HOUSINGS.

Because the cassette housing becomes part of the tape transport system, Maxell has always focused special attention on this aspect of their products. The new PA (Phase Accurate) mechanism is part of every XLI-S and XLII-S cassette. PA includes refinements such as anti-curling hubs, onto which the tape is secured by an exclusive Quin-Lok clamp assembly. This eliminates bumps in the tape pack as the tape winds, and thereby prevents loss of head contact during play or recording. Special smoothing guide rollers hold the tape tension in balance and suppress vibration during use. The tape pack is sandwiched between specially embossed slip sheets, compounded with graphite, to reduce friction during play and fast winds and ensure neat, smooth packing. And a new type of



pressure pad has been devised for the PA mechanism. The pad thickness and the tension of the phosphor bronze spring to which it is affixed have been made twice as accurate as those in conventional cassettes.

THE RIGHT TAPE FOR THE RIGHT SETTING.

XLI-S is suitable for use in just about any cassette deck ever made. It has been designed to work optimally at the Normal bias and equalization standard, yet to tolerate the small differences in bias and equalization that occur from one deck manufacturer to another.



XLII-S should be used in the High (Chrome) bias and equalization switch positions. That yields an improved signal-to-noise ratio plus the wide frequency response, and other fine performance characteristics inherent in both XL-S cassettes. Since the beginning of cassette recording, Maxell has been in the business of creating excellence...the XL-S cassettes continue in that tradition.

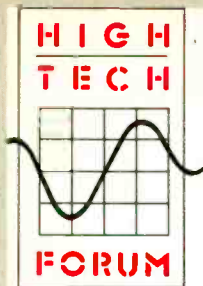


IT'S WORTH IT.

Maxell Corporation of America

60 Oxford Drive, Moonachie, NJ 07074

CIRCLE NO. 3 ON READER SERVICE CARD



For Superior Car Stereo Performance— Dynamically Equalized/ Bi-amplified/Powered Speakers

Most researchers would agree that the amplifier-to-speaker match is one of the most problematic—if little discussed—areas in audio. For an engineer, there are at least four compelling theoretical reasons for integrating the speaker and amplifier into a single unit:

1. The output circuit of the amplifier can be specifically matched to the impedance characteristic of the driver.
2. The damping factor of the amplifier can be set to provide the optimum "Q" at resonance for a given driver.
3. The amplifier can be designed to dynamically control the normal electro-acoustic and mechanical characteristics of the driver to flatten its frequency response and to prevent overdrive distortion—or damage.
4. The usual crossover network in series with the driver is no longer necessary. This eliminates the losses of damping factor and dynamics typical of conventional crossovers.

And when a powered speaker is also *bi-amplified*, there are at least four additional significant advantages:

1. The dynamic characteristic of the individual amplifiers can be tailored for optimum match (in respect to crossover frequency, relative level, etc.) to the needs of each driver.
2. Intermodulation distortion effects are eliminated by separate dedicated amplifiers for the high and low bands.
3. Momentary overdrive of either amplifier leaves the other amplifier and its frequency band unaffected.
4. The specific power demands of each driver are met separately.

THEORY INTO PRACTICE.

Audiovox, a 19-year-old autosound company totally invested in state-of-the-art technology, made their own engineering analysis of the advantages of bi-amplified, powered, and dynamically equalized speakers. And their full commitment to the concept is expressed in the new line of "Constant Velocity" car-stereo speakers introduced early this year. There are four drivers currently available in the CV series: a 6 x 9-inch woofer (Model SW1), a 6 x 9-inch two-way coaxial (Model 620), a 5¼-inch two-way coaxial (Model 520), and a 4-inch single-cone full range (Model 410).

The physical and electrical operation of the CV series embody a host of novel features:

Within the compact housing surrounding the magnet structures of the coaxial models are individual, direct-coupled bridged output amplifiers for both the woofer and the tweeter. The woofer is driven by an 18-watt amplifier and an independent 12-watt unit drives the tweeter. In this way, each amplifier can be optimized for the specific frequency range and driver that it serves. The result is a measureable reduction in intermodulation distortion and a more-than-noticeable increase in clarity. (The CV-SW1 subwoofer also has two amplifiers but they drive the dual windings of its voice coil. The CV-410 has a single built-in amplifier.)

The CV circuit is completely sealed in epoxy to ensure maximum long-term stability. The aluminum heatsink is kept well within safe operating temperatures even under the often hostile automotive environment by means of a unique (Patent Pending) and very efficient radiant cooling technique that also employs the woofer cone movement to supply additional air flow.

DYNAMIC EQUALIZATION.

The fact of built-in amplification does not in itself explain the quality of sound of the CV speakers. By treating the amplifier and speaker as a single integral system, it is possible to design in dynamic equalization circuits to automatically compensate for non-linearities in the speaker, the acoustic environment of the car, and the human ear's loudness response. The functions are provided on an automatic and dynamic basis with more precision than can be achieved through manual adjustments.

To compensate for the tremendous variety in automobile interiors—and

speaker mounting—and the effect these can have on high-frequency absorption, detented tweeter-level controls are provided for the CV-520 and the CV-620. The CV-SW1 subwoofer has a similar control to set its relative output level. These controls, when set at the time of installation, need no further adjustment.

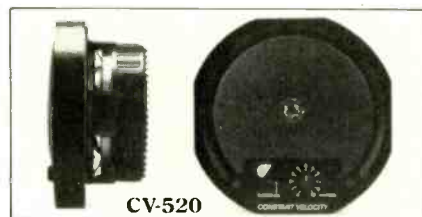


CONTROLLED EXCURSION.

The Constant Velocity design's special breakthrough is in the manner in which its circuits control speaker cone motion. Standard designs have always been compromised in performance by the constraints placed upon the cone movement by the typical tight cone suspension. Without such restrictions, the cone would be free to move easily in direct compliance with the input signal, thus providing greater efficiency and wider frequency range. But the cost of such "freedom" would be increased potential for distortion through non-linearity and "bottoming-out" of the voice coil.

These and similar problems are avoided in the CV speakers because the voice coil behavior is under electronic, rather than purely mechanical, control. This assures that the response is full and perfectly defined at all volume levels. It is virtually impossible for the specially designed polypropylene-coated woofer cone to break up or bottom out. The ferrofluid-treated cone tweeters used on the CV-520 and CV-620 reproduce the higher frequencies with clarity and in perfect balance with the woofer.

In total, the Audiovox CV series clearly represent a substantial step forward in the theory and performance of car-stereo speaker design. Prove it to yourself at your nearest Audiovox dealer.

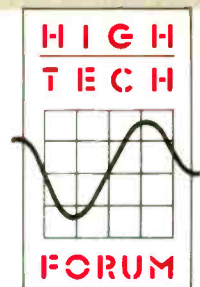


**CONSTANT
VELOCITY**
BY AUDIOVOX

150 Marcus Blvd., Hauppauge, NY 11788 (516) 231-7750

CIRCLE NO. 6 ON READER SERVICE CARD

EHG Hi-Fi and HD-PRO—TDK upgrades its video tapes to meet the demands of a changing market



When TDK Electronics was founded in 1935 to explore the commercial potential of industrial ferrite magnetic materials, little did its engineering team realize that its strength and leadership in that field would lead it nearly fifty years later to become the number one manufacturer of quality magnetic media. In fact, almost 60 percent of today's audio hardware manufacturers use TDK tapes as their reference standard and count on TDK for the development of new products. TDK also produces 75 percent of the rotary transformers used in video head drums, a fact that keeps TDK's research on the leading edge of video technology.

AVILYN MOVES AHEAD

Back in the early 1970's, TDK stepped beyond the existing formulations that existed in audio tape at that time—most notably the chromium dioxide particle—to produce Avilyn, a magnetic particle consisting of cobalt ions adsorbed (coated) on finely-milled, needle-shaped gamma ferric oxide particles. These early

developments in fine-particle audio technology laid the groundwork for breakthroughs in today's video tape technologies—particularly TDK's two newest tapes formulated to meet the demands of today's new wave of high fidelity VCRs. The first of these breakthrough formulations, dubbed TDK EHG Hi-Fi, benefits the videophile who wants to be certain that lifelike video images are coupled with high quality stereo sound. The second breakthrough tape, HD-Pro, is the closest thing the connoisseur video taping can get to 1/4 inch resolution in a half-inch format—a tape which is ideal for live camera recordings, dubbing, special effects work and other pro or semi-pro applications.

CRITICAL PERFORMANCE

Both EHG Hi-Fi and HD-Pro share certain technical similarities which enable each to offer visually better results than their competition. TDK accomplished this by further refining Super Avilyn particles so that they are noticeably shorter, thinner and more uniform than particles used

response and sensitivity up 1 dB over Standard TDK tape.

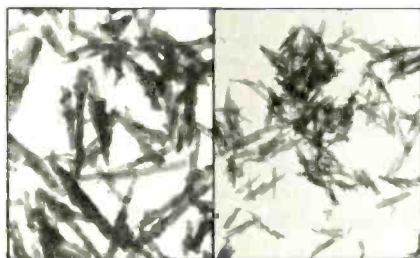
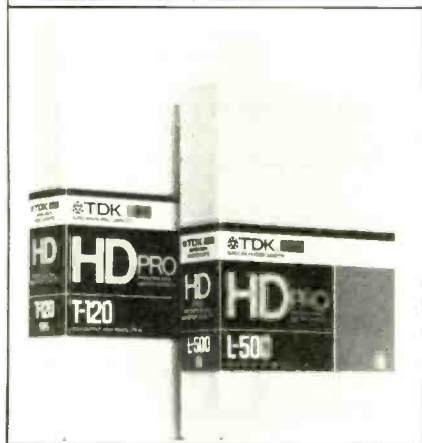
The second tape, HD-Pro, is without question the highest definition half-inch video tape on the market, boasting unequalled freedom from dropouts. And if you don't believe us, testing experts at *Asahi Camera* in Japan agreed, placing TDK well above its competition in this respect.

DIGITAL AUDIO RECORDING

A good video tape has wide and remarkably uniform response over a megahertz bandwidth, low noise relative to the signal recordable, and reasonable freedom from dropouts (random losses of signal as a result, usually, of physical imperfection in the tape coating). Digital recording on videotape doesn't care about bandwidth and low noise—but is profoundly disturbed by dropouts. Dropouts in digital audio are heard, and if sufficient in duration can sound as violent as the deepest sort of record scratch. The digital world has learned, as did *Asahi Camera's* tape tester, that not all video tapes are equal.

Digital usability has become a by-product of TDK's meticulous attention to physical integrity and the uniformity of the cassettes coming off its line. Both HD-Pro and EHG Hi-Fi reflect this careful attention to quality and detail. Remember, however, that these tapes are still the best video tapes you can buy, with features such as a precision-made "SQ" shell mechanism built to tolerances 2.5 times industry standards, a conductivity back coating, and ultrasmooth base film, contributing to the smoothest running performers on the market.

So whether you're a videophile whose needs are met by TDK's EHG Hi-Fi, or a master "pro" recordist who demands the sophistication of HD-Pro, you'll welcome the benefits of these recent developments. Just visit your favorite retailer and pick out a few to try on your own VCR. You'll quickly discover that the height of video performance just got higher.



Note the smaller size of the new HD-Pro particles (right) compared to standard particles (left).

in other tapes. This means the tape particles can be packed together more densely to produce better sound and video. In HD-Pro's case, the particles are so fine that they can be packed together 12 times more densely than TDK's own Standard tape. Designed to meet the demands of today's unerringly precise VCR's, TDK's EHG Hi-Fi delivers exceptional picture quality and dynamic sound—even after hundreds of plays. Signal-to-noise ratio is up 4.5 dB in luminance and 5 dB in chrominance over TDK's current Standard tape. This means razor-sharp definition, extra-bright colors, and extra detailing and shading even in black and white. EHG Hi-Fi also offers cleaner, more natural sound, with improved frequency

TDK
TDK Electronics Corp.
Technical Services Dept.

12 Harbor Park Drive, Port Washington, NY 11050
CIRCLE NO. 43 ON READER SERVICE CARD

Defining a Cost Effective Digital Monitor Loudspeaker

As readers of this publication are no doubt aware, audio technology is in the midst of a world-wide "digital revolution." And it is evident that loudspeaker systems are among the products most affected by the demands of digital program material.

B&W's approach to loudspeaker design has been clearly validated by one simple fact: More conductors, orchestras, and instrumentalists world wide have chosen B&W 801's as their classical music monitor system. This was true during the recent analog period, and it has continued to be true for today's digital recordings. In fact, it can be said that the B&W 801 has become the *definitive* monitor for the world's most discriminating recording professionals.

A FORMIDABLE TASK

Late in 1982, B&W set themselves a formidable task: The Research and Development team was commissioned to create a new line of loudspeakers that would embody all that had been learned from the Model 801—and in addition would meet certain other special requirements. The design goal, simply stated, was to provide the advantages of digital capability in a less costly package; the intention was to make B&W quality accessible to a greater number of music listeners.

The successful execution of the project is expressed in B&W's eight new monitor speakers. The DM Series are legitimate digital monitors that are not only affordable in themselves, but which, through their high sensitivity (efficiency), also reduce the power demands—and cost—of a digital playback system.



BEHIND THE DESIGN.

The "design brief" for the DM models had three main requirements:

(1) High sensitivity, not less than 90 dB SPL with 1 watt input measured at 1 meter. In fact, the DM Series systems offer 5 to 7 dB greater sensitivity than previous B&W systems. In addition to their high sensitivity, the systems must be capable of extremely high acoustical output, approximating that of a live performance.

(2) A wide and linear frequency response, mirroring as closely as possible the reference standard—the Model 801.

(3) A dramatic reduction in manufacturing costs. To achieve this, the drive units were totally redesigned so as to adapt them to cost-effective automated production methods.

The precision made possible by computer controlled production resulted in systems capable of extremely high performance. In particular, the exceptionally close tolerances between speaker pairs and their good polar distribution provides extremely accurate stereo imaging and depth information.

DM TECHNICAL DATA.

The smallest of the new models, the DM110, is a two-way system with a vented enclosure measuring only 19.3 inches high by 10.25 inches wide by 9.8 inches deep and weighing 18.5 pounds. The 8-inch woofer is crossed over at 3 kHz to the 1-inch dome tweeter via a fourth-order Butterworth squared circuit. Rated sensitivity is 91 dB SPL; frequency response is 70 Hz to 20 kHz \pm 3 dB.

Recommended driving power is 10 to 50 watts RMS. Suggested list price is an astonishingly low \$149 each, and matching speaker stands are available.

The DM220 is a three-way system with a more extended bass response and greater power handling capability. It employs two 8-inch drivers; one serves as a lower-bass driver, while the other handles the upper bass and midrange frequencies. The same 1-inch dome tweeter is used as in the DM110, and the 3 kHz crossover employs the Butterworth squared configuration plus a first-order difference filter. Rated sensitivity is 90 dB SPL; frequency response is 53 Hz to 20 kHz \pm 3 dB. Recommended driving power is 10 to 75 watts RMS. The sealed enclosure of the DM220 measures approximately 26.75 inches high by 11.4 inches wide by 12.6 inches deep and weighs 30.4 pounds. Suggested list price is \$249 each, and matching stands are available.

The DM330 uses essentially the same driver and crossover configuration as the DM220, but in a taller (by 7 inches) floor-standing enclosure. The cabinet design has been optimized by computer modal analysis for improved bass transient response and lower coloration. Sensitivity is improved by 1-dB over the DM220, power handling is up to 100 watts, and bass response (-3 dB) has been extended down to 48 Hz. Suggested list price is \$349 each. The top model, the DM 3000, has a suggested list of \$895 each.

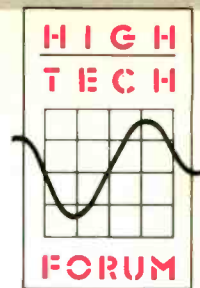
All eight models in the DM Series are capable of extremely high acoustical output levels. Typically, a pair of DM220's can produce 115 dB SPL in a 3,500 cubic foot room.

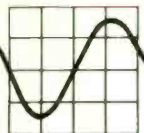
In all respects, the models in the Digital Monitor series have more than met their stringent design goals. Their high sensitivity, substantial acoustic-output potential, and excellent transient behavior, combined with a broad and linear frequency response, easily meet the technical demands of digital program material—and the musical demands of critical listeners.



P.O. Box 653, Buffalo, New York 14240

CIRCLE NO. 47 ON READER SERVICE CARD





Proton Offers Some Advice on How to Look at Video Monitors

From its very beginning, Proton has been a product-driven company. About two years ago we found an area where our talents and know-how could make a significant difference. With the improvement in laser discs, and the continued success of music videos, music lovers are beginning to seek full fidelity video to complement their high fidelity audio. To meet that need Proton has designed and produced an excellent video tuner-preamplifier, an exceptional integrated TV monitor receiver, and two superb video monitors with 19- and 25-inch screens. The superiority of the Proton video technology is clearly visible if you know what to look for—and we would like to tell you how to do just that.

The five main technical qualities that distinguish our high-performance monitors from conventional products are: *Overscan*, *Black Level*, *Linearity*, *Convergence*, and *Detail*.

OVERSCAN.

Most TV screens do not give you the full picture; in fact, the typical television set crops as much as 20 percent off the edges of the broadcast image! Sets are designed to *overscan* to compensate for picture size fluctuations. (People seldom notice when the picture edges are trimmed, but they usually complain when the picture doesn't completely cover the face of the screen.) Size fluctuations occur because a very bright scene can cause the picture to "bloom" (expand) and dark scenes can cause shrinkage. Normal variations in the AC line voltage can also result in picture size shifts. Proton solves such problems by the use of a special—and expensive—ultra-stable power supply. It costs us more money, but you get to see more picture.

BLACK LEVEL

Black can be beautiful, particularly when you compare the true blacks of a Proton monitor against the dark greys of conventional color sets. The ability to produce the dynamic range from pure black to pure white is the first step toward ensuring picture contrast, color quality, and three-dimensionality. The second step is to maintain the black under dynamic signal conditions. A computer-

grade power supply provides the hum-free DC voltage that does the first part of the job; a *DC restoration* circuit takes care of the rest.

A discussion of the operating theory of DC restoration would more than fill this page, so for the moment let's just point out the very visible benefits you should look for. The black and white dynamic range strongly affects the range, strength, and subtle shading of colors. In addition, previously unseen detail will be visible in the picture's black or dark areas, night scenes won't be lost in grey fog, and a sort of three-dimensional quality (which depends on subtle tonal gradations in the picture) will come through.

LINEARITY.

Most television screens do not produce accurate sizes and shapes. Circles become egg shaped, squares become rectangles, and straight lines bend near the edges of the screen. These problems arise from a lack of geometric linearity. The cure is not to be found with compass and protractor, but rather through paying special attention to the design of a complex arrangement of electromagnetic coils mounted on the neck of the picture tube. Properly known as the *deflection yoke*, its task is to magnetically deflect the electron beams passing through the tube neck so as to scan the picture tube screen linearly and precisely. Through careful tube design and precise yoke geometry, Proton achieves a visible improvement in linearity, from top to bottom and edge to edge.

CONVERGENCE.

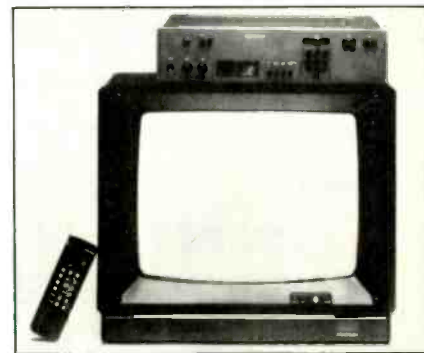
Also under the precise control of the deflection yoke, there are three separate electron beams shooting through the neck of the picture tube. These are responsible for the red, green, and blue elements on the screen. The beams themselves are colorless, but they are aimed to impinge on sets of phosphorus dots on the inside of the tube face that, when hit by the electron beams, fluoresce red, green, or blue.

These three colors, by themselves or in combination, produce *all* the colors—including white—that you see on a TV screen! Enormous precision is needed in

controlling the intensity and focus of the three beams to ensure the proper color mix in the continuously varying picture. When you see color fringes on edges or the wrong colors because the beams are off target, you'll know that the deflection yoke isn't all that it could be—and that you are *not* looking at a Proton monitor.

DETAIL

When you see crisp sharp lines and hard clean edges, when individual strands of hair are visible, you know that a set is delivering fine detail. Two factors determine picture detail: (1) the size of the phosphorus dots on the picture tube face, and (2) the bandwidth of the monitor's video section. Perhaps needless to say, we have paid particular attention to both areas. You should be aware that there are several different ways of specifying video frequency response and lines of resolution. As a result, it's wiser to compare video pictures than video specifications.



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DISCS AND TAPES
 REVIEWED BY
 RICHARD FREED
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BIZET: *Carmen*. Julia Migenes Johnson (soprano), *Carmen*; Plácido Domingo (tenor), Don José; Ruggero Raimondi (bass), Escamillo; Faith Esham (soprano), Micaela; others. Chorus and Children's Chorus of Radio France; Orchestre National de France, Lorin Maazel cond. ERATO/RCA ● NUM 751133 three discs \$32.94, © MCE 751133 three cassettes \$32.94; © ECD 880373 three discs, no list price.

Performance: **Basically good**
 Recording: **Very good**

This new version of *Carmen* is the by-product of a motion picture to be released in the U.S. this fall. Lorin Maazel presides over a lively performance with generally brisk tempos, maintaining light and transparent orchestral textures in which instrumental details emerge with great clarity. He has an excellent chorus at his disposal, and that includes the children, whose rendering of "*Avec la garde montante*" is exceptionally authentic-sounding. There are, however, several eccentricities. Maazel's opening tempo for the *Chanson bohème* is almost unbearably slow. Things pick up later, but the episode lacks spontaneity. The quintet in Act II is too fast and charmless, and certain later episodes (the "*Bel officier*" ensemble, for one) are a bit fussy.

Plácido Domingo has now recorded Don José three times. He towers over all his rivals in this role—and, for that matter, over all his colleagues here. Listeners attuned to a Berganza/Horne/Troyanos kind of mezzo lushness in the role of *Carmen* will require some adjustment to the light soprano timbre of Julia Migenes Johnson. But she offers an interesting, well-thought-out, and quite convincing portrayal of a wild, sexy, kittenish *Carmen* who turns into a tiger in the tragic finale.

Ruggero Raimondi's bass-baritone finds the in-between tessitura of Escamillo's music quite congenial: he sings the part well enough, though there could have been more personality projection. The Micaela of Faith Esham, on the other hand, is not yet of high international caliber, particularly in view of her recorded competition. The supporting singers are almost uniformly competent.



PHOTOGRAM INTERNATIONAL

BRENDEL'S NEW BEETHOVEN

THE new set of Beethoven piano concertos by Alfred Brendel and the Chicago Symphony under James Levine commands special attention. In an album note that is simultaneously charming and enlightening, Brendel gives valid reasons for his recording these works a third time, citing specific corrections made in some of the scores since his last cycle some six years ago. He also points out the aesthetic advantages of recording in concert instead of in a studio setting without an audience. But there's the rub. The audience is quiet enough during these performances, but Philips has unaccountably decided to give us generous helpings of the applause *preceding* as well as following each one. This is not only tiresome on repeated hearings, but perverse. It is the more regrettable because the performances, collectively and individually, are perhaps the finest yet recorded of these works—and the best *sounding*.

Everything about these performances is utterly right—so majestic and yet so com-

passionate, so profound and yet so charged with wit, so filled with Beethovenian spontaneity yet so meticulous in detail, balance, and proportion. In Levine and the Chicagoans Brendel has the best collaborators he has ever been given in concert recordings. One might revel in the glory of the orchestral playing itself, but the peaks of musical insight reached again and again throughout the cycle render even this level of virtuosity a matter of strictly secondary interest (though still indispensable in making these performances what they are). The recorded sound is superb in detail and in balance, and it is lifelike in the most flattering sense.

Richard Freed

BEETHOVEN: *Piano Concertos Nos. 1-5*. Alfred Brendel (piano); Chicago Symphony Orchestra, James Levine cond. PHILIPS ● 411 189-1 four discs \$47.92, © 411 189-4 three cassettes \$47.92; © 411 189-2 three discs, no list price.

On the whole, this is a respectable achievement, captured in excellent digital sonics. The spoken dialogue is closely miked, which can be distracting, but there is less of it than in the Solti recording for London. In the end, however, Solti's recording and Abbado's, on Deutsche Grammophon, remain my choices for this marvelous opera. G.J.

Explanation of symbols:

- = Digital-master analog LP
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- Ⓣ = Digital Compact Disc
- Ⓢ = Eight-track stereo cartridge
- Ⓛ = Direct-to-disc recording
- Ⓜ = Monophonic recording

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Kodály: **HÁRY JÁNOS**
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BOÏTO: Mefistofele (see Best of the Month, page 66)

BRAHMS: String Quintet No. 1, in F Major, Op. 88; String Quintet No. 2, in G Major, Op. 111. Pinchas Zukerman (viola); Guarneri Quartet. RCA ◉ ARC1-4849 \$12.98, © ARK1-4849 \$12.98.

Performance: **Radiant**
Recording: **Excellent**

Brahms's two string quintets, both mel- low, ripe works of his mature years, have inexplicably been just about the least frequently encountered titles in his abundant legacy of chamber music. They may still represent "discoveries" to a large number of otherwise experienced listeners, but they are both thoroughly and luminously Brahmsian in their coloring, characteristic themes, and wonderful range of moods. And it would be hard to imagine either work more beautifully played than they are here. The Guarneri Quartet has never sounded more appealing, and Pinchas Zukerman's viola fits in seamlessly. Both works are beautifully recorded too, with all the strands clear and in ideal balance. This album may be just what is needed to win a wider audience for these curiously neglected works. In any event, it is one of the most enjoyable chamber-music releases of the last several seasons. Highest recommendation. *R.F.*

GLUCK: Iphigénie en Tauride. Pilar Lorengar (soprano), Iphigénie; Walton Groenroos (tenor), Oreste; Franco Bonissolli (tenor), Pylades; Dietrich Fischer-Dieskau (baritone), Thoas; Angelika Nowski (mezzo-soprano), Diane; others. Chorus and Orchestra of the Bavarian Radio, Lamberto Gardelli cond. ORFEO ◉ S 052833 three discs \$41.94.

Performance: **Stark**
Recording: **Fine**

Iphigénie en Tauride was Gluck's penultimate opera. When he wrote it he was not only at the apex of his creative power but also at his most laconic. It is an austere work.

And this is an austere performance. Both Pilar Lorengar as Iphigénie and Walton Groenroos as her brother Oreste sing with continuous intensity, rigid rhythms, and little vocal coloration. Dietrich Fischer-Dieskau barks out the role of Thoas in an appropriately savage manner. The only humanity in the opera is displayed by Pylades, and Franco Bonissolli makes the most of Pylades's heartfelt compassion for Oreste. Lamberto Gardelli paces the music spaciouly and brings a chill to Gluck's unyielding nobility of style. Perhaps Gluck's controlled musical language and chiseled classicism is not to everyone's taste, but those who appreciate his music will appreciate this fine album. *S.L.*

MENDELSSOHN: Symphony No. 4, Op. 90 (see SCHUBERT)

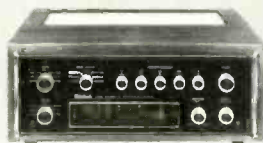
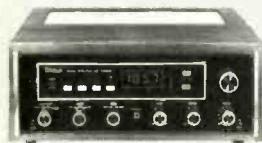
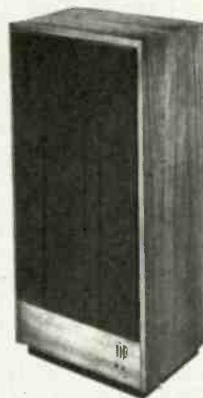
MOZART: Sonata in D Major for Two Pianos (K. 448); Fugue in C Minor (K. 426); Larghetto and Allegro in E-flat Ma-

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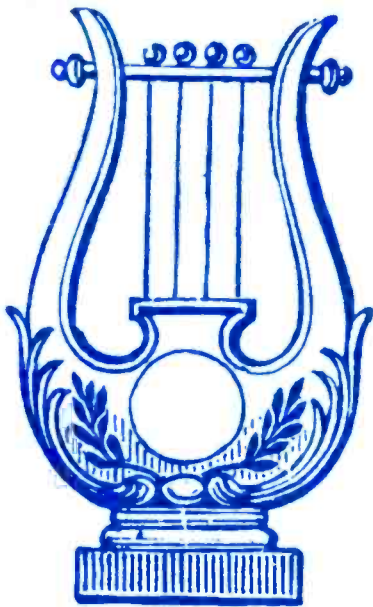
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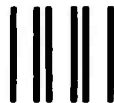
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Performance: **Impeccable**
Recording: **Crisp**

Although Mozart's Sonata in D Major sparkles with airy melodies and crisp textures, when it is performed on modern instruments it can seem somewhat elephantine and muddy. But here, as it is performed on copies of Classical Viennese fortepianos, the textures are lucid, and the whole affair is transformed into an elegant romp. It is not only the instruments that work toward the transformation: Robert Levin and Malcolm Bilson enhance Mozart's sparkle with their own impeccable sense of articulation, rhythmic drive, and masterly ensemble.

The Larghetto and Allegro in E-flat Major, discovered some twenty years ago, is a real treasure. Although the manuscript takes us only through the exposition of the allegro, Levin's completion of the development and recapitulation is excellent and adds another masterpiece to the two-piano repertoire. *S.L.*

RACHMANINOFF: Piano Concerto No. 2 (see Best of the Month, page 64)

RAVEL: Shéhérazade; Trois poèmes de Stéphane Mallarmé; Chansons madécasses; Don Quichotte à Dulcinée; Cinqs mélodies populaires grecques. Heather Harper, Jill Gomez, Jessye Norman (sopranos); José Van Dam (baritone); BBC Symphony Orchestra; Members of the Ensemble InterContemporain, Pierre Boulez cond. CBS M 39023, © MT 39023, no list price.

Performance: **Superb**
Recording: **Excellent**

Rare is the Ravel album that can boast such riches as a *Shéhérazade* by Heather Harper, Jill Gomez's languid Mallarmé *Poèmes*, Jessye Norman's barbaric *Chansons madécasses*, or José Van Dam's wry

Don Quichotte or virile Greek peasant. The music and singers are magnificent, and Pierre Boulez and his forces offer refined support that transports us into an impressionistic past that only Ravel could have created. *S.L.*

SCHUBERT: Symphony No. 8, in B Minor ("Unfinished"). MENDELSSOHN: Symphony No. 4, in A Major, Op. 90 ("Italian"). Philharmonia Orchestra, Giuseppe Sinopoli cond. DEUTSCHE GRAMMOPHON 410 862-1 \$11.98, © 410 862-4 \$11.98; © 410 862-2 no list price.

Performance: **Provocative**
Recording: **Impressive**

Giuseppe Sinopoli's performance of the *Unfinished* bespeaks a view that is profoundly tragic in the first movement and seraphically nostalgic in the second. Tempos are slow but not ponderous, and the dynamic range is extraordinarily wide. Whether you choose to go along with some of the hairpin shifts in dynamics is to some degree a matter of taste. One thing is sure, after you hear this performance you will never hear the *Unfinished* with quite the same ears again.

The Mendelssohn *Italian* here strikes me as ripely Mengelbergian: a slowish opening movement and an ultra-dignified *Andante con moto*. Most other conductors working at this pace would make the movement a hopelessly plodding affair, and for those used to the volatile Toscanini or Koussevitzky approach, it may well seem that way. There is ample energy to the finale, with genuine momentum and a delineation of much lovely detail. *D.H.*

VERDI: Rigoletto. English translation by James Fenton. John Rawnsley (baritone), Rigoletto; Arthur Davies (tenor), Duke; Helen Field (soprano), Gilda; John Tomlinson (bass), Sparafucile; Jean Rigby (mezzo-soprano), Maddalena; Norman Bailey (baritone), Monterone; others. English National Opera Chorus and Orches-

tra, Mark Elder cond. ANGEL 0 DSBX-3957 two discs \$26.98, © 4X2X-3957 two cassettes \$20.98.

Performance: **Fine**
Recording: **Very good**

Compared with some truly bizarre efforts by certain stage directors who have invaded opera in the past decades, Jonathan Miller's much-heralded production of *Rigoletto* for the English National Opera appears relatively tame. Victor Hugo's basic plot is played out in New York's "Little Italy" around 1950. The libretto's Italian Renaissance characters remain Italians, but they have here been turned into a Mulberry Street mob.

Within Miller's concept, James Fenton's English translation must be judged a success. The language is natural, conversational, and occasionally enlivened with ingenious rhymes (or near-rhymes). It is also singable, a few awkward bits of prosody notwithstanding, and the words are reasonably well fitted to Verdi's music. The performance is paced by Mark Elder with an expert hand in a traditional, unmannered fashion, a shade tamely in the first act but gathering momentum as the action progresses. Baritone John Rawnsley emerges as the recording's hero, as the *Rigoletto* should. He reveals a smoothly produced lyric tone, full, well-centered, and even across the range. Tenor Arthur Davies also has his role well in hand, though his top notes are forced. The callow-youth image he projects is perfectly acceptable for medieval Mantua, but it requires more imagination than I possess to accept him as a modern-day *capo*.

Helen Field's Gilda is small-scaled, tremulous, but certainly adequate. The minor roles (Marullo, Borsa, Ceprano) are also filled no more than adequately, but there are notable contributions from Norman Bailey's solid Monterone, Jean Rigby's lusty Maddalena, and John Tomlinson's truly sinister Sparafucile (can his going rate of \$80 per "hit" be realistic even in pre-inflationary 1950?). *G.J.*



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THE ALARM: *Declaration*. The Alarm (vocals and instrumentals). *Declaration; Marching On; Where Were You Hiding When the Storm Broke; Third Light; 68 Guns; We Are the Light; Shout to the Devil;* and five others. IRS SP-70608 \$8.98, © CS-70608 \$8.98.

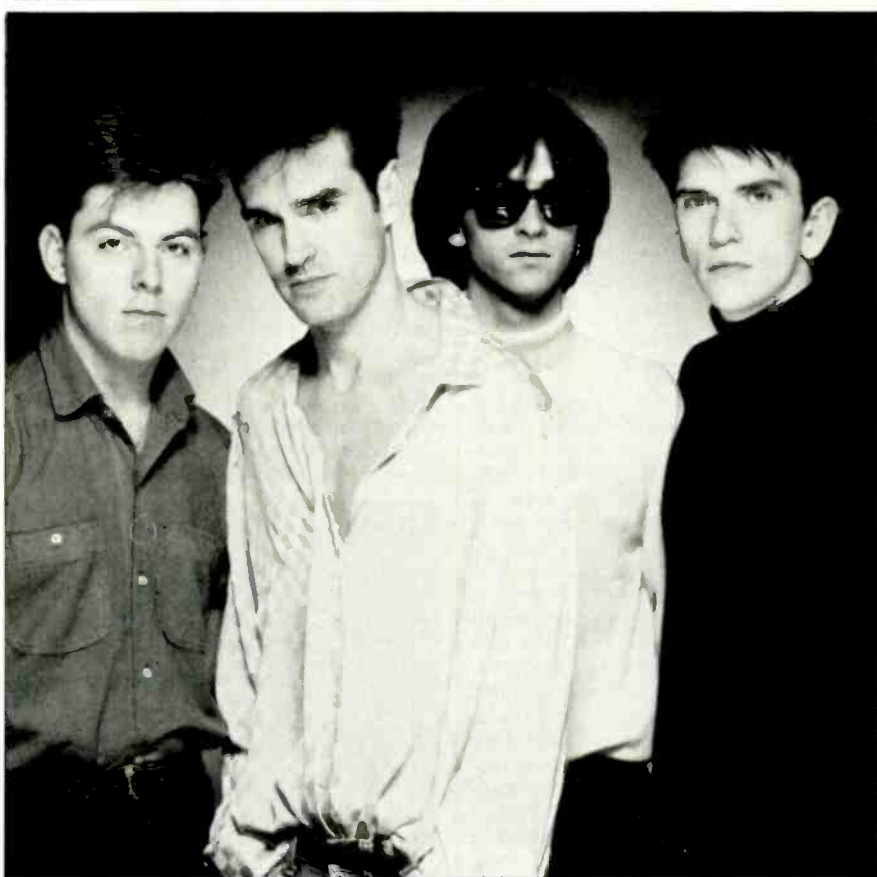
Performance: **Transparently phony**
 Recording: **Excellent**

These guys are being touted in some critical circles as the most exciting thing since sliced bread, apparently because of their fondness for acoustic guitars and political lyrics. Well, I suppose I'm glad they're not another synth dance band, and I'm as big a sucker for a protest song as the next Sixties relic, but I don't believe in these guys for a minute. Neither, I suspect, will you. In fact, once you listen past the Wall of Mud production, past the "White Album"-style martial horn licks, and the old Delaney and Bonnie guitar parts, what you hear is simply another third-rate British punk band that couldn't concoct a memorable tune if their lives depended on it and whose politics, at least as far as I can figure out from the songs here, are so vague they could just as easily be Trotskyites or Young Republicans. Highly underwhelming stuff. S.S.

THE CARS: *Heartbeat City*. The Cars (vocals and instrumentals). *Hello Again; Magic; Strange Eyes; It's Not the Night; I Refuse; Looking for Love;* and four others. ELEKTRA 60296-1 \$8.98, © 60296-4 \$8.98.

Performance: **Almost endearing**
 Recording: **Excellent**

About the Cars... as Joan Rivers would say, can we talk? I mean, does anybody out there, except perhaps Ric Ocasek (who writes the songs), still take this outfit's steely futurist pretensions seriously? Come on, now, these guys are a pop band—always were and always will be. It was not an accident that the intro to their *Just What I Needed* was exactly the same



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KEEPING UP WITH THE SMITHS

THE new Sire album by a four-man British rock group called the Smiths is a delicate, even precious, little record in a deliberately anachronistic way. Its quiet intensity has a genuine if fragile appeal. The album's dominant influence seems to be the third Velvet Underground album—which, as one writer described it, was "one long sigh." The parallels are pretty explicit, actually, and go beyond the Smiths' stripped-down Byrdsy folk-rock instrumentation. The cover photo is from an old Andy Warhol film, *Flesh*, and the band's lead singer calls himself Morrissey, which might be a nod to Warhol's director, Paul Morrissey.

The songs are mostly midtempo love ballads with a not-so-subtle homoerotic ambiguity. They're very matter of fact, however, and seem genuinely felt. Morrissey has a vocal style that manages to

walk the tightrope between being affectingly plaintive and cloyingly sensitive. He comes off as a reasonable post-liberation version of the early Lou Reed—a bit of a wimp, perhaps, but so is Jackson Browne, whom he also resembles.

Beyond that, let's just say that these guys sound promising. Not a great band, certainly, but probably an honest one. And on some cuts here already an exciting one. Stay tuned. *Steve Simels*

THE SMITHS. The Smiths (vocals and instrumentals). *Reel Around the Fountain; You've Got Everything Now; Miserable Lie; Pretty Girls Make Graves; The Hand That Rocks the Cradle; This Charming Man; Still Ill; Hand in Glove; What Difference Does It Make?; I Don't Owe You Anything; Suffer Little Children.* SIRE 25065-1 \$8.98, © 25065-4 \$8.98.

as the intro to the old bubblegum classic *Yummy Yummy Yummy*.

"Heartbeat City," the Cars' first album with producer Mutt Lange, sounds pretty much like their others (tick-tock rhythms, massive instrumental layering), though the band seems much less embarrassed than usual about having absolutely nothing to say and more relaxed about getting

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on instead with what they do well—which is, let us not mince words, simply to grind out catchy, stylish, high-gloss fluff, pure pop confections such as *You Might Think* and *Hello Again*. In fact, apart from their debut album, this is the friendliest-sounding record the Cars have ever made. To indulge in an automotive metaphor, it's closer to a Chrysler than, say, a Lamborghini. S.S.

GLORIOUS STRANGERS. Glorious Strangers (vocals and instrumentals). *Modern Life; Deception; Young and in Love; Move It Time; It's Hot; One Person/One Vote*; and four others. FUN CITY GS-1 \$6.98 (from Fun City Records, 340 East 22nd Street, New York, N.Y. 10010).

Performance: **Avant-cute**
Recording: **Pretty good**

This is an interesting little record but not at all what I expected. Wharton Tiers, who more or less runs this show, was in the Theoretical Girls with Glenn Branca, and he's been involved in a number of the more . . . er, rigorously avant-garde bands in the recent New York rock underground. This new project, however, verges on pop, though not of a type to give the Sheena Eastons of this world anything to lose sleep over. It's an odd mixture of the slick and the primitive, with some extremely lush synth textures counterpointed by simplistic organ riffs, awkward drumming, and girl-next-door vocals by Carol Tiers. In its more melodic moments it could pass for the Shangri-Las if they'd been produced by Phillip Glass. Not exactly epochal stuff, but quirky and worth a listen. S.S.

GUS HARDIN: *Fallen Angel*. Gus Hardin (vocals); vocal and instrumental accompaniment. *Fallen Angel (Flyin' High Tonight); Not Tonight I've Got a Heartache; I Pass; Are We Still in Love or Just Lonely*; and six others. RCA CPL1-4937 \$8.98, © CPK1-4937 \$8.98.

Performance: **Muzzled**
Recording: **A bit cluttered**

As with her impressive debut mini-LP of last year, Gus Hardin's first full-length album may not seem all that grabby at first, but after a few listenings it's hard to get it off the turntable. Producer Rick Hall has once again taken her down to Muscle Shoals, Alabama, for that homogenized Southern funk sound, and it works to best advantage on the uptempo numbers, *Where's the Fire* and *I Pass*. The latter sounds delightfully like a cross between an old Elvis tune and a Beatles number.

Hall is also producing Terri Gibbs now, and at times here, especially with the use of the harmonica, it seems as if he's merely rolling out his "Husky Female Vocalist" production formula No. 4. No matter how manufactured the arrangements get, however, Hardin's rough-hewn voice cuts through, promising still greater things to come with just the right song and a lot more soulful production. A.N.

JOE JACKSON: *Body and Soul* (see Best of the Month, page 63)

THE JUDDS. Wynonna and Naomi Judd (vocals); vocal and instrumental accompaniment. *Had a Dream (for the Heart); John Deere Tractor; Isn't He a Strange One; Blue Nun Café*; and two others. RCA MHL1-8515 \$5.99, © MHK1-8515 \$5.99.

Performance: **Gutsy**
Recording: **Very good**

The Judds are a mother/daughter duo from the tiny town of Morrill, Kentucky (population fifty, "and most of them cousins"), but Maybelle and the Carters they are not. Naomi (that's the mother) may make her own lye soap, but she's also been a professional model (that's her on the cover of Conway Twitty's "Lost in the Feeling") and lived for a time in California, where she worked as a secretary to the pop group the Fifth Dimension. In other words, Naomi and daughter Wynonna have been exposed to just about all the music that's come down the pike, and you can hear everyone from Bonnie Raitt

electrifying. Guts have been in short supply in country music lately, and I, for one, am glad the Judds have decided to go for it. Reward them with a listen. A.N.

JUMP 'N THE SADDLE BAND. Jump 'n the Saddle Band (vocals and instrumentals). *The Curly Shuffle; It Should've Been Me; Deep in the Heart of Texas; The Chicken Song (Ain't Nobody Here But Us Chickens); Night Life*; and five others. ATLANTIC 80141-1 \$8.98, © 80141-4 \$8.98.

Performance: **High spirits**
Recording: **Very good**

It's hard to resist an album whose cover shows six grown men in bed with a horse, and, when you get right down to it, there's no need to. These are the guys who brought you *The Curly Shuffle*, that lunatic paean to the Three Stooges that got a fair amount of play on MTV in the spring. If this album is any indication, they are the quintessential frat-party



Wynonna and Naomi Judd: a progressive style with Kentucky roots

to the Andrews Sisters in their inflections and dead-eye harmonies.

RCA obviously believes that Naomi and Wynonna have what it takes, and, judging from this first offering, I'd have to agree. Producer Brent Maher culled the selections from some of Nashville's top songwriters (Dennis Linde, Kenny O'Dell, Harlan Howard), and he worked out the arrangements to balance such traditional "instruments" as jugs and washboards with the most contemporary of electric studio sounds. Thus, the Judds sound vaguely country (they pronounce "steel" as a two-syllable word), and their rural appeal is helped along nicely by songs with such back-forty titles as *John Deere Tractor*. But there is also a decidedly hip stance to their music, and, all in all, they really do have a sound all their own, one that manages to be progressive while keeping a toe-hold on the Judds' Kentucky roots and front-porch singalongs. To my ears, it is a style as gutsy as it is

band, a good-time, high-energy, let-it-all-hang-out group that alternates original material with tunes by the likes of Willie Nelson and Britain's Nick Lowe.

The repertoire ranges from big-band to boogie, rock, and jazz, with an occasional country theme thrown in, and, for all their clowning around, these guys are no slouches in the instrumental department. Still, Peter Quinn's big-shot vocals really carry the group along. If he wanted to, Quinn could probably take Jump 'n the Saddle Band out of the novelty-tune realm and put it up against the competition. Be interesting to see what would happen. A.N.

MIDNIGHT OIL: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1. Midnight Oil (vocals and instrumentals). *Outside World; Only the Strong; Short Memory; Read About It; Scream in Blue; US Forces; Power and the Passion; Somebody's Trying to Tell Me Something; Tin Legs and Tin Mines; Maralin-*

ga. COLUMBIA BFC 38996, © BCT 38996, no list price.

Performance: **Impassioned**
Recording: **Excellent**

This summer will see Midnight Oil's first American tour. For those who aren't lucky enough to catch what is arguably Australia's best rock band, the U.S. release of the triple-platinum album "10, 9, 8, 7, 6, 5, 4, 3, 2, 1" is as good as being there. It is, very simply, a remarkable record. Midnight Oil's reputation—such as it is—is that of a politically motivated heavy-metal band. Political it is; heavy it is not.

"10, 9, 8, . . ." is as balanced and articulate as a string quartet, with meticulous arrangements of the band's impassioned music. Every chord from the twin guitars of Martin Rotsey and Jim Moginie, every beat, every sound effect makes a discrete, audible contribution. Nothing is wasted or redundant. The melody lines, sometimes carried on piano and synthesizer, but chiefly sustained by guitar and the vocals of Peter Garrett, tend to be long and unhurried but punctuated with slicing, distorted guitar effects. They have the quality of folk or street music electrified by barely contained anger.

Garrett, a frightening specter at six-and-a-half feet and completely bald, is the menacing force behind Midnight Oil's deadly serious message. One moment he declaims in somber tones, the next with the frenzy of a sane man in an asylum. While the album title is meant to suggest the countdown to nuclear Armageddon, the subjects range over big-power politics, militarism, apathy, and the politics of personal relationships. The treatments are personal and compelling, never preachy. Fused with the accomplished music writing of Moginie and drummer Rob Hirst, Garrett's raging lyrics make this an album of uncompromising force and conviction. See Midnight Oil if you can, but get this record regardless. *M.P.*

OMNI. Omni (vocals and instrumentals); vocal and instrumental accompaniment. *On & Off (Love Affair); Roctron; Just How Bad; Let Me Run It; All for the One;* and three others. MERCURY 818 035-1 M-1 \$8.98, © 818 035-4 M-1 \$8.98.

Performance: **Promising**
Recording: **Good**

Although the three members of Omni have been around for years as studio musicians and songwriters, this represents their first exposure as a group on a major album. They have drawn liberally from their roots in rhythm-'n'-blues while leaning at times toward a more electronic sound, as on *Roctron*, which features metallic vocal and instrumental effects that make it the best dance cut here. But what they are doing doesn't seem to be all that new. They're really at their best when they settle down and sing songs in the classic r-&-b style, such as the lovely *Just How Bad* and *All for the One*. *P.G.*

LOU REED: *New Sensations* (see *Best of the Month*, page 64)



TANIA MARIA

BRAZIL has yielded so many musical treasures from its rich blend of Portuguese, Indian, and African cultures that the emergence of Tania Maria, the most exciting new artist to fuse Latin music with jazz, should come as no surprise. Born in the country that gave us bossa nova, Flora Purim, and Milton Nascimento, Tania Maria has since 1980 been living in New York City. She has been paying her dues on the jazz circuit and gaining attention nationally through a series of excellent Concord recordings. Her fourth album, "Love Explosion," confirms her enormous talent.

In her varied roles as composer, singer, and pianist, Tania Maria spans such diverse musical horizons that her style might be called contemporary eclectic. Her music, brilliantly melodic and always accessible, sizzles, surges, and pulsates. Her piano style is solid, her voice

lustly and full-throated. She intermingles hypnotic Brazilian rhythms and assertive jazz improvisations with sophisticated funk. And she is a masterly creator and interpreter of those bittersweet ballads so closely identified with Brazil.

But in singing and playing her way across much of the contemporary musical spectrum, Tania Maria fuses all these disparate ingredients into a richly compelling, highly personal whole. The music on "Love Explosion" is all her own, and it is wonderful. *Phyl Garland*

TANIA MARIA: *Love Explosion.* Tania Maria (vocals, piano, keyboards); instrumental accompaniment. *Funky Tamborim; It's All in My Hands; You've Got Me Feeling Your Love; Love Explosion; Bela Be Bela; The Rainbow of Your Love; Deep Cove View; Pour Toi.* CONCORD PICANTE CJP-230 \$8.98, © CJP-230C \$8.98.

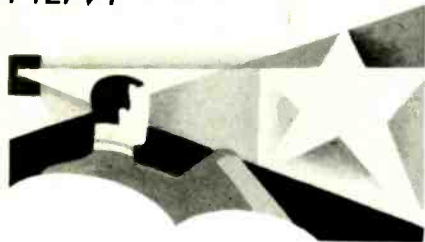
R.E.M.: *Reckoning.* Peter Buck (guitar); Mike Mills (bass); Bill Berry (drums); Michael Stipe (vocals). *Harborcoat; 7 Chinese Brothers; S. Central Rain; Pretty Persuasion;* and six others. IRS SP-70044 \$8.98, © CS-70044 \$8.98.

Performance: **Mystery rock**
Recording: **Deliberately difficult**

A year and a half ago, R.E.M. wasn't even the best-known band in its home town of Athens, Georgia. But after its 1983 LP, "Murmur," won a number of major critics' polls, R.E.M. became a band that commands the attention of serious rock

listeners. "Reckoning" contains ten smart, engaging pop tunes shrouded in mystery. The lyrics are frequently rendered unintelligible by Michael Stipe's nasal, slightly slurred vocals, and they're oblique even when you can make them out. Yet they're wonderfully evocative. The music is totally approachable pop made to seem less polished and more alien than it really is by the low-tech production. That "Reckoning" just seems to get better—if not more fathomable—with repeated listenings means R.E.M. can expect the same enthusiasm from listeners that it has won from critics. *M.P.*

FILM



AND THE SHIP SAILS ON. Original-soundtrack recording. Mara Zampieri, Nucci Condò, Giovanni Bavaglio, others (vocals); orchestra. MILAN A 228 \$4.99, © A 228 \$4.99 (from Musicrama Record and Tape Distributors, P.O. Box 1275, Long Island City, N.Y. 11101).

Performance: **Fine**
Recording: **Good**

Federico Fellini's best films have always possessed a dreamlike quality, none more so than his latest, *And the Ship Sails On*. This delightful mixture of fantasy, comedy, and music is set aboard a ship crammed with admirers and/or colleagues of a recently deceased diva and sailing through a cardboard sea just before the First World War. Most of the music derives from Rossini and Verdi, and it is carefully performed by the vocalists and orchestra in a tradition of Palm Court gentility. While this approach may not serve the musical interests of the composers, it does perfectly frame Fellini's ecstatic vision of the world of the *grand salon*, a world that vanished totally with the first shot fired by the guns of August. *P.R.*

CARMEN. Original-soundtrack recording. Paco de Lucia (guitar); Regina Resnick, Mario del Monaco (vocals); orchestra. POLYDOR 817 247-1 \$8.98, © 817 247-4 \$8.98.

Performance: **Interesting pastiche**
Recording: **Good**

The latest incarnation of Carmen appears on the soundtrack of the celebrated Spanish director Carlos Saura's new movie version. Well, perhaps not the *latest*, since Saura has chosen to use old recordings as counterpoints, recordings that star Regina Resnick and Mario del Monaco. Both are in fine fettle, and their contributions are dropped in amidst lots of expertly steely flamenco guitar playing by Paco de Lucia and what sounds like enough clacking, stomping feet to fill a Super Bowl performance of *42nd Street*. *P.R.*

FOOTLOOSE. Original-soundtrack recording. Kenny Loggins, Shalamar, Deniece Williams, Mike Reno, Ann Wilson, Bonnie Tyler, others (vocals and instrumentals). COLUMBIA JS 39242, © JST 39242, no list price.

Performance: **Listless**
Recording: **Okay**

Footloose is another of those torrid teen-movie dance epics, a sort of male *Flashdance* in which the pubertal hero is

trapped in a small town that has (wouldja believe?) banned dancing! The film itself features only about ten minutes of actual dancing by its star, Kevin Bacon (or his double). The rest of the time is taken up with a listless soundtrack that features songs by Kenny Loggins, Sammy Hagar, Karla Bonoff, Bonnie Tyler, and so on. For a score that is supposed to celebrate the joys of movement, I can only report that I didn't tap either of my feet once—not even the good one. *P.R.*

RUMBLE FISH (Stewart Copeland). Original-soundtrack recording. Stewart Copeland (instrumentals); Stanard Ridgway (vocals, harmonica, string synthesizer); instrumental accompaniment. A&M SP-6-4983 \$7.98, © AAM-6-4983 \$7.98.

Performance: **Accomplished**
Recording: **Nice**

I haven't seen *Rumble Fish*, which appears to be the latest installment in Francis Ford Coppola's plan to film the collected novels of S. E. Hinton, but be assured that its score is not exactly *Alexander Nevsky*. The Police's Stewart Copeland, who tinkered it into shape, has a fusion background that he has only fitfully kept under wraps in the past. Here he doesn't so much re-create the style of Curved Air—the hippy jazz-rock band where he first learned the music of the spheres—as come up with a contemporary equivalent. It's all eclectic in the extreme and extremely well played (Copeland does nearly all the instrumental work, not just the drums), but basically it's the sound of a musician warming up. The tracks could be rhythm jams the Police abandoned before turning them into actual songs. High-class noodling—nothing more, nothing less. *S.S.*

TO BE OR NOT TO BE (John Morris-Mel Brooks). Original-soundtrack recording. Anne Bancroft, Mel Brooks, others (vocals, dialogue); orchestra. ANTTILLES 8 ASTA 2 \$8.98, © 8 ASTA 2 \$8.98.

Performance: **Inimitable**
Recording: **Mostly good**

What you think about *To Be or Not to Be* probably depends on your degree of affection for Mel Brooks and/or the old Ernst Lubitsch/Jack Benny/Carole Lombard original that the movie is based on. Speaking as a Brooks fan, and as somebody too young to have experienced the Lubitsch Touch the first time around, I found the remake charming and in no way a violation of a (near) classic. This new soundtrack album is a hybrid; it includes all the musical numbers (including everybody's favorite, the Brooks/Anne Bancroft Polish version of *Sweet Georgia Brown*) as well as healthy chunks of dialogue. It also includes, as a bonus, a shortened version of Mel's current rap single, which might be described as Grandmaster Flash meets Field Marshal Goering. Probably you won't play the album as often as either "Thriller" or Bruno Walter conducting Mahler's Ninth, but it's fun nonetheless. *S.S.*

VHS HI-FI

(Continued from page 43)
headphones) with the unit you are considering buying.

TRADING OFF

Our interchangeability tests indicated that one or both of our samples did not conform totally to the VHS Hi-Fi standard. A tape recorded on the Jensen produced an elevated high-frequency response (+5 dB at 15,000 Hz) when played on the RCA. A tape made on the RCA was down by the same amount at the same frequency when played on the Jensen. Until standard calibrated test tapes become available, there is no telling which machine is "right."

By any standards, however, the RCA VKT-550 and Jensen AVS-

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6200 are excellent audio recorders. The VHS format is the only medium allowing up to eight hours of *continuous* recording time, just right for those interminable Wagner operas. And don't forget that with these machines you are also buying a *video* recording capability that can be used simultaneously. Their video quality at the slowest speeds seemed to be unaffected by the VHS Hi-Fi process and looked equivalent to what is generally available with top-of-the-line VHS recorders. On the other hand, neither the Beta nor VHS format comes as close to studio-quality video recording as the VHS and Beta Hi-Fi systems come to studio-quality *audio* recording. So far in high-fidelity VCR's, most of the fidelity is sonic. Let's hope the picture can catch up. □

For more information on the Jensen AVS-6200, write to Jensen Sound Laboratories, Dept. SR, 4136 North United Parkway, Schiller Park, Ill. 60176. For more on the RCA VKT-550, write to RCA, Dept. SR, 600 North Shore Drive, Indianapolis, Ind. 46201.

COMPATIBILITY

(Continued from page 53)

components can theoretically deliver since some compromise is almost always necessary. Of course, there are some obvious caveats, such as being aware of any special positioning requirements a speaker may have before buying a pair. If the speakers are designed to sound best on free-standing pedestals, for example, don't place them on shelves against a wall.

TURNTABLE/ROOM

There is a potentially serious record-player compatibility problem that has nothing to do with the usual turntable specifications, such as rumble, flutter, or speed variation. It is never specified by turntable manufacturers or anyone else, probably because there is no established way to measure it or to determine its importance to a particular user. I am referring to a record player's susceptibility to external vibration from footsteps, jarring, or the output of loudspeakers.

The response of the record player to airborne vibration originating



from the speakers can, in its most severe form, cause acoustic feedback—a howling or deep rumbling that not only renders the program unlistenable but can even damage the amplifier or speakers. In a milder form, feedback may not be audible as such yet have an audible effect in terms of “muddying” the sound of the program.

In general, the more “softly sprung” record players are less sensitive to feedback effects as well as to base-conducted vibrations. Sometimes placing the turntable on accessory isolating mounts can help, but the best treatment is prevention: keep the turntable well away from the speakers and other

sources of vibrations. This may require some trial and error in the placement of the components.

THE BOTTOM LINE

These days most name-brand components will work well with each other without any extraordinary measures to ensure their compatibility. But you do need some basic understanding of what hi-fi components are built to do before you start to assemble a system or buy a new component to fit into the system you have. And use common sense.

If you know where the real trouble spots are likely to be, you can concentrate on them and stop worrying about the rest of the system. Instead of fretting about whether your preamplifier can live happily with your Compact Disc player, for example, you'd probably do better to give some thought to how well the speakers you like in the store are going to work in your listening room. Real problems, not theoretical ones, are very common in this area, and they are not always very easily solved. But that's another article! □

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dbx SOUNDFIELD ONE
(Continued from page 59)

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but be prepared for dissatisfaction with your present loudspeaker system after you do. □

For more information on the dbx SFX-1 Soundfield One speaker system, write to dbx, Inc., Dept. SR, 71 Chapel Street, Newton, Mass. 02195.

HIRSCH-HOUCK LAB MEASUREMENTS

Because of the almost infinite variety of response curves made possible by the SFC-1 controls, we measured the system's limit conditions and then concentrated on measurements made with the control settings established during our subjective listening tests. We obtained the most pleasing sound balance in our room by setting the LOW-FREQUENCY COMPENSATION to its center position and the HIGH-FREQUENCY COMPENSATION to the upper end of its marked "normal" range. It was apparent that the actual acoustic balance could be made almost anything that one desired. Interestingly, however, these modifications had no effect on the stereo imaging qualities of the system.

The system's averaged and smoothed room response, with our preferred control settings, was flat within ± 3 dB from 150 to 20,000 Hz. It was essentially independent of the microphone's location in the room. The bass response was a very creditable ± 4 dB from 20 to 150 Hz, and it could be spliced to the middle- and high-frequency room curves to obtain a ± 6 -dB response from 20 to 20,000 Hz.

Measurements with our IQS FFT analyzer showed a single dbx SFX-1 speaker's quasi-anechoic response to be about ± 6 dB from 180 to 23,000 Hz at a 45-degree angle inward from the front of the speaker. At 90 degrees inward (facing the other speaker), the output rose smoothly with increasing frequency, changing by about 10 dB from 4,000 to 20,000 Hz. The traditional frontal (0-degree) response curve was somewhat ragged, an expected effect of multiple-driver interference interacting with the characteristics of our FFT system. Measurements of individual drivers, with close microphone spacing, showed them to have smooth outputs in their operating ranges. The group delay, measured on the 90-degree axis, was constant within ± 0.4 millisecond from 5,000 to 20,000 Hz.

The SFX-1's impedance was pretty much as claimed and one of the most uniform we have yet measured. It dipped to 3.2 ohms at 100 and 1,000 Hz, and the minimum value of about 2.5 ohms was measured at 20,000 Hz. The maximum values were 4.5 to 5 ohms, measured at several frequencies.

The exceptional uniformity of the speaker impedance tends to support dbx's claim that it is essentially resistive and therefore probably an "easy" load for most good amplifiers despite its relatively low value.

The system's sensitivity (in the midrange) is rated at a 90-dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts. Our tests tended to confirm this, although the system's directionality makes it necessary to specify the relative orientation between the speaker and the microphone. Our measurements showed an SPL of 94 dB (the maximum output with a 2.83-volt input) on the axis between the speakers and 88 dB on the frontal axis. We measured bass distortion by supplying a constant-amplitude signal to the SFC-1 controller, equivalent to a speaker drive of 2.83 volts at 100 Hz, and varying the frequency downward from that point. Although the SFC-1 greatly increased the drive voltage at lower frequencies, the distortion of the woofers remained quite low. At 50 Hz, for example, it was only 1.65 per cent, even though the speaker was being driven with about 10 watts. Even at 30 Hz, the distortion was only about 9 per cent with 45 watts of drive power!

The SFC-1 controller did its job without any degradation of the system's essential signal properties. Its maximum output was in the range of 5 to 6 volts at the frequency extremes. The 1,000-Hz maximum output was 1.7 volts, but that required an input of about 6 volts, a level unlikely to be found at an amplifier's tape outputs! The distortion at a 1-volt output was about 0.01 per cent. A-weighted noise output was 90 dB below 1 volt.

The pulsed-power capability of the SFX-1 speakers was measured with short-duty-cycle tone bursts at 100 and 1,000 Hz (we were unable to reach the saturation limits of the tweeters at 10,000 Hz). At 100 Hz, the woofers "bottomed" at roughly 500 watts input. At that level, the tone burst produced a house-shaking "thump." At 1,000 Hz, visible waveform distortion appeared on the acoustic output at about 200 watts. These signals did not activate the power-monitor circuits, which respond only to relatively long-duration signals that could overheat the voice coils.

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MUSIC VIDEOS:
ROCK & ROLL
(Continued from page 48)

6 THIS IS ELVIS
(Warner Bros.) The King, from white heat at nineteen on the Milton Berle Show to blubbery self-parody and grisly death. This is more than a rockumentary—it's practically a metaphor for America. The home version contains forty minutes not included in the theatrical release. Most of it is Fifties performance stuff and as riveting as you'd expect. Stereo.

7 RUDE BOY
(Columbia). A backstage semi-documentary, this spends a little too much dramatic time with its nominal star, a young Clash fan who is the Rude Boy of the title. But every time it cuts to the band the energy level becomes close to overwhelming. Regardless of how they've since turned out, at this point the Clash had more charisma (there's

no other word) than any other band in the world. It's nice to have them and the punk scene they exemplified documented so well. No stereo yet.

8 THE LAST WALTZ
(Warner Bros.). The Band's retirement concert, with great guest performances by everybody from Van Morrison to Muddy Waters, shot with old-fashioned MGM elegance by Martin Scorsese. A lovingly documented farewell to the road, this is also nothing less than, as one critic called it, "the sight and sound of an era shutting down."

9 ROCK AND ROLL HIGH SCHOOL
(Warner Bros.). The Ramones, *Eating Raoul's* Mary Woronov and Paul Bartel, and the delectable P. J. Soles demolish Vince Lombardi High in this delirious parody/homage to those Alan Freed rock-sploitation films of the

Fifties. This one has it all, from a great soundtrack (Chuck Berry, the MC5) to a great ending (they blow up the school).

10 WE'RE ALL DEVO
(Pioneer LaserDisc). A career retrospective, this time a sort of Greatest Video Hits, from a band whose ideas have always been most cogently expressed in visual terms. The best of all the current rock video packages by a mile.

HONORABLE MENTIONS
The Rutles (Pacific Arts)
Woodstock (Warner Bros.)

MUST-HAVE'S AWAITING RELEASE
The Girl Can't Help It starring Little Richard, Eddie Cochran, Gene Vincent, Fats Domino, and Jayne Mansfield.

Riot on Sunset Strip with the immortal Standells, the Chocolate Watchband, an LSD gang rape, and Aldo Ray as the cop.

MUSIC VIDEOS:
SONIC SPECTACULARS
(Continued from page 48)

whale at the conclusion, this film remains a dazzling journey through what Paul Kresh called "the tunnel of hate that was the war in Vietnam." The soundtrack, from the helicopter attack to the *Ride of the Valkyries* to the Mekong Delta surf scene to the Stones' *Satisfaction*, is nearly as effective at home as it was in the theater.

4 SATURDAY NIGHT FEVER
(Paramount). Or, *A Pompadour Grows in Brooklyn*. Starring John Travolta and the Bee Gees' classic disco score, this not only sounds great but has a significant advantage over the LP version: it will probably never wear out.

5 FORBIDDEN PLANET
(MGM/UA). A Fifties sci-fi version of Shakespeare's *The Tempest* starring Robbie the Robot and a

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remarkably effective stereo soundtrack that probably hasn't been heard since the film's initial release. Best moment: when the steel shutters on Dr. Morbius's house slam shut in sequence and the sound moves from one speaker to the other.

6 STAR TREK: THE MOTION PICTURE (Paramount). One of the great light shows of all time, the special longer version offers some of the most impressive stereo sound effects ever created for a feature film. Jerry Goldsmith's score is also one of the loveliest ever, making this worth buying for the pre-credit overture alone.

7 WEST SIDE STORY (MGM). If you can overlook the fact that everybody in this movie of Leonard Bernstein's musical, including Natalie Wood, looks like a member of Mink DeVille, you'll find it is still one of the niftiest

of all film musicals. And though the stereo sound is not quite Eighties state of the art, it's such a kick to have it blasting in your living room that you probably won't care.

8 A STAR IS BORN (Warner Bros.). More Fifties stereo and remarkably good in this restored version. Your TV set may not be able to reproduce George Cukor's groundbreaking Cinemascope visuals, but, here again, the terrific sound supplies the sense of scale.

9 RAIDERS OF THE LOST ARK (Paramount). The greatest Republic serial Republic never made, this Steven Spielberg/George Lucas collaboration features Harrison Ford and an exceptionally realistic audio track. The sound of the giant boulder in the opening temple scene alone is worth the price of the LaserDisc (the VHS stereo

version is merely okay in comparison).

10 AROUND THE WORLD IN EIGHTY DAYS

(Warner Bros.). Mike Todd's all-star rendering of the Jules Verne fantasy is less fun now than I remember its being when I saw it as a child, and some of the movie's wide-screen visual effects are necessarily compromised in my living room, but the soundtrack works. You haven't lived until you've experienced David Niven's brittle charm in early stereo.

with appropriate sensitivity and grace.

9 SPARTACUS

(Video Arts International). Made in 1977, this film is slightly flawed by the kind of jumps and wear you might expect from a much older print, but it is a splendid cinematic effort with stellar performances by Vladimir Vasiliev in the title role and Marius Liepa as Crassus, the villainous Roman general. Choreographer Yuri Grigorovich directed the definitive ninety-five-minute Bolshoi Theater production, and A. Zhuraitis conducts the Khatchaturian score.

10 SAMSON ET DALILA

(Pioneer LaserDisc). This was a 1981 performance at the Royal Opera House, Covent Garden, preserved by the BBC with typical expertise. Jon Vickers and Shirley Verrett seem to have been born to the title roles. Colin Davis conducts.

LOOKING AT MUSIC BALLET AND OPERA
(Continued from page 50)

Kolpakova and Sergei Bereznoi dance the leading roles, and Viktor Fedotov conducts. Sound and sight have been superbly captured by Russian television director Elena Macheret, who choreographed the cameras

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BY RICHARD FREED

FOR some years critic Richard Freed, a contributing editor of *STEREO REVIEW*, has listened to all available recordings of the nearly two hundred symphonic works that form the essential core of orchestral programs and classical record collections, selecting those versions he considers the best. We have published his choices in a pamphlet, which we have updated periodically, and we are now publishing his selections of the best current recordings of the Basic Repertoire in a series in the magazine. All those cited are stereo LP's unless indicated otherwise by our usual symbols.

□ **RODRIGO: *Concierto de Aranjuez*.** Narciso Yepes's oldish recording with Argenta conducting remains for me the most persuasive of the several excellent accounts of this most beloved of all guitar concertos (London STS 15199, © STS5 15199). Among the newer and more expensive versions, Alfonso Moreno's, with Enrique Bátiz conducting, is especially recommendable, not only in its own right but also for the little-known material on the other side (Angel ● DS-37876, © 4XS-37876).

□ **ROSSINI: *Overtures*.** RCA's digital remastering of the Reiner collection, still at the low Gold Seal price, makes it competitive with the best available, and the selections are choice (AGL1-5210, © AGK1-5210). An outstanding mixture of familiar and unfamiliar titles is served up by Riccardo Chailly (London ● LDR 71034, © LDR5 71034, © 400 049-2). Abbado's album is nearly as fetching (RCA ARL1-3634, © ARK1-3634). None of these collections includes *Semiramide*; for a broader selection, the best combination of two discs without duplication would be Peter Maag's (London STS 15030, © STS5 15030) and the first of Marriner's five packages of this material (Philips 6500 878, © 7300 368).

□ **SAINT-SAËNS: *Carnival of the Animals*.** The recording by André Previn and the Pittsburgh Symphony excels in every respect and in every format (Philips ● 9500 973, © 7300 973, © 400 016-2). For the original chamber version, try Jörg Faerber on disc (Turnabout TV 34586) or Philippe Entremont on tape (CBS © MT 35851). Anyone who really wants the Oden Nash verses should buy the original recording in which Noël Coward recites them with André Kostelanetz conducting (Odyssey ● Y 32359).

□ **SAINT-SAËNS: *Piano Concerto No. 2, in G Minor*.** The new recordings

by Cécile Ousset, with Simon Rattle conducting (Angel ● DS-38004, © 4XS-38004), and by Pascal Rogé, with Charles Dutoit (London CS 7253, © CS5 7253), are both outstanding. Entremont's older version with Ormandy (CBS MS 6778) is superior to his remake with Plasson, and the Tacchino/Froment is a genuine bargain (Candide QCE 31080, Vox © CT-2124, or in Vox QSVBX-5143, © CBX-5143).

□ **SAINT-SAËNS: *Symphony No. 3, in C Minor ("Organ")*.** Charles Dutoit and the Montreal Symphony Orchestra, with organist Peter Hurford, may be said to sweep the field with their extremely sympathetic, brilliantly recorded performance (London ● LDR 71090, © LDR5 71090, © 410 201-2), but Munch's 1959 Boston recording, re-vivified in RCA's half-speed remastering, is still a contender for top honors (ARPI-4440, © ARE1-4440).

SCHOENBERG: *Transfigured Night*. Several of the choice string-orchestra recordings have been deleted recently. Of the surviving ones, Horenstein's (Turnabout TV 34263) and Stokowski's (Seraphim S-60080) are the most expressive, Neumann's a bit brighter sounding (Quintessence PMC-7177, © P4C-7177). There are appealing recordings of the sextet version by the Ramor Quartet and friends (Turnabout TV 37012, © CT-7012) and from the Santa Fe Chamber Music Festival (Nonesuch ● 1-79028, © 4-79028).

SCHUBERT: *Symphony No. 8, in B Minor ("Unfinished")*. Top honors may be divided between Carlos Kleiber's profound, freshly thought out reading (DG 2531 124, © 3301 124) and Jochum's powerful, heartfelt Boston performance (DG 2530 318). Also exceptional are Böhm's live Viennese remake (DG 2531 373, © 3301 373), Klemperer's (Angel RL-32038, © 4RL-32038), and the latest by Karajan (Angel SZ-37544, © 4ZS-37544, or in SE-3862).

□ **SCHUBERT: *Symphony No. 9, in C Major ("The Great")*.** The Munch/Boston version, back on cassette only (RCA © Victrola ALK1-4507), is a marvelously exuberant performance, well recorded, and now an incredible bargain. At the expensive end of the scale, I like Heinz Rögner's provocative, grand-scaled digital recording (Denon ● OB-7350/51-ND, © 38C37-7035). Karajan's DG version, reissued now in the Privilege series, is a gem (2535 290, © 3335 290). Szell's CBS recording stands up beautifully in its latest transfer (MY 37239, © MYT 37239). Böhm's Dresden remake is marked by a splendid balance between majesty, urgency, and lyricism (DG 2531 352, © 3301 352).

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BY RALPH HODGES

AUDIO/VIDEOPHILIA

WHEN assembling an audio system today, high-end or otherwise, it behooves the purchaser to consider whether, sooner or later, some form of video might not wind up as its centerpiece. This is true even if you've decided that music videos are not for you or that TV, stereo or not, is going to remain TV. The chances are too good that, somewhere down the line, a particularly effective amalgamation of audio and video will grab you seductively, awaken your acquisitive instincts again, and send you back to the store for an additional something you hadn't realized you couldn't live without. That something could well turn out to be a wide-screen or projection TV, so plan ahead while there's time.

Of course, it's farfetched to imagine that anything like video games will cause you to want a seven-foot picture between your Acoustat towers (although, even at this moment, somewhat sophisticated stereo music is being synthesized and recorded for the next generation of arcade time-wasters). No, you will probably succumb, as so many audiophiles have in the past, to motion pictures and their more-ambitious-than-ever soundtracks.

With good reason, film critics have been advising that a Hollywood spectacular is only half experienced if not heard in a proper cinema auditorium with large batteries of behind-the-screen loudspeakers together with arrays of "surround" speakers around and behind the audience section to deliver sonic information about off-screen action. And the result is often well worth dragging yourself downtown to a showcase theater for. But now, today, you can also take it with you—take it home, that is, to a domestic screening room that, sonically at least, can equal or exceed the impact of the \$5 seat in the movie palace. To the minds of those who are involved with it, that is what high-end audio for video is all about.

The key development has been

the establishment of Dolby Stereo optical soundtracks as a *de facto* standard for the cinema industry. These two tracks running along the edge of the film furnish properly equipped theaters with left- and right-channel information for a true stereo presentation, a derivable center channel, and a matrix-encoded surround channel that is extracted electronically and piped to side and rear speakers. The scheme is nothing more than the matrix-quadraphonic technology of the 1970's in a new but not fundamentally different application, and the recorded information is accessible to virtually any home quadraphonic decoder, simple or complex, ever made.

None of this would be of more than passing interest if the soundtracks in question were not available to the home consumer. But they are. Any Dolby Stereo motion

Lost Ark, Star Wars] and designer of the state-of-the-art THX theater sound system, started with the classic seven-foot Advent Videobeam picture, added front and rear pairs of Boston Acoustics A40 speaker systems along with a subwoofer (for summed left and right), and drives them, suitably amplified, with a Pioneer SP-101 signal processor, which decodes the surround channel reasonably well ("I do get a bit of 'dialog shift' to the rear occasionally," he reports) and provides some bass enhancement. Processors from Fosgate and Surround Sound, Inc. are intended for the same home-decoding application.

Such is the outlook for high-end audio video in the near future that at this point further words from me are not particularly relevant. Rather, now is the time for all interested parties to go out and experience one



"Manchester, go to my den, load my shotgun, and bring it here. I'm going to put a cartridge out of its misery."

picture actually released in stereo, whether on tape or disc, is reproduced from the same audio recording that created the stereo optical print for theater release—or is perhaps reproduced directly from a theater print. Everything the theater needs for its most ear-stunning effects is right there in the hand that has paid money for a video tape of *Raiders of the Lost Ark*, and to deprive yourself of the full worth of such a soundtrack is foolishness.

But what do you do with it once you've got it? For his own home setup, Tomlinson Holman, technical director of Lucasfilm [*Raiders of the*

of these multimedia presentations.

Courtesy of Kloss Video, Sony, Fosgate, SSI, and Warner Brothers, I was able to play Beta Hi-Fi movie tapes at home for several months last year. The experience rendered day-to-day reality intolerably drab for a while, but it did absolute wonders for my social life. Were it not that projection TV's don't work very well when the sun is out, I'd have had permanent boarders. So don't overlook video as you plan your home-entertainment system. Otherwise, you may find yourself becoming somebody else's permanent boarder. □

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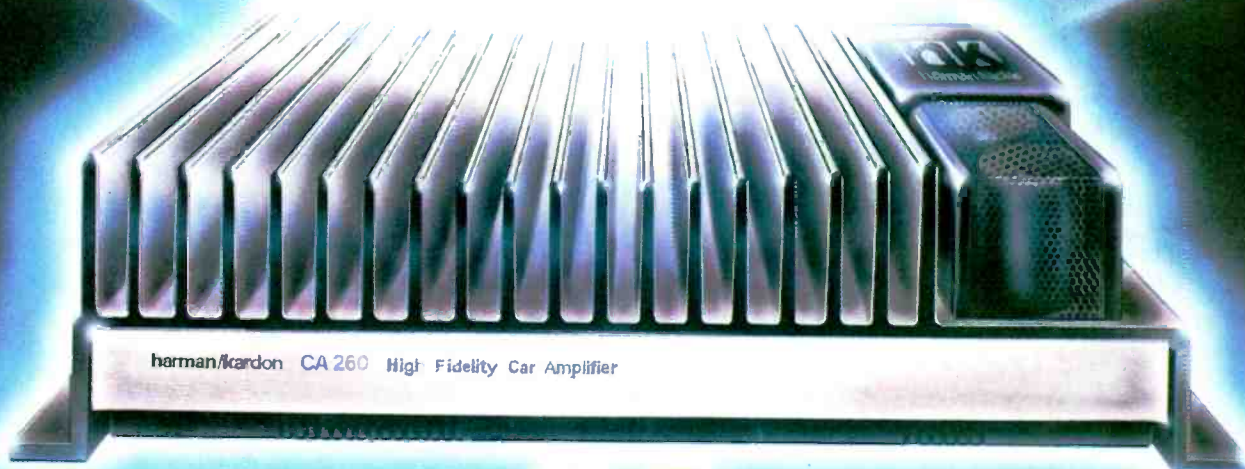
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