



JUNE 1987 ● \$2.25

Stereo Review

**SPECIAL
REPORT:
AMERICAN
AUDIO**



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Matthew Polk's Awesome Sounding SDA-SRS & SDA-SRS 2



SDA SRS 2
\$995 ea.

SDA SRS
\$1495 ea.

Digital Disc Ready

Matthew Polk's SDA SRS and SRS 2 have both won the prestigious AudioVideo Grand Prix Speaker of the Year Award.

"The Genius of Matthew Polk Has Created Two Awesome Sounding Grand Prix Award Winning SDA SRSs"

"Spectacular...it is quite an experience"

Stereo Review Magazine

Now the genius of Matthew Polk brings you the awesome sonic performance of the SDA-SRS in a smaller, more moderately priced, but no less extraordinary loudspeaker, the SDA-SRS 2.

Matthew Polk's own dream speakers can now be yours!

Matthew Polk's ultimate dream loudspeaker, the SDA-SRS, won the prestigious Audio Video Grand Prix Speaker of the Year award last year. Stereo Review said "Spectacular...it is quite an experience" and also stated that the SRS was probably the most impressive new speaker at the 1985 Consumer Electronics Show. Thousands of man hours and hundreds of thousands of dollars were spent to produce this ultimate loudspeaker for discerning listeners who seek the absolute state-of-the-art in musical and sonic reproduction.

Matthew Polk has, during the last year, continued to push his creative genius to the limit in order to develop a smaller, more moderately priced Signature Edition SDA incorporating virtually all of the innovations and design features of the SRS without significantly compromising its awesome sonic performance. The extraordinary new SRS 2 is the spectacularly successful result. Music lovers who are privileged to own a pair of either model will share Matthew Polk's pride every time they sit down and enjoy the unparalleled experience of listening to their favorite music through these extraordinary loudspeakers, or when they demonstrate them to their admiring friends.

"Exceptional performance no matter how you look at it"

Stereo Review

Listening to any Polk True Stereo SDA* is a remarkable experience. Listening to either of the Signature Edition SDAs is an awesome revelation. Their extraordinarily lifelike three-dimensional imaging surrounds the listener in 360° panorama of sonic splendor. The awe inspiring bass performance and dynamic range will astound you. Their high definition clarity

allows you to hear every detail of the original musical performance; while their exceptionally smooth, natural, low distortion reproduction encourages you to totally indulge and immerse yourself in your favorite recordings for hours on end.

Julian Hirsch of Stereo Review summed it up well in his rave review of the SDA-SRS: "The composite frequency response was exceptional...The SDA system works...The effect can be quite spectacular...We heard the sound to our sides, a full 90° away from the speakers...As good as the SDA feature is, we were even more impressed by the overall quality of the Polk SDA-SRS...The sound is superbly balanced and totally effortless...Exceptional low bass. We have never measured a low bass distortion level as low as that of the SDA-SRS...It is quite an experience! Furthermore, it is not necessary to play the music loud to enjoy the tactile qualities of deep bass...Exceptional performance no matter how you look at it."

The awe-inspiring sonic performance of the SDA-SRS 2 is remarkably similar to that of the SRS. Words alone can not express the experience of listening to these ultimate loudspeaker systems. You simply must hear them for yourself!

"Literally a new dimension in sound"

Stereo Review

Both the SDA-SRS and the SDA-SRS 2 are high efficiency systems of awesome dynamic range and bass capabilities. They both incorporate Polk's patented SDA True Stereo technology which reproduces music with a precise, life-like three dimensional soundstage which is unequalled and gives you, as Julian Hirsch of Stereo Review said, "literally a new dimension in sound". Each beautifully styled and finished SRS 2 cabinet contains 4 Polk 6½" trilaminate polymer drivers, a planar 15" sub-bass radiator, 2 Polk 1" silver-coil polyamide dome tweeters and a complex, sophisticated isophase crossover system. It is rated to handle 750 watts. The SRS utilizes 8-6½" drivers, a 15" sub-bass radiator, 4 Polk tweeters and an even more complex crossover. It is rated to handle 1000 watts.

Both the SDA-SRS and SRS 2 incorporate:
1.) time compensated, phase-coherent multiple

driver vertical line-source topology for greater clarity, increased coherency, lower distortion, higher power handling, increased dynamic range and more accurate imaging. 2.) a monocoque cabinet with elaborate bracing and MDF baffle for lower cabinet read-out and lower coloration. 3.) progressive variation of the high frequency high-pass circuitry for point-source

"Literally a new dimension in the sound"

Stereo Review Magazine

operation and wide vertical dispersion. 4.) the use of small active drivers in a full complement sub-bass drive configuration coupled to a large 15" sub-bass radiator for extraordinarily tight, quick and three-dimensional mid and upper bass detail combined with low and sub-bass capabilities which are exceptional. The speakers are beautifully finished in oiled oak and walnut.

Other superb sounding Polk speakers from \$85. ea.

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"Our advice is not to buy speakers until you've heard the Polks"

Musician Magazine

The experts agree: Polk speakers sound better! Hear them for yourself. Use the reader service card for more information and visit your nearest Polk dealer today. Your ears will thank you.

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*U.S. Patent No. 4,489, 432 and 4,497, 064. Other patents pending.



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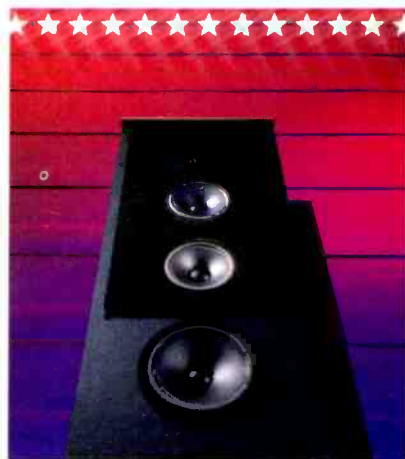
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In speakers as in cars, the make is everything.

Amazing but true: people can spend hours choosing a car receiver—and then pay no attention to the speakers. Obviously, they've never heard what a difference really good car speakers can make. They haven't experienced the muscular punch of deep bass or the breath-taking intimacy of clear treble.

In short, they've never heard AR car loudspeakers.

At some comparisons, speakers are an afterthought. At AR, they're a way of life. This attitude is amply demonstrated in the superior power handling of our liquid-cooled tweeters. It's evident in AR's preference for full crossover networks. It's expressed in every mica-filled polypropylene driver, every solid steel frame, every wire-mesh grille. AR even created a car amplifier to make these speakers sound their best.

AR car speakers range from most affordable to most luxurious. They're easy to install. But once they're in, you'd no sooner change them than change your car.

Acoustic Research. We speak from experience.



by Christie Barter and William Burton

MORE MID-PRICE CD'S

Erato, the classical French label distributed here by RCA, has introduced a series of mid-price (less than \$12) compact discs in its new Bonsai collection, named for the miniaturized trees cultivated originally in Japan. The initial release includes twenty CD's containing popular works performed by some of the label's best-selling artists, and each CD offers between 60 and 74 minutes of music. . . . Qualiton Imports has entered the field of mid-price CD's with the release of fifteen compilations on the new White Label, all from the Hungaroton catalog.

YAMAHA'S 18-BIT CD PLAYERS

New compact disc players from Yamaha feature two unique "Hi-Bit" technologies: 18-bit quadruple-oversampling digital filters and 18-bit digital-to-analog conversion using 16-bit converters. The players are the CDX-5000 (\$2,500) and the CDX-1100U (\$1,099). Unique digital processing is also a feature of Yamaha's CX-10000 preamplifier (\$7,500), which has digital parametric equalization.

MUSICIANS IN THE NEWS

Sir Georg Solti, who celebrates his seventy-fifth birthday in October, was given an honorary Doctor of Music degree by the Eastman School of Music in Rochester, New York. . . . The Juilliard School in New York City awarded honorary doctorates this year to violinist Itzhak Perlman, soprano Leontyne Price, and composer William Schuman. . . . ASCAP president Morton Gould presented the society's 1987 Golden Note Award to conductor André Previn for outstanding achievement in the field of music.

ANTI-DAT LAWS ADVANCE

An amendment limiting sales of digital audio tape (DAT) recorders has been attached to the trade bill coming before the House of Representatives. The amendment, supported by the Reagan administra-

tion, was approved by the Energy and Commerce Committee.

Senate Bill 506, which is similar to the House amendment, is coming before the Senate's Telecommunications Subcommittee. Both pieces of legislation would prevent the sale of DAT recorders without scanner chips to detect copy-guard coding. The coding system, designed at CBS Records Technology Center, uses a notch filter to remove a narrow band of frequencies from the original recording.

NEW CASSETTE SINGLES

The major pop labels, responding to an almost vanishing market for 45-rpm singles, have just launched the cassette single, at the same list price, and are monitoring sales of the new configuration in a large sample of stores across the country. First of the fifty-odd titles released on both tape and 7-inch vinyl was Bryan Adams's *Heat of the Night* on A&M.

TECH NOTES

Clarion has begun production of DAT car players, samples of which are being provided to car manufacturers in the U.S., Japan, and Europe in hopes of encouraging orders for 1988 models. . . . ADS is readying new components for its Atelier series, including the remote-controlled R4 receiver, the CC4 tuner/preamplifier, and the PA4 power amplifier. . . . Look for car speakers from Polk using its Stereo Dimension Array imaging technology to cancel interaural crosstalk. . . . A new company called NHT—for Now Hear This—is previewing an unusual small speaker designed by Ken Kantor, formerly of AR. . . . Speaker pioneer Henry Kloss (formerly of Advent, AR, and KLH) is making speakers again, this time for his \$4,400 Model 10 rear-projection TV. . . . Sharp's new 100-watt-per-channel AM/FM receiver with built-in six-disc CD changer is called the "CDVER." . . . Sony's Boodo Khan Body System (\$499.95) consists of headphones, a 20-watt amplifier, and a woofer built into a back cushion. . . . Fuji has shown videotape compatible with uncom-

ing Super-VHS video recorders. . . . Bose's Acoustic Wave bass technology—used in its one-piece portable music system, three-way AM-5 speaker system, and special Zenith TV sets—has been adapted for movie-theater sound systems. The Acoustic Wave Cannon, part of the Bose Cinema Sound System, uses a 12-inch woofer in a 12-foot-long tube.

THE FAB FOUR IN STEREO

In the wake of the furor over Capitol's release in mono of the first four Beatles albums on CD, Mobile Fidelity has stepped up shipments of the same titles on audiophile LP's in stereo mixes from the original masters. The albums were originally included in the label's limited-edition set of fourteen LP's, "The Beatles/The Collection," and were subsequently released individually.

BIODEGRADABLE CD'S

Rykodisc has announced the development of "the world's first disposable compact disc." Conservationists, the company notes, have been up in arms over the introduction into the planet's ecosystem of products like the aluminum-coated CD and the recent gold-plated CD, which are made to last forever. In response, Rykodisc claims that its new copper-coated CD's will "eventually rust away, thereby replenishing the earth's ozone layer," and that its concept of planned obsolescence will thus be "a boon" to the industry and the world at large. In its press release, dated April 1, the company failed to specify who would be performing on its first copper CD.



TERRY ALLEN

SPEAKING MY PIECE

by Louise Boundas



The Spoilers

THE digital compact disc has played a large role in the revival of the American record industry. Consumers are flocking to the record stores. The demand for CD's still exceeds the supply, even at the common retail price of \$16 a disc. According to the Recording Industries Association of America, the RIAA, 1986 sales of American CD's were up 134 percent over 1985, and greater increases are predicted for 1987. Pressing plants are springing up across the country to meet the demand. Although some of the plants are owned or partly owned by foreign concerns, they are creating American jobs and pressing American discs.

Meanwhile, the audio equipment industry is prospering too. Consumers are also buying new stereo equipment, not just CD players but amplifiers with more power, speakers with better sound, and high-quality headphones to use with their new CD portables. Much of that equipment is American. Record and equipment retailers are sharing in the prosperity.

But here comes trouble.

Digital audio tape decks, conspicuously labeled "prototypes," began making their appearance at the Japan Audio Fair in Tokyo in 1985 and at the U.S. Consumer Electron-

ics Show in early 1986. According to industry sources, marketing concerns and the objections of CD manufacturers delayed DAT's introduction to consumers. On February 12 of this year, however, Aiwa finally announced that it would begin marketing a DAT deck and cassettes in Japan, and since then a number of other Japanese companies have followed suit. The decks being sold in Japan are incapable of digital-to-digital recording of CD's because of built-in sampling-rate differences. But no form of DAT is available on the American market.

Nobody, to my knowledge, is disputing the sonic advantages of DAT or its market potential. What is being disputed is home taping—again. The disputants are the recording industry and the equipment industry—again. But this time there may be some new casualties.

There are bills, supported by the Reagan administration, before committees in the U.S. Senate and the House of Representatives to make it illegal to import DAT recorders that do not contain "anti-copy" or "spoiler" chips. These circuits, part of a system developed by CBS Records Technology Center, would prevent the taping of any CD recording (or tape or broadcast) containing a particular frequency "notch" imposed during the manufacturing process. CBS has announced that it will deliver CD copy-coding notch filters to record manufacturers in June. People who have testified in the Congressional hearings disagree about the audibility of the notch, but we have not yet had public demonstrations proving its inaudibility.

Copyright and trade debates aside, if there is any possibility that even the most discriminating listener will hear *any* difference between an encoded CD and one that is not encoded, the very proposal to encode CD's is absurd.

Will the Congress write the spoiler chip into law? Will record companies voluntarily encode their compact discs with the frequency notch—possibly degrading the sound of a proved, popular format in an attempt to prevent the entry into the marketplace of another promising format? Will consumers buy encoded CD's? Stay tuned. □

Stereo Review

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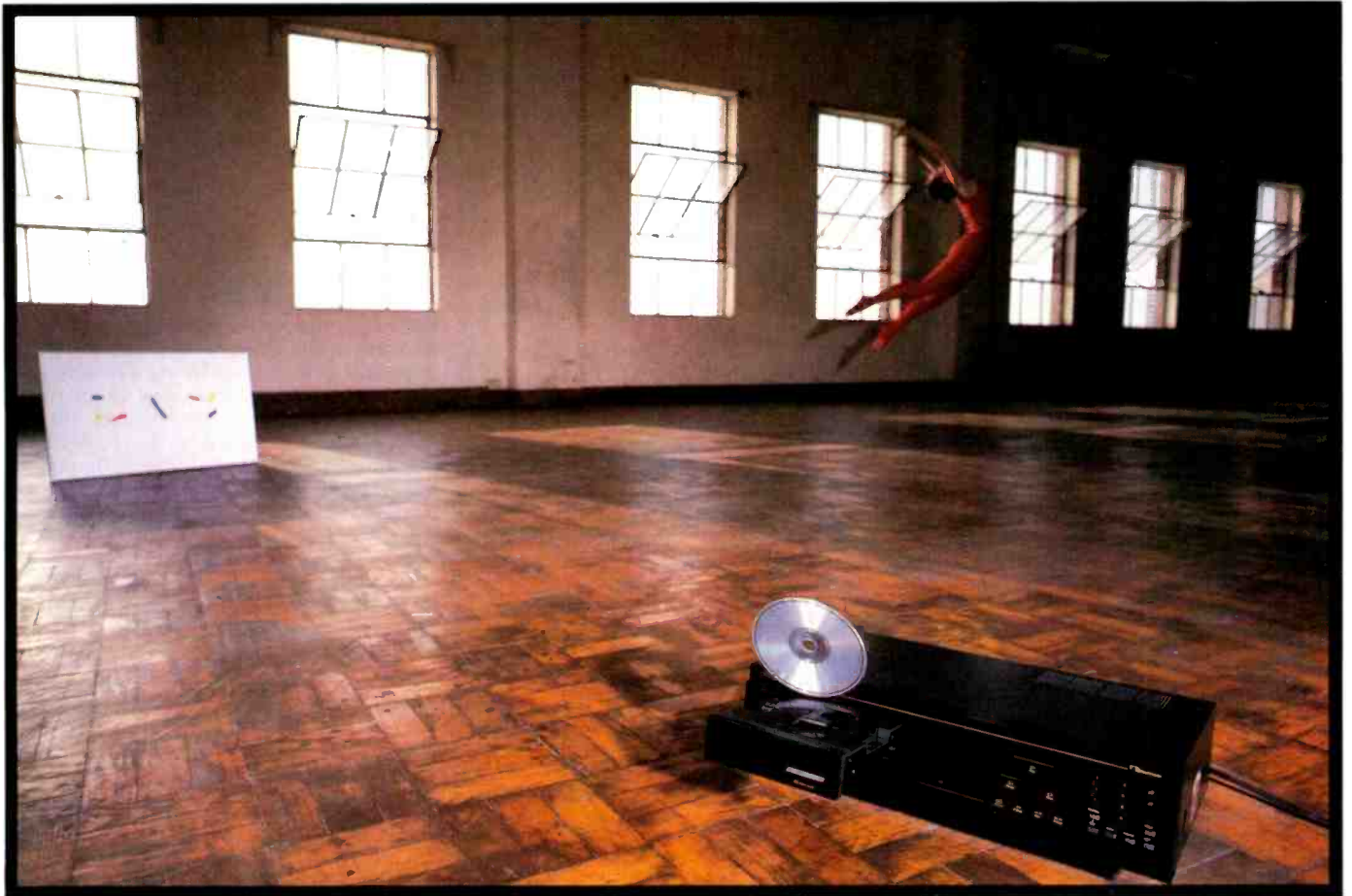


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CIRCLE NO. 74 ON READER SERVICE CARD

LETTERS

Protection or Piracy?

I was appalled to read in April's "Bulletin" that CBS, in its infinite wisdom (or greed), plans to distribute ninety copy-guard encoding machines to record companies in the near future and that encoded CD's, LP's, and cassettes could be in record stores by July. To quote Messrs. Barter and Burton, "According to Denon engineers, the effects of the preproduction encoder are audible in *classical* music but not in popular music" (emphasis added). So much for lovers of great classical music and for a fascinating new technology with much potential.

Why change the quality of the software? I, for one, would be willing to pay a bit more to satisfy the greed of the record industry. There certainly must be a solution to the [pirating] problem other than compromising the sonics.

RONALD H. COHEN
Plainview, NY

"Things are getting curiously and curiously!" exclaimed Alice regarding the CBS copy-guard system for audio re-

cordings. "First sound engineers develop recording techniques that come ever so near to perfection. Then they invent digital recorders that make nearly perfect copies. And then, so no one will want to make copies with his expensive new digital audio tape deck, they propose to spoil the recordings they worked on so diligently in the first place."

"But don't you see, my dear," the White Rabbit explained, "the people who buy and copy the popular music won't be able to hear that anything is wrong with their records. Only the lovers of classical music will notice the missing frequencies, and they are not the ones the record companies are worried about! It makes perfect sense."

JOSEPH COOPER
Santa Barbara, CA

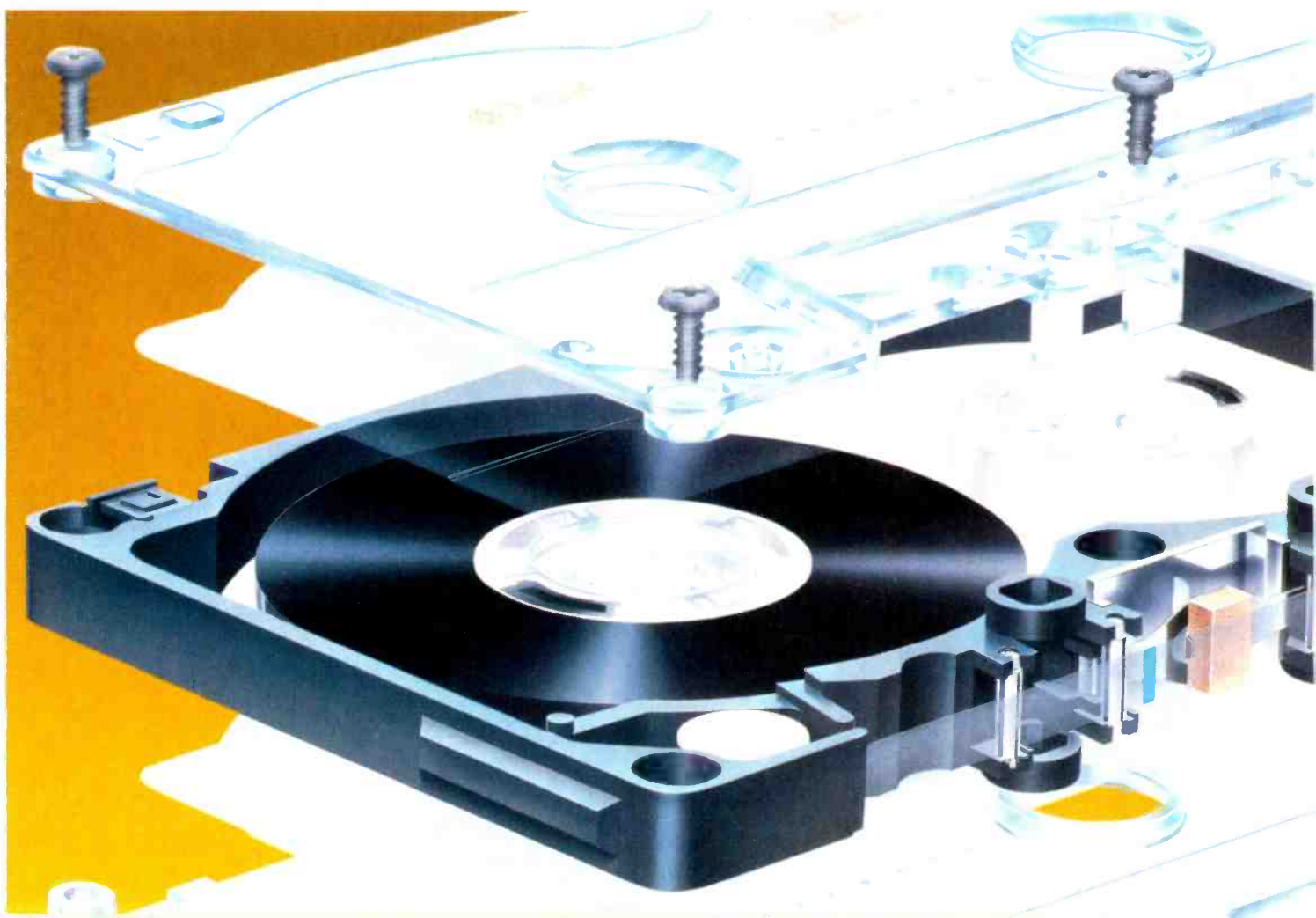
The CBS copy-guard system would appear to be throwing a monkey wrench into the works. Are we to have recordings with copy-guard signals in place of some of the musical information? If this is true, then I wish CBS the same success with this encoding system as it had with CX.

On the other hand, since no serious software pirates will be foiled by such a system, there is an implied threat to future consumer purchases of tape and tape recorders. If manufacturers must include the copy-guard chip by law, I believe most consumers will not knowingly buy a tape recorder that will automatically balk at recording discs and tapes in their possession. Curtailed growth in sales of tape recorders would hinder the sale of blank tape also.

Is this potential loss in tape and hardware sales the recording industry's way of coercing the blank-tape and recorder manufacturers into accepting a royalty/tax on tape and recorder sales? I think I would rather pay a little extra in the form of a tax on blank tape than have to put up with \$15 CD's that have missing musical notes.

JOHN M. MOSEY
Derry, NH

As a record retailer specializing in classical music, I will not stock or sell any classical recording that offers the built-in defect of an audible copy-guard. Nor, as a consumer, will I buy any audi-



LETTERS

bly disfigured recording. Home taping is a minor threat to the classical part of the business, and CBS's proposed copy-guard system would certainly end it, because no serious consumer would buy a deliberately flawed recording to begin with. Isn't all this a little like throwing out the baby with the bath water?

DAVID NELSON
Goleta, CA

I do not tape my discs, and I do not lend them to others. The effects of copy-guard encoding will sometimes be audible, so I will not buy any encoded discs. Instead, I will buy imports. And I will do no business with CBS.

ROBERT ROWTON
Albuquerque, NM

Do Steve Birchall's ideas on taxing blank tape and tape recorders ("DAT: Issues and Answers," March) represent the opinion of STEREO REVIEW? He says that "A royalty fee at a reasonable rate could benefit everyone." Sounds good, Steve. Substituting the words "royalty fee" for "tax" is pretty much the same tactic the government uses to get un-

popular ideas accepted by the public—substituting the word "peacekeepers" for "nuclear missiles, bombers, etc." Who wouldn't want his favorite artists to get the royalty they deserve, and who wouldn't want peacekeepers?

Is there a serious copying problem? How does anyone really know? Sure, a lot of blank tape is sold, but did they ever hear of car stereo? Or how about the convenience of taping your own LP's for your personal use? That is legal, isn't it?

MIKE MCFARLANE
Springfield, OR

Many people think the "copying problem" is very serious. If you feel strongly about this issue, write your congressmen. Call the Home Recording Rights Coalition at 800-282-TAPE for information.

Digital Alternatives

I was surprised at Steve Birchall's assertion in "DAT: Issues and Answers" (March, page 59) that "the only sources of digital music will be pre-

corded DAT's—or CD's." This error tends to justify the movement toward protectionist restrictions on DAT decks that allow direct digital copying, which would hit me rather close to home both as a musician and as a recording engineer, as well as harming many other people who have no criminal intent.

For the past five years or so, most professional audio engineers have been taping live concerts (and many recording sessions) with video-based digital processors such as the Sony PCM-F1. These tapes have fully professional digital quality but cannot be edited directly, and digital audio processors are too expensive for the average musician to afford. As a result, whenever a musician needs a different audition tape made, the engineer has to redo the sequencing and dubbing. But a DAT deck, with its internal address data and self-tracking system, should lend itself well to fool-proof electronic editing. If mass production can bring the prices down to below \$400 the way it has with VCR's, composers and performers will be able to meet more of their own needs for high-quality audition tapes.

PERFECT MARRIAGE

New SA-XG is TDK's exclusive SA-X formulation—the world's quietest tape—technomiously joined together with TDK's most sophisticated mechanism ever—the RS-II.

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TDK. THE ART OF PERFORMANCE.

LETTERS

The same advantages will also be welcomed by radio and film sound producers, who often need to assemble high-quality programs from digitally recorded live sound sources. Programmable DAT decks could be a very powerful and flexible tool in the hands of electronic composers as well. Some synthesizers are already capable of generat-

ing a 16-bit digital bitstream, and others would surely follow. There is also great potential in the use of personal computers for sound analysis as well as music synthesis.

In short: not all the world is made up of techno-pirates!

DAVID SATZ
New York, NY

Ronstadt and Riddle

Congratulations to reviewer Mark Peel for his fine observation in April's "Best Recordings of the Month": "... Thank you, Linda Ronstadt . . . for reawakening our ears to a rich era in American popular music." I'd like to add: "Thank you, Nelson Riddle!"

DENNIS HENDLEY
Milwaukee, WI

Paying the Price

Who says CD players don't cost much?

I bought mine just over a year ago. I knew immediately that I had to upgrade my cassette deck. And my amplifier.

Next came the gold-plated interconnect cables. Soon after followed audiophile speaker wire. Then came the speaker stands. Right around the next corner came expensive headphones.

Recently I had to buy a Carver Sonic Hologram preamplifier, a real-time spectrum analyzer, and a remote control for the cassette deck. Throughout all this I was building a collection of more than seventy CD's.

If my wife hears me say, "That's all I need, I'm done," one more time, she's going to divorce me . . . and my stereo system, of course.

STEVEN DICARLO
Washington, DC

Trouble Brewing

Steve Simels's review in April of "Good Music" by Joan Jett and the Blackhearts could have been worded better. I'm sure that he intended "... brewing under our very noses" and "an album best appreciated on a car stereo after a six-pack of beer" to be taken figuratively, but the linking of a six-pack with car stereo is a sensitive issue in today's world.

HAL TRYCHTA
Lake Villa, IL

Tape Deck Tips

Regarding the March issue's "Twelve Tips on Choosing a Tape Deck": Congratulations to William Burton for writing a clear, succinct, and easily understood article for nongeniuses like myself who gag on the sometimes absurdly complex writeups [in audio magazines].

MICHAEL SCHINAGEL
Drexel Hill, PA

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soon to come is Kiri Te Kanawa in *My Fair Lady*.

What's next, *Gypsy*?

DON E. MANNING
Chicago, IL

Bose AM-5 Speakers

Before I read the special test report on the Bose AM-5 speaker system in the April issue, I thought that the components shown on the front cover were phono cartridges and a pillow speaker!

FRANK L. CHOVANEC
Taylor, TX

It's about time someone designed a satellite speaker in “parts” so you can aim one driver at a side wall and have another pointed at you—congratulations, Dr. Bose! Question: Will Bose sell the AM-5 satellite Cubes separately so that consumers can use them with another subwoofer?

JOHN CUDRIK
Gainesville, FL

According to Bose, the company has no plans to market the Cubes separately from the Acoustimass bass module.

Reissues by Request

I have several old records, some on pretty obscure labels, that I treasure. I'm curious about the process by which record companies decide which recordings to rerelease as CD's. Is there any way for a consumer to cast a vote?

Also, is there a reasonable way to find out who has the master tapes for specific recordings? Some of the record companies in question probably don't even exist any more. Since I am not in the record business and don't follow the trade journals, I wouldn't know where to begin.

JERRY EBNER
Wilmette, IL

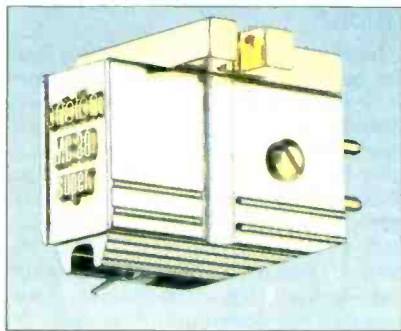
Music Editor Christie Barter replies: Reissues on CD are for the most part determined by considerations of what will sell. Obscure artists and obscure repertoire cannot always be counted on to meet the sales criteria of the larger companies, but it's possible that the more important titles in the catalog of an obscure label could be reissued on CD if the label were particularly interested in establishing a presence in the CD marketplace. You can cast your vote as a consumer by writing the A&R (Artists and Repertoire) department of the record company in question—see Schwann for addresses. The A&R people can also probably advise you regarding master tapes. In the case of defunct labels, it's possible that the performers or their managers might know.

NEW PRODUCTS

Ortofon

The Ortofon MC 30 Super moving-coil cartridge has a Fritz Gyger I stylus, which is said to trace record grooves more accurately without distortion, mistracking, or bridging high-frequency information. The use of hand-wound silver-wire coils and a conical aluminum cantilever (similar to the one used in Ortofon's top-of-the-line MC 2000) results in a low total moving mass. Weight is 9 grams. Usable tracking force ranges from 1.6 to 2.0 grams, with 1.8 grams recommended. Frequency response is given as 20 to 40,000 Hz +4, -1 dB. Channel separation is greater than 27 dB at 1,000 Hz and greater than 19 dB at 15,000 Hz. Price: \$450. Ortofon, Dept. SR, 122 Dupont St., Plainview, NY 11803.

Circle 120 on reader service card



Revox

Three newly developed large-scale integrated circuits, a proprietary analog filter, and 16-bit quadruple oversampling are highlights of the Revox B226 compact disc player. Error correction is said to be improved through the use of adaptive circuitry that selects the best error-correction strategy from among sixty possibilities. In addition to standard time and track information, the LCD panel includes a proportional bar graph that indicates the pickup's relative posi-

tion within the track. Convenience features include the B205 wireless remote control, which can also operate all other Revox 200 Series components, variable outputs for use with amplified speakers, and two digital outputs for such future applications as CD-I graphics or CD-ROM. Signal-to-noise ratio is rated as greater than 100 dB from 20 to 20,000 Hz, frequency response as 20 to 20,000 Hz ± 0.1 dB. Price: \$1,150. Studer Revox, Dept. SR, 1425 Elm Hill Pike, Nashville, TN 37210.

Circle 121 on reader service card

Polk

Polk's Mobile Monitor Series now includes the Model 6502 (left) and Model 5502 (right), both two-piece, three-way car speaker systems with polymer-laminate cones, butyl-rubber surrounds, and perforated steel grilles. The systems combine unique two-way mid/high-frequency satellite modules with separate bass drivers. Each satellite includes a 2-inch polymer midrange, a $\frac{3}{4}$ -inch polymer dome tweeter, and a crossover network. Although they are no larger than most one-way satellites, they are said to provide the dispersion, imaging, and power handling of full-size two-way systems. The satellites can be mounted on an angled surface, flush mounted, or mounted behind a panel; accessories for all three types of mounting are included. Mounting depth is $1\frac{1}{4}$ inches.

The Model 6502 comes with a 6 $\frac{1}{2}$ -inch woofer/subwoofer (mounting depth 2 $\frac{3}{8}$ inches). System frequency response is rated as 38 to 20,500 Hz, power handling as 100 watts. The Model 5502 comes with a 5 $\frac{1}{2}$ -inch woofer (mounting depth 2 $\frac{3}{8}$ inches). System

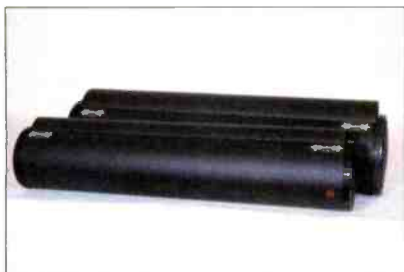


frequency response is 40 to 20,500 Hz, power handling 100 watts. Prices: Model 6502, \$115 each; Model 5502, \$99.95

each. Polk Audio, Dept. SR, 5601 Metro Dr., Baltimore, MD 21215.

Circle 37 on reader service card

NEW PRODUCTS



SAS

The T16 (front) and T18 (rear) Bazooka Bass Tubes from Southern Audio Services are designed to be flush mounted against the rear wall or deck of a car. Both use corner-loading woofers

and high-impact, moisture-resistant plastic enclosures. The T16 has a 6½-inch woofer with a 20-ounce magnet and a high-power/high-temperature voice coil. Bass efficiency is rated as 98 dB at 1 watt, power-handling capability as 100 watts per channel. Dimensions are 35½ inches wide, 6¾ inches high, and 8¾ inches deep.

The T18 uses an 8-inch woofer. Bass efficiency is 100 dB at 1 watt, power-handling capability 150 watts per channel. Dimensions are 38 inches wide, 8½ inches high, and 10 inches deep. Prices: T16, \$199; T18, \$279. Southern Audio Services, Dept. SR, 2909 Crater Lake Dr., Baton Rouge, LA 70814.

Circle 122 on reader service card



Sharp

Designed for use in rooms where space is at a premium, the Sharp CR-CD10 is a digital AM/FM clock radio with a built-in compact disc player. Tracks on a CD can be programmed for playback in any order using the Automatic Programmable Music Selector, and specific tracks can be accessed easily using the bidirectional skip feature. The CR-CD10 has a pair of built-in

3⅞-inch speakers. Stereo outputs are provided for connecting it to a more extensive stereo system or to powered loudspeakers. The LCD clock has a wake-up alarm timer and a sleep function. The CR-CD10 is available in misty mauve, enchanting black, and twilight blue finishes. It measures 18 inches wide and 8 inches deep. Price: \$319.95. Sharp, Dept. SR, Sharp Plaza, Mahwah, NJ 07430.

Circle 123 on reader service card



Infinity

Infinity's new Kappa Series speakers are headed by the Reference Standard 9 K. The five-way system's six drivers include two cast-frame 12-inch polypropylene and graphite-fiber woofers, a 5-inch Polygraph K dome midbass transducer (80 to 500 Hz), a 3-inch Polydome K midrange, an EMIT K tweeter, and a SEMIT supertweeter. Both the EMIT K tweeter and SEMIT supertweeter use special light diaphragms surrounded by neodymium magnets.

Crossover frequencies are 90, 700, 5,000, and 10,000 Hz. Rated frequency response is 29 to 44,000 Hz ± 3 dB. Nominal impedance is switchable between 4 and 8 ohms. Power-handling capacity is said to be 60 to 340 watts per channel. The Reference Standard 9 K can be bi-amplified. Finish is hand-rubbed and oiled oak. Price: \$1,199 per pair, including pedestals. Infinity, Dept. SR, 9409 Owensmouth Ave., Chatsworth, CA 91311.

Circle 124 on reader service card



Proton

The Proton AL-300 is a three-way, floor-standing loudspeaker system. The front panel is angled back at a point just above its middle in order to improve stereo image focus and reduce irregularities in frequency response. The angled part of the panel contains a 1-inch fluid-cooled polyester soft-dome tweeter and a 3½-inch treated-cone midrange driver. The midrange is mounted in an integral air-suspension subenclosure and incorporates an 11-ounce magnet. The 12-inch air-suspension woofer, with a 30-ounce magnet, is said to have low har-

monic and intermodulation distortion even at high power levels.

Nominal system impedance is 4 ohms. Rated frequency response is 39 to 22,000 Hz ± 2 dB; power handling is 100 watts average, 1,000 watts peak; sensitivity is 90 dB sound-pressure level at 1 meter. The 500-Hz crossover, at 12 dB per octave, and the 3,200-Hz crossover, at 18 dB per octave, both use shunt elements. Each speaker measures about 15½ inches wide, 35¾ inches high, and 13½ inches deep. Price: \$899 per pair. Proton, Dept. SR, 737 W. Artesia Blvd., Compton, CA 90220.

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NEW PRODUCTS



Mobile Fidelity

Mobile Fidelity, which developed the half-speed mastered audiophile LP, is pressing high-quality compact discs called UltraDiscs. The polycarbonate

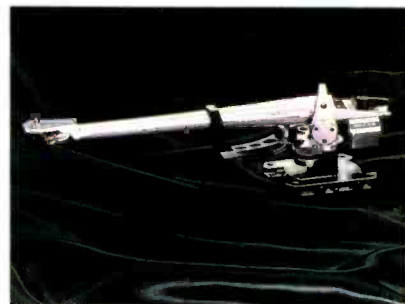
coating of a standard aluminized CD is bonded with twenty-four-karat gold and treated with vacuum-particle-deposit ionization. The process is said to make the gold-colored discs smoother, flatter, and capable of generating audio signals far above current standards. The gold coating is also said to be noncorroding, and test discs are said to have exhibited no apparent wear long after most aluminum-type test discs suffered significant degradation.

The first UltraDisc release is the "Jazz CD Sampler," featuring the Zoot Sims Quartet, the Max Roach-Clifford Brown Quartet, and others. A sampler of previously unreleased titles from the Soviet Union's Melodiya label will follow. Price: \$29.95 per disc. Mobile Fidelity, Dept. SR, 1260 Holm Rd., Petaluma, CA 94952-1182.

Circle 126 on reader service card

SME

The SME Series IV tonearm, imported by Sumiko, uses much of the same technology as the more expensive SME Series V, including the same one-piece, pressure-die-cast magnesium arm tube, mounting base, bearing design, and rotating damped output socket. The Series IV uses liquid-crystal oxygen-free copper (LC-OFC) wiring and an LC-OFC interconnect. Its ABEC-3 bearings are said to be low in friction and virtually indestructible. Vertical tracking force is set by a calibrated thumb-wheel. Finish is silver. Price: \$1,050.



Sumiko, Dept. SR, P.O. Box 5046, Berkeley, CA 94705.

Circle 127 on reader service card



Yamaha

Yamaha's TT-500U (shown) and TT-400U fully automatic turntables can be operated either by their own front-panel

controls or by any unified remote control supplied with a Yamaha RS-Series component. Manual operation is possible when the dust cover is closed.

The TT-500U uses an FG servo direct-drive system and a static-balanced straight tonearm. Tracking force can be set from 0 to 3 grams in 0.1-gram steps. Rated signal-to-noise ratio is greater than 78 dB, wow-and-flutter less than 0.03 percent wrms. The turntable measures 16¹/₁₆ inches wide, 4⁹/₁₆ inches high, and 14³/₄ inches deep. The TT-400U uses a DC servo belt-drive system. The tonearm, tracking force, and dimensions are identical to those of the TT-500U. Signal-to-noise ratio is rated as greater than 70 dB, wow-and-flutter as less than 0.45 percent wrms. Prices: TT-500U, \$229; TT-400U, \$179. Yamaha, Dept. SR, 6660 Orangethorpe Ave., Buena Park, CA 90620.

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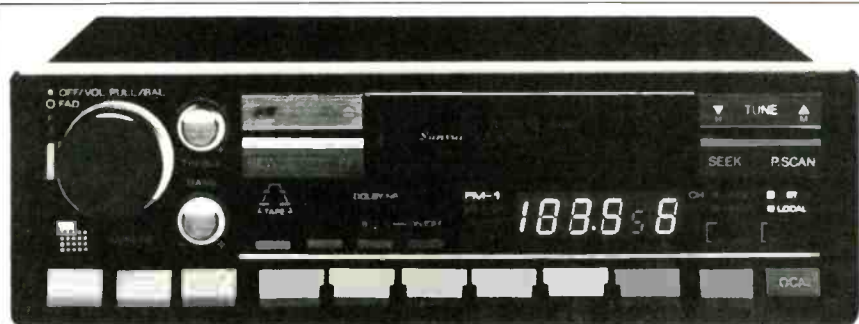
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SANSUI GT-X7000

by Julian Hirsch and Christopher Greenleaf

SANSUI'S GT-X7000 is a complex but carefully laid-out autoreverse tape player and tuner intended for use with one or more external power amplifiers. It has front and rear line-level preamplifier outputs and an 8-pin DIN-style jack for connecting Sansui's CD-X500 CD player or an equalizer. It is highly versatile in both the radio and cassette departments, offering many control features usually found only in more expensive head units.

The tuner has one AM band with six memory presets and three FM bands with six presets each, for a total of twenty-four presets. A user has the option of tuning manually, seeking the next receivable station, or scanning the presets. The volume, balance, tone, and fader controls are the only rotary knobs; all other controls are pushbuttons. The FM mode (mono or stereo) and local or distant scanning sensitivity are selectable. The distant setting allows the tuner to lock onto many more stations than it does in the local setting. The same local/distant option works for the INTRO-M function, which scans through the receivable stations of the band so that the desired ones can be memorized. An unusual feature is a pushbutton to select between wide and narrow bandwidth for AM listening, allowing the user to select lower noise and adjacent-frequency interference or higher overall sound quality.

The cassette player reverses direction automatically at tape end, repeating endlessly until ejected, and it can also be reversed manually.

Both Dolby B and Dolby C noise-reduction circuits are provided, and there is automatic sensing for normal 120- μ s or chrome/metal 70- μ s tapes. The side of the tape facing up when the cassette is inserted is normally played first, and a tape-motion indicator shows the actual movement of the tape.

It is possible to change from tape play to tuner listening without ejecting the cassette but not to listen to the radio during fast winding. If a cassette is in the well when the car or the player is switched off, the pinch-roller and tape head automatically disengage. If the car's interior lights have accidentally been left on, an alarm buzzer—which cannot be mistaken for the beep that acknowledges each touch of a control button—warns of the omission. Other automated features include BLANK SKIP, which fast forwards through blank segments on the tape, automatic music program search, introscan, which samples the first 10 seconds of successive tracks, and single-track repeat.

The illumination is of a kind becoming more common: only those functions affecting the signal source currently in use light up. The clock display is on during tape play and can be shown briefly during radio listening. Price: \$700. Sansui, Dept. SR, 1250 Valley Brook Ave., Lyndhurst, NJ 07071.

Lab Tests

The FM tuner section of the Sansui GT-X7000 had the quieting and distortion characteristics typical of good car stereo receivers. Although

the noise levels were low, the distortion readings were in the range of 0.5 to 0.6 percent at most usable signal levels. The tuner's frequency synthesizer was about 10 kHz in error, degrading its usable sensitivity somewhat (it measured about 2 dB better when the signal generator was detuned to match the receiver's actual frequency).

The automatic channel-blending action at low signal levels prevented an accurate determination of the stereo threshold. To deal with this rather common characteristic of car radios, we modulate the signal generator with a difference signal (L - R). Since the audio output level from that signal varies with the amount of channel separation, we arbitrarily define the stereo threshold as the input signal level at which the output decreases by 6 dB from its maximum. In this case, the threshold was 37 dBf (19.5 microvolts, or μ V) at the radio's 75-ohm antenna input.

The FM tuner's alternate-channel selectivity could not be measured, apparently because the receiver's internal automatic gain control (AGC) shut down its sensitivity to the point where we could not inject a strong enough signal to make the measurement. Even the adjacent-channel measurement was suspect: our 20-dB reading was unusually high!

The AM bandwidth changed only slightly in the wide setting, but it dropped very steeply above 6,000 Hz in the normal (narrow) setting, much more gradually with the wide setting. It is evident that the AM-bandwidth option is designed to remove interstation heterodynes (a 10-kHz whistle) rather than simply to cut the noise level or control the audio bandwidth.

The tone controls showed conventional response characteristics, with a sliding bass turnover frequency and treble curves hinged at about 2,000 Hz. The loudness compensation boosted both low and high frequencies as the volume was reduced.

The tape deck, like most autoreverse players, had different frequency responses in the two directions of tape travel because of changes in the azimuth alignment. Using an IEC-

standard 120- μ s test tape, the forward response was an excellent +1.5, -5 dB from 31.5 to 18,000 Hz (the falloff was mostly at the lowest frequencies). In reverse, the output began to drop off above 2,000 or 3,000 Hz and fell sharply above 7,000 Hz to about -10 or -12 dB in the 9,000- to 18,000-Hz range. The large amplitude fluctuations in that range indicated poor contact between the tape and the playback head, a common problem in autoreverse car tape decks. Interestingly, the 70- μ s test tape had opposite characteristics—its frequency response was better in reverse than in the forward direction—although

even the reverse response fell off above 10,000 Hz to -7 dB at 18,000 Hz. The tape deck's flutter was low, but its speed was about 2 percent fast.

Like most car stereo cassette tuners or receivers, the Sansui GT-X7000 requires some familiarization before it can be used effectively. Unlike many, however, it offers intelligently designed and positioned controls that can be operated by people with normal-sized fingers (and normal vision). During our bench tests, we appreciated the convenience of having a single, full-sized knob to adjust volume without interfering with other control

functions instead of the kind of multiple concentric control that must be pushed and pulled to access some of its functions. Even the concentric fader control is designed to make its accidental shifting unlikely, and the tiny tone-control knobs, which are easy to operate when extended, are completely out of the way when recessed in the panel.

Our only criticism of the ergonomic features of the GT-X7000 concerns the internal lighting of some of the control switches, which was too dim to be read in ordinary room light or at a slight angle.

Overall, the GT-X7000 is a full-featured, handsomely styled, and easy-to-use car stereo tape/tuner/control system. Its performance on the test bench was generally good or better. It was not below par in any respect except the tape-head azimuth difference in the two directions of tape travel, an almost universal problem among autoreverse players. Driving a pair of good power amplifiers and with properly installed speakers, it should satisfy the most critical mobile hi-fi enthusiast. *J.H.*

Road Tests

The coldest weekend of the year provided an excellent excuse to spend lots of time inside of the car as we drove a few hundred miles to visit friends. The subzero temperatures and a broad high-pressure zone combined to give us two bright, clear days and nights with far better AM and FM reception conditions than normal, so distant stations doubtless came in more clearly with the Sansui GT-X7000 than they might otherwise have done. (Comparison with another radio of known sensitivity confirmed this.) In both FM and AM, the tuner proved to be a good performer with acceptable noise levels. The automatic high-blend was mostly innocuous, as it should be, but the mono button was useful for listening to fringe stereo stations.

I cannot remember ever having encountered an AM tuner section with a switchable pass-band setting. Most listeners will probably leave it set on wide and ignore it, while others who have problems with strong adjacent frequencies might resort to

FEATURES

- Digital-synthesis AM/FM tuner
- Manual, auto-seek, preset, and preset-scan tuning
- Up to twenty-four station presets (eighteen FM, six AM)
- INTRO-M to audition receivable stations with option for one-touch storage in preset memory
- Local/distant sensitivity switch to change threshold for scan functions
- WIDE switch to extend AM tuner bandwidth
- Digital display of frequency or time and preset number
- Fader control concentric with volume/balance knob
- Bass and treble tone-control knobs retract flush with panel after setting
- Switchable loudness compensation
- Switchable mono mode
- Line-level audio outputs for front and rear channels
- Rear input socket for Sansui CD player
- Audio output level switchable during installation

LABORATORY MEASUREMENTS

- Tuner Section** (all measurements for FM only except frequency response)
 - Mono usable sensitivity** (75-ohm input): 14.8 dBf (1.5 μ V)
 - 50-dB quieting sensitivity** (75-ohm input): mono, 12.5 dBf (1.15 μ V); stereo, 33 dBf (12.3 μ V)
 - Signal-to-noise ratio** at 65 dBf: mono, 70 dB; stereo, 69.5 dB
 - Harmonic distortion** (THD + noise) at 65 dBf: mono, 0.53%; stereo, 2.1%
 - AM rejection** at 65 dBf: 55 dB
 - Selectivity:** alternate-channel, not measurable (see text); adjacent-channel, 20 dB (see text)
 - Stereo channel separation** at 100, 1,000, and 10,000 Hz: 36, 38.5, and 30 dB
 - Frequency response:** FM, 30 to 15,000 Hz +2.9, -1.1 dB; AM (wide), 25 to 2,600 Hz; AM (narrow), 25 to 2,200 Hz
- Control Section**
 - Maximum output voltage** (100% FM modulation): LO, 0.775 volt; HI, 1.68 volts
 - Tone-control range:** \pm 11 dB at 100 and 10,000 Hz
 - Loudness compensation** (-30-dB volume setting): +7.5 dB at 50 Hz; +6.5 dB at 10,000 Hz
- Tape Deck**
 - Frequency response** (31.5 to 18,000 Hz relative to 315-Hz level): forward, +1.5, -5 dB (120 μ s) or +0, -6.5 dB (70 μ s); reverse, +0, -13 dB (120 μ s) or +0, -10.5 dB (70 μ s)
 - Flutter:** 0.083% JIS-weighted rms, \pm 0.13% CCIR-weighted peak
 - Speed:** +2.1% at start of tape, +1.9% at end of tape
 - Rewind time** for C-60: 88 seconds
 - Crosstalk** at 1,000 Hz: -52 dB
 - Noise** (A-weighted, referred to 250 nWb/m at 1,000 Hz): no noise reduction, -55 dB; Dolby B, -65 dB; Dolby C, -71 dB

CAR STEREO

it fairly frequently. In the course of our trip, because we were able to pull in stations well beyond the usual limits, the crowding of the AM band quickly yielded several weak but listenable stations next to one or even two strong frequencies. At a

slight sacrifice in fidelity, especially the already marginal bass, nearly all interference disappeared in the narrow setting—an altogether praiseworthy addition to AM car listening. The FM section was not entirely resistant to ambient electrical noise,

but it tended to be clean and crisp enough to let me hear the differences in audio quality from one station to another.

If you love the sound, convenience, and flexibility of cassette tape—now at the zenith of its technical excellence—this is the kind of player you will find a pleasure to use. The automated features included make sense. Having both Dolby B and Dolby C is welcome, of course, but even more important is the automatic tape-type sensing. Any good chrome or metal cassette these days has the rear-edge indents that permit automatic identification of the tape type, so why force the user to make this determination? There's no silly "metal" button on the Sansui's faceplate, though there is a display light to tell you a 70- μ s tape has been loaded.

The autoreverse player appeared to work nearly identically in either direction. The fast-wind blank-space sensor (for BLANK SKIP, AMPS, and intro-scan) was sensitive enough to permit the unit to function very well even with classical-music tapes. Naturally, very brief pauses between movements fooled the sensor, but only CD and DAT players can perform this sort of track location all of the time. Excellent shock resistance, lack of flutter, and overall transport stability were apparent throughout my tests on the road and while listening to it through my home system.

The one bone I will pick with the otherwise delightful GT-X7000 is the long learning curve associated with comfortable mastery of all its controls. Even as a supposed car stereo "adept," I found myself referring to the complex and poorly proofread manual to confirm what the cryptic symbols and label initials promised when I touched a given button. Though the faceplate is not as logically arranged as on some units, once I had learned my way around it, I found the GT-X7000 to be a flexible and versatile music source on the road. There are a lot of controls, to be sure, but nothing extraneous. With the addition of the optional CD player, the GT-X7000 can be a fully satisfying car stereo component. *C.G.*

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Shankar Pat Metheny Lyle Mays Ralph Towner
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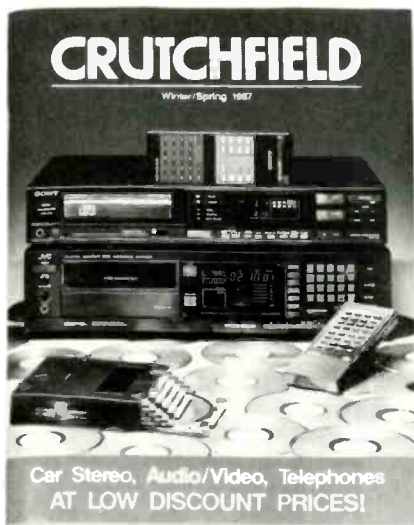


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AUDIO Q&A

by Ian G. Masters



Decibels

Q I still can't grasp a concept STEREO REVIEW has addressed time and time again. Why does a level difference of 3 dB represent a doubling or halving of power in some cases, while in others it means just a slightly noticeable difference in volume?

ERIC T. DEZUBAY
Monroe, LA

A Tricky things, these decibels. One thing a decibel is *not* is a unit, like a watt or a volt; it expresses a ratio between the intensity of one signal and another.

In the electrical part of an audio system, such a ratio can be expressed in many ways. When we compare a 50-watt amplifier with a 25-watt amplifier, we could say the ratio was "2:1" or "twice" or "2×"—any of these expressions would serve equally well. But the result of everything that happens in an audio system has to be meaningful in terms of the final element, the listener, and human beings do not perceive level differences in a linear manner. Doubling the electrical signal to a speaker will not result in an apparent doubling of sound level. In fact, the ratio of the softest sounds we can hear to the loudest sounds we can endure is about one to a trillion.

To correlate with the way we perceive level changes, a logarithmic notation has been adopted for use in all parts of audio. This has the advantages of keep-

ing the numbers relatively small (that trillion-to-one ratio translates into 120 dB) and allowing for simple computation of signal levels. To multiply two power differences, all you have to do is add or subtract the ratios in decibels.

Much of the original work to establish the decibel scale was very subjective, because it is extremely difficult for anyone to know for sure that one sound is, say, exactly twice as loud as another. But after a great deal of experimentation, averaging the responses of many listeners, one decibel was defined as the minimum perceptible change in level, with no reference to what had to happen electrically to produce that change. Building on that, it was determined that 3 dB—still only barely audible—represented either a doubling or halving of electrical power, depending on whether the change was an increase or decrease, and that an *apparent* doubling or halving of the level required an 8- or 10-dB change (10 dB is the figure usually quoted because, electrically, it neatly represents a *ten*-fold change).

None of this would be very important to anyone but engineers if it did not bear directly on the sort of amplifier power you should have for true high-fidelity sound. To give an example, if your system coasts along at about 2 watts for the average program level—by no means an unusual situation—and then hits a very modest 20-dB musical peak, all of a sudden your amplifier will be called upon to deliver one hundred times the power (10 + 10 dB means 10 times 10 watts), or 200 watts. And a really heavy transient will require even more power than that.

Pre-Echo

Q With many of my LP's, I have noticed that immediately prior to a song I can hear a "pre-echo" of the music to follow. Why is this so?

CHRISTOPHER CHEN
Berkeley, CA

A This effect doesn't just happen at the beginning, but throughout a record. Normally, however, it is masked by the music. Careful mastering techniques can minimize pre-echo, but to some degree it is inherent in the conventional vinyl record.

An LP is cut by a heated stylus that carves a groove in a very soft material—much softer than the final product you buy. As the cutting stylus reacts to a music signal, its sharp tip moves from side to side, digging out the surface material as it goes. Because it is hot, however, and because the surface material is soft, the stylus pushes the acetate coating around to some extent, deforming the adjacent groove already re-

New World Technology From Old World Artisans.

corded. The deformation is tiny, but it does create an echo of the audio signal being recorded.

As long as the signal moving the stylus is quiet, the deformation will probably be inaudible. And if the playback stylus is tracking a heavily modulated (that is, loud) groove, you won't hear echoes from the next groove, partly because they are masked by the present sound and partly because grooves are more widely spaced in loud portions of the music. But if your stylus is tracking a quiet passage (or, worse, the silent lead-in grooves), a *fortissimo* signal in the adjacent groove becomes easily audible.

Once such an effect has been mastered into a record, it can't be removed. Fortunately, recording engineers are better at preventing pre-echo than they once were, so it has become one of audio's less pressing problems.

Persistent Hiss

Q *I seem to be plagued with a hiss from my speakers no matter which input source has been selected. It's still there even when the volume control is all the way down. Any suggestions for a remedy?*

B. J. ANDERSON
Vancouver, BC

A You seem to have made all the right troubleshooting moves to eliminate possible sources of the problem. The fact that the hiss occurs with all sources means that no one of them is the cause, and that it is still there with the amplifier level control set to its minimum rules out the input stages of that component. That leaves only the output stages of the amplifier or the speakers themselves.

When they are misbehaving, speakers can cause all sorts of unpleasant noises, but normally hiss isn't one of them. Hiss is a broadband noise that has to be generated; speakers only translate electrical signals to acoustic ones. Speakers can emphasize certain parts of the audio spectrum, however, so if your amplifier is producing hiss, the speakers can make it more obvious than it would otherwise be by having a prominent high end (hiss is much more audible and annoying in the treble range). If the balance of your speakers is acceptable with music, however, it is unlikely that they are the source of your troubles.

The likelihood that your amplifier is at fault seems to me very high. It might be a matter of a simple repair; if so, it's worth getting done rather than letting one component degrade the performance of all the others. If it turns out to be a design fault, though, you should look into upgrading the amplifier. □

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by Julian Hirsch



Is American Audio Technology Dead?

LIKE the prematurely reported demise of Mark Twain, the presumed extinction of the American hi-fi industry has been "greatly exaggerated." It would be easy to conclude the opposite, however, from the publicity given to the technological breakthroughs in this and other fields coming from the Far East and Europe.

Hi-fi, as a hobby, began in this country shortly after the close of World War II. It had actually existed, on a very limited scale, in the pre-war years both in the United States and elsewhere, notably in Great Britain, but the numbers of enthusiasts and manufacturers were so small that I prefer to think of 1946 as the real beginning of the audio age.

In those days, there was no hi-fi industry as we know it today. Then, as now, there were various individuals and small companies manufacturing speakers, amplifiers, tuners, and similar components. Most of

them were literally garage operations catering to a limited enthusiast and hobbyist market. These hobbyists, considered a bit daft by the general public, were called "audiophiles" in those days, and the name remains even now—possibly for want of a better one.

The technical sophistication of the early hi-fi products left something to be desired—certainly in comparison with what we have today—but the standards of performance were correspondingly lower, and enthusiasts argued as vehemently over the relative sound qualities of GE, Pickering, and Audax magnetic cartridges, or of University and Perm-o-flux speakers, as they do over today's equivalents.

Although the technology of forty years ago was far inferior to that of 1987, do not assume that the audio designers of that time were living in the dark ages. Most of the fundamental work in acoustics, and even in such specialized areas as phono-cartridge and loudspeaker design, had been done in the 1920's or earlier. (Helmholtz laid the foundation for much of today's acoustic knowledge in the 1880's!) Unfortunately, the early audio designers and builders did not have the benefit of solid-state technology or of computers capable of eliminating the guesswork from speaker design—guesswork that resulted in some embarrassingly awful products as well as others that could hold their own in today's world.

In the absence of a broad-based market, there was no need for large-scale manufacturing of audio products, and the market expanded slowly, both here and in Britain. I have no information on how and

when it grew in Japan, which was more concerned during the first decade or so after the war with rebuilding its heavily damaged country and economy. Understandably, nonessential consumer goods did not receive a high priority during that period. Another factor slowing the growth of audio, especially in this country, was the simultaneous growth of the TV industry. It was difficult for component hi-fi to compete with TV for the consumer dollar. Although early TV sets cost \$600 or more, equivalent to several thousand dollars today, they obviously had a much greater popular appeal than the hi-fi components of the time.

Between 1950 and 1970 a number of fairly sizable (by previous standards) American companies began to establish their places in the hi-fi market. Names like Fisher, Scott, Sherwood, McIntosh, Marantz, Electro-Voice, Altec Lansing, and many others became household words among audiophiles. Most of today's audiophiles will still find these names familiar, but, with few exceptions, they are only brand names owned by foreign manufacturers (mostly, but not exclusively, in the Far East) for use on products destined for the American market.

What happened? Well, it is a complex subject, and I am not an economist or businessman. My interpretation may be simplistic, but it reflects the way the situation looks to me—and, after all, I lived through the entire process of change. I have scanned through my twenty-nine-year collection of that invaluable research tool, this magazine's *Stereo/Hi-Fi Directory and Buyers' Guide*, and the first recognizable Japanese brand name appears in 1965, when Kenwood introduced several stereo receivers. Though cheaper than the top units from Fisher and others, the Kenwood receivers bore prices comparable to those of most American receivers with similar ratings.

The situation did not change markedly for several years. A few Kenwood tuners, receivers, and amplifiers appeared in the 1966 directory, and in 1967 Sony offered the TA-3120, a high-quality, and not inexpensive, amplifier. So far, there

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346643. Andreas Vollenweider—Down To The Moon. (CBS)
346478. Madonna—True Blue. (Sire)
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348979. Tina Turner—Break Every Rule (Capitol)
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326629. Bruce Springsteen—Born In The U.S.A. (Columbia)

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343715. Vivaldi—Four Seasons. Maazel, members Orch. National de France (Digital—CBS Masterworks)
340323. Sade—Promise. (Portrait)
342105. Bangles—Different Light. (Columbia)
335547. Berlioz: Symphonie Fantastique—Barenboim, Berlin Phil. (Digital—CBS Masterworks)
347492. Glenn Miller Orchestra—In The Digital Mood. (Digital—GRP)

293597. Led Zeppelin—Houses Of The Holy. (Atlantic)
350736. Rolling Stones—Rewind. (Rolling Stones Records)
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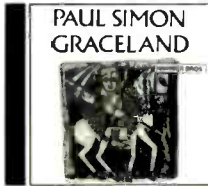
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TECHNICAL TALK

were no signs of a Japanese takeover of the American audio industry. The year 1968 saw the appearance of Pioneer and Sansui receivers and a Sony tuner, but the imports still showed no signs of runaway growth. In 1969, Rotel was added to the roster. In 1970, JVC and Standard appeared, and Sony expanded its line of components.

With benefit of 20-20 hindsight, a pattern begins to emerge in this picture. In those five years, no major American brand names disappeared, but at least six Japanese brands entered the market. As the years went by, increasing numbers of American companies chose to have their products manufactured, in whole or in part, overseas. Obviously, this was an economic decision on their part. The Japanese products that were introduced here in the 1960's, though good, were neither better nor cheaper than comparable American products.

In the early 1970's, each year saw the addition of one or more Japanese brand names to the directory listings, although most of the familiar brands remained. By 1980 the metamorphosis was almost total, with at least twenty Japanese brand names, from Aiwa to Yamaha, among the listings for amplifiers and receivers alone. And by that time, most of the *non*-Japanese brands, if not actually owned by Japanese companies, were already being manufactured there.

To me, this history of the decline—*not* demise—of the American audio industry signifies that the industry was not taken from us in any underhanded way—we gave it away! In the beginning, Japanese labor costs were lower than ours, and there was an economic advantage to having our equipment made there. This may have been a short-sighted decision, or it may have been necessary for economic survival. We have seen much the same thing happen with TV sets and automobiles, where in many cases the import had a clear advantage in quality, a less important consideration in the case of hi-fi. Whatever the immediate reasons, it seems that the American audio companies fell into economic difficulties and had to sell out.

There have been some survivors, though. Typically they are creative, innovative, and imaginative people like Ray Dolby, who not only survived and grew, but actually licenses his unique noise-reduction circuits to countless manufacturers, Larry Schotz, who does not manufacture under his own name but licenses his inventions to various manufacturers, and Nelson Pass, creator of the Threshold Stasis amplifier circuit, who now licenses Nakamichi to use his invention.

Everywhere I look in the American audio scene, I see talented, skilled individuals, many of whom are successfully producing unique products and selling them to audiophiles who can appreciate their qualities. In some ways, this is a return to the situation of thirty or forty years ago, with the differences that today's market is much larger and more sophisticated and we now have the technology that makes possible the recent advances in all phases of audio. Perhaps in the past we could not compete with the Japanese on production costs, but I believe that this is changing rapidly. The most modern American plants I have seen, such as Bose, are heavily automated, and this enables them to be strong and competitive in their fields. Japanese hi-fi products

are no longer significantly cheaper than their few American competitors, if you compare similar items.

I think our problem with Japanese technological competition is not basically economic, especially in view of the current yen/dollar ratio. Japanese brands in many product areas speedily established a reputation for quality and reliability that contrasted sharply with competitive American products. In the automobile industry, for example, despite massive efforts to improve American quality standards, there is still a *perception* of Japanese superiority that must be overcome before we can regain our former status in the marketplace. In hi-fi, the American "high end" companies, some of which still do not provide reliability commensurate with their prices (or sonic quality), will face the same problem if they ever hope to expand their market coverage significantly.

My conclusion is that American audio technology and capability are second to none. Our manufacturing efficiency needs some improvement if we are to compete effectively with countries having lower labor costs. And our dedication to the highest quality standards must be *greatly* improved if we are to recover any significant part of the market we gave away. □



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ACOUSTIC RESEARCH TSW910 SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

ACOUSTIC RESEARCH recently announced a line of speaker models called the TSW Series (the initials stand for "titanium solid wood," referring to the tweeter material and cabinet construction). The series spans a wide range of sizes and prices and is now headed by the new AR TSW910, a formidable column-shaped speaker that measures 15¾ inches wide, 18½ inches deep, and

52½ inches high and weighs approximately 120 pounds.

Removing the black cloth grille (which is angled slightly backward) reveals an all-black front board with six vertically aligned drivers. A 12-inch subwoofer and its twin on the rear of the cabinet operate as an acoustic-suspension system using virtually the whole 4.4-cubic-foot internal volume of the cabinet. There is a crossover at about 200 Hz

to an 8-inch woofer just above the front subwoofer. The woofer and each of the other drivers operates in its own separate sealed, isolated compartment.

Above the 8-inch woofer is a pair of vertically aligned 6-inch midrange drivers, which operate from approximately 550 to 5,500 Hz. The subwoofers, woofer, and midrange drivers are all filled-polypropylene cones. The final crossover is to a newly designed ¾-inch titanium-dome tweeter.

The portion of the front panel that includes the two midrange speakers and the tweeter is covered by a layer of acoustic absorbing material, an "Acoustic Blanket" originally introduced by AR some years ago in the AR-9. This material, which occupies about half of the total panel area, absorbs sound radiated in the plane of the front panel, thereby eliminating or reducing diffraction at the edges of the cabinet that could cause irregular frequency response. The system's rated frequency response has its -3-dB points at 28 and 32,000 Hz. Nominal impedance is 4 ohms (3.2 ohms minimum), the power-handling range is 35 to 400 watts per channel, and sensitivity is 89.5 dB sound-pressure level (SPL).

The top and bottom of the cabinet are made of handsomely finished solid wood (oak and walnut are available) with rounded front edges. The side panels are covered in a black cloth to match the grille. Input connectors are recessed into the rear panel. Separate pairs of heavy-duty five-way binding posts are provided for the bass section and for the midrange and high-frequency drivers, permitting biamplified operation if desired (the binding posts are normally strapped together for use with a single amplifier). There are no external controls.

In addition to its imposing size and driver array, the AR TSW910 owes some of its more important, if subtle, sound qualities to its new tweeter. Although titanium has been used for tweeter domes by some other speaker manufacturers, it is an expensive material to fabricate and is far from common. The low mass and high rigidity of the AR tweeter dome, which is only

TEST REPORTS

0.001 inch thick, eliminate resonances in the audio range. The front of the dome faces an "acoustic lens" that widens the dispersion angle of the tweeter's output at the higher frequencies. The tweeter's voice coil is liquid-cooled for increased power-handling ability. These features are not unique to AR speakers either, but the tweeter's "Tetra-Hedral Constant Intensity Radiator" mounting plate *is*.

Most dome tweeters are assembled on flat, circular metal plates several inches in diameter. When

According to AR, the unique mounting plate of its new titanium tweeter smooths the frequency response and increases the tweeter's sensitivity by almost 2 dB.

such a plate is mounted on the surface of a speaker board, there is a surface discontinuity, a physical "jog," of perhaps a quarter-inch all around its circumference. At the edge of the mounting plate, the higher frequencies in the tweeter's output are refracted, reradiated in various directions with a small time delay relative to the direct signal from the tweeter dome.

The amount of delay is directly related to the distance from the dome to the edge of its mounting plate. The result is an interference between the direct and refracted signals that produces amplitude irregularities at the listening position. Stereo imaging can also be seriously degraded by this effect.

The problem is most severe with a circular mounting plate since the distance from the dome to the edge is identical in all directions, which maximizes the undesirable effect at a particular frequency (or band of frequencies). AR's engineers set out to design a mounting plate whose shape would provide a continuously varying distance from its edge to the tweeter dome, thus spreading the diffraction effects over a wide range of frequencies. The result was the "helicoid" shape (patent applied for) used in the TSW Series tweeter.

The flat plate's edge curvature changes constantly, and, according to AR's measurements, it not only smooths the frequency response of the tweeter but, by reducing the cancellation effect of the diffracted signal, also increases the tweeter's sensitivity by almost 2 dB over its frequency range.

The "solid wood" aspect of the speaker's construction is largely cosmetic, but the enclosure walls are unconventionally treated. Instead of depending only on bracing and absorbing material to minimize cabinet resonance and vibration, AR has cut narrow slots, or grooves, across selected portions of the inside surfaces of the cabinet panels. Computer analysis of accelerometer measurements of the external cabinet vibration helped the engineers establish the optimum groove pattern to increase the damping of the cabinet walls, thereby reducing their flexing and possible contribution to the total sound output of the speaker system.

The suggested retail price of the AR TSW910 is \$2,000 per pair. Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021.

Lab Tests

We tested a pair of prototypes of the AR TSW910, which were identical to regular production models except for having hand-made cabinets and minor cosmetic differences. The speakers were placed about 1 foot from the back wall (a little space is required between the rear subwoofer and the wall) and about 7 feet apart.

After we had combined and smoothed out the room-response curves from the two speakers (measured at a single microphone position) and corrected the high frequencies for the known response of the room, the resulting curve was impressively flat over the whole audio range. Even the lower midrange and bass range, always subject to unavoidable room standing-wave effects, showed a peak-to-peak response variation of no more than 10 to 12 dB. If we were to average those variations, the frequency response of the speaker could be described as ± 3 dB from 20 to 20,000 Hz.

Since very few speakers behave

this nicely in a real-world listening situation, we normally measure the bass response using a close microphone spacing to eliminate room effects. AR had informed us that in order to minimize interference effects between multiple drivers in the same frequency range, which would produce a varying frequency response, the two subwoofers and the two midrange drivers were given slightly different responses or cutoff characteristics. We therefore measured the two drivers of each set individually, plotting their responses on the same coordinates.

Below 80 Hz, the two subwoofers had identical responses, but the rear driver rolled off sooner at higher frequencies. Its output was down about 10 dB at 200 Hz relative to its maximum output at 60 to 80 Hz, while the front driver's response was down 3 dB at 250 Hz and 10 dB at 400 Hz. The outputs of the two midrange drivers were identical at the measured 550-Hz crossover frequency, but the output of the upper driver was about 5 dB greater than that of the lower one over most of their operating range.

We formed a composite frequency-response curve by splicing the front bass/subwoofer curve to the room response. The result was a ± 2 -dB variation from 42 to 2,000 Hz, a depression of several decibels

Our first hearing of the AR TSW910 made us aware of its exceptional balance. No portion of the audio spectrum was dominant or even audibly obvious under most conditions.

at 2,600 Hz (approximately the tweeter crossover frequency), and a return to a flat output at 5,000 Hz. From there the response varied only 1 dB overall up to our 20,000-Hz measurement limit. In the low bass, the close-miked output fell at 12 dB per octave below 60 Hz. In a normal room, one could expect an appreciably extended (and stronger) bass response.

Quasi-anechoic FFT frequency-response data (measured on-axis at a

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2-meter distance to integrate the outputs of the speaker's several drivers) confirmed that the AR TSW910 had exceptionally flat response in the upper midrange and treble. From 3,500 to 10,000 Hz, the output varied about ± 1.5 dB. This measurement also confirmed the presence of a 5- to 6-dB "hole" at about 2,500 to 3,000 Hz that showed up in almost every FFT measurement as well as the room-response measurements.

Horizontal-directivity measurements on-axis and 45 degrees off the speaker's axis were appreciably different between 2,000 and 5,000 Hz; the axial curve was flatter and the off-axis output showed a pronounced depression in that range. The excellence of the system's phase response was demonstrated by its group delay, which varied only ± 0.1 millisecond from 3,000 to 29,000 Hz and an additional 0.2 millisecond down to below 1,000 Hz. These measurements are a strong indication that the drivers of the TSW910 have an intrinsically flat response and a phase-shift variation that is linear with frequency, leaving only the unavoidable interference between drivers radiating

the same frequencies from different locations as the explanation for the observed response irregularities.

The TSW910 produced an 89-dB sound-pressure level (SPL) at a 1-meter distance with a pink-noise input of 2.83 volts. Its average impedance was 4 to 5 ohms, with a minimum of 3.7 ohms at 900 to 1,000 Hz and a maximum of 7 ohms at 37 Hz. We measured the distortion of the front subwoofer with a constant input of 3.2 volts, equivalent to a 90-dB SPL system output with a pink-noise signal. Distortion was in the range of 0.3 to 0.5 percent from 100 to 50 Hz, increasing slowly to 1.4 percent at 30 Hz, 1.75 percent at 25 Hz, and 3.7 percent at 20 Hz.

As might be expected from its driver configuration, the power-handling ability of the AR TSW910 was impressive. Like most speakers, it had no difficulty handling very high-power short-term (single-cycle) inputs at 1,000 and 10,000 Hz, where our amplifier clipped at respective outputs of 1,040 watts and 1,620 watts without any obvious distress on the part of the speaker. Most speakers, however, are much more limited in the bass, where woofer cones can reach their me-

chanical limits at fairly attainable power levels. At 100 Hz, the 12-inch subwoofer drivers began to rattle at a 900-watt input, which is certainly one of the highest power levels (if not *the* highest) that we have ever reached in this test.

Comments

Our first hearing of the AR TSW910, before making any measurements, made us immediately aware of its exceptional *balance*. No portion of the audio spectrum was dominant or even audibly obvious under most conditions. It had the easy, effortless character that we associate with large, multidriver systems of the highest quality.

The very size of this system, as well as the array of drivers handling the bass region, led us to expect a powerful deep bass, and it did not disappoint us. When playing CD's with good, deep bass, these speakers gave a fine account of themselves. It is hard to imagine a listener so bass-starved that he would even think of adding an external subwoofer to a system like this!

The absence of a response "bump" in the middle or upper bass is a good clue to the natural sound of the TSW910. Male voices, in particular, are reproduced with little or no artificial heaviness. The listener is never made aware of the array of drivers behind the grille, which is as it should be. With most program material, there is no obvious indication that the tweeter's response extends nearly to 30,000 Hz (on axis, it varied less than 1 dB from 15,000 to 26,000 Hz!), but when you drive it with a recording that has appreciable energy at the highest audible frequencies, the effect can be quite striking.

If the size, weight, and price of the AR TSW910 do not discourage you (or even if they do), this speaker should be heard before making a purchasing decision. Admittedly, there are other fine speakers at (or slightly above) its price, but every speaker has its own special character, and this one made a strong, positive impression on us while it dominated our listening room. We never tired of its easy, smooth sound. Few people would.

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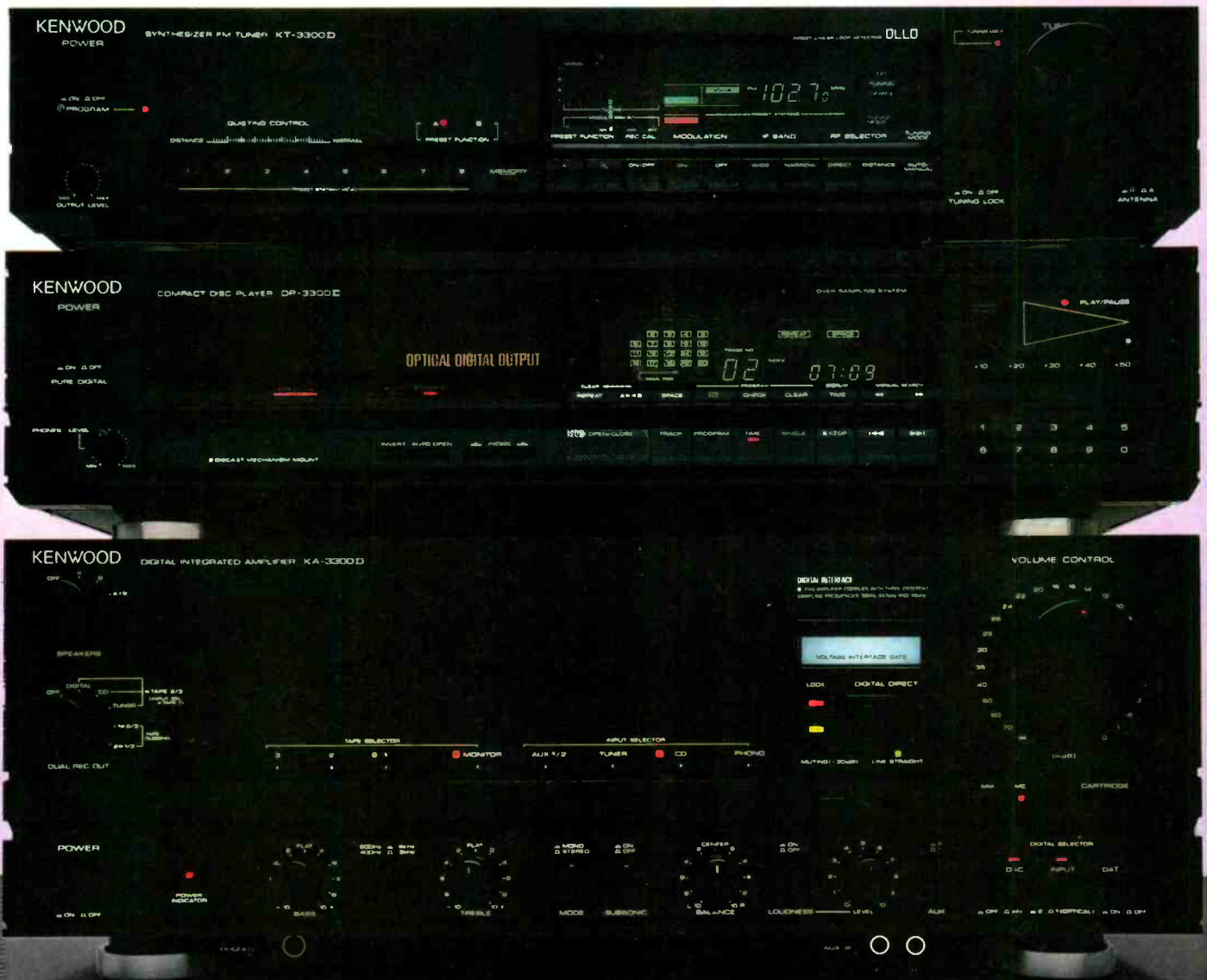
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We removed the protective coating from the cable shown to clearly illustrate a fiber optic transmission.



JOCK LEUNG

NAD 6300 CASSETTE DECK

by Craig Stark, Hirsch-Houck Laboratories

THE Model 6300 cassette deck from NAD is designed within a tradition of high performance with few frills. A three-head, dual-capstan deck with Dolby B and Dolby C noise reduction, it is unique in incorporating both Dolby HX Pro and DynEQ circuits to extend high-frequency recording potential, and it provides a control to compensate for playback irregularities *before* the signal is processed by the Dolby circuits. All this sophisticated technology is packaged in a distinctly plain wrapper that deliberately eschews such fancy features as programmable music selection, memory rewind, and automatic bias/equalization switching. As if to compensate,

however, the Model 6300 comes with a full-feature wireless remote control.

The record and playback heads of the NAD 6300 are separate units contained in a single case, enabling a user to make an instantaneous comparison between the sound quality before and after recording. This design also permits the use of a wide-gap record head, to maximize signal-to-noise ratio (S/N), and a narrow-gap playback head, to reproduce the highest audible frequencies. Because cassettes recorded on other decks often lack proper high-frequency response, a defect that can be exaggerated when the tapes are decoded by Dolby circuitry, the Model 6300 provides a front-panel

PLAY TRIM control whose boost or cut is restricted to the highest musical octave (10,000 to 20,000 Hz).

The tape transport is solenoid-controlled. The two capstans have slightly different diameters so that the one on the supply-hub side tends to turn more slowly, providing tape-holdback tension, and their flywheels have different masses. This design approach minimizes wow-and-flutter in recordings by preventing the capstans from reinforcing rather than damping out irregularities in the tape motion. A separate motor is used to turn the reel hubs for high-speed tape shuttling.

The cassette well is of conventional design, providing a small amount of rear illumination and moderate label visibility. The front door is easily removable for routine cleaning and demagnetizing.

It has long been known that the amount of record bias that produces

A man wearing a white cowboy hat, a white shirt, and a tan vest is leaning on a rustic wooden fence. He is looking to the left and has a lit cigarette in his mouth. In the background, a brown horse with a white blaze on its face is visible. The scene is set outdoors in a rural, grassy area.

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minimum distortion and maximum S/N at low frequencies also restricts the amount of high-frequency information that can be stored on a cas-

sette. The Dolby HX Pro headroom-extension system, originally developed by Bang and Olufsen, continuously monitors the high-fre-

quency level being fed to the record head, and when it senses that the treble saturation point is being reached, it slightly lowers the record bias to give the tape more high-frequency headroom. At normal signal levels the bias level is unaffected and can be set for maximum low-frequency performance.

The HX Pro circuitry in the NAD 6300 is supplemented by the Dyneq system invented by Tandberg's Herman Lia. Like HX Pro, Dyneq monitors the high-frequency current being fed to the recording head, but instead of lowering the bias, it momentarily reduces the treble boost (record equalization). The problem with treble saturation in cassettes is not that, like a sponge, the tape reaches a point where it can hold no more and ignores attempts to fill it even further. When the treble saturation point on a cassette is reached, further increases in treble input actually *lower* the high-frequency output from the tape. By lessening the amount of treble boost at high signal levels, therefore, Dyneq maximizes the tape's high-frequency capacity beyond the amount that HX Pro can contribute.

The Dyneq system is less needed with Dolby C than with Dolby B, since the "dynamic skewing" built into Dolby C already lowers the deck's treble boost to some degree. Given the enormous amount of treble boost that must be built into a cassette deck to achieve response out to 20,000 Hz, however, there are potential sonic benefits from the inclusion of both the Dolby HX Pro and Dyneq systems.

The record-level indicators are relatively conventional, with twelve peak-reading LED's per channel calibrated from -20 to +8 dB. The four-digit electronic counter can be switched to register either conventional counter units (reel rotations) or elapsed time, but it contains no memory-rewind or time-remaining circuits.

Three-position lever switches are used to control the Dolby circuits and to set bias and equalization for ferric, CrO₂-type, and metal cassettes. A FINE BIAS control permits a user to compensate for differences in the record-bias requirements of different cassettes, though no built-

FEATURES

- Separate record and playback heads
- Dual-capstan, solenoid-controlled transport
- Dolby HX Pro and Dyneq headroom-extension circuitry
- Playback high-frequency compensation control
- Infrared remote control
- Car stereo processor (dynamic-range compression, bass and treble boost)
- Twelve-segment-per-channel peak-reading LED record-level indicator
- Switchable FM-multiplex filter
- Dolby B and Dolby C noise reduction

LABORATORY MEASUREMENTS

Fast-forward time (C-60): 62 seconds

Rewind time (C-60): 60 seconds

Speed error: 0.0%

Dolby B tracking error: +0.5, -0.5 dB

Dolby C tracking error: +0.5, -1.5 dB

Wow-and-flutter: 0.018% wrms, 0.029% DIN peak-weighted

Line input for indicated 0 dB: 40 mV

Line output at indicated 0 dB: 0.47 volt

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

Tape: TDK AD (Type I, ferric)

IEC 0-dB distortion: 0.34%

Meter indication at 3% third-harmonic distortion: +5 dB

Output at 3% third-harmonic distortion: +6.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	59.0	61.5	59.2
Dolby B	62.5	70.2	69.2
Dolby C	65.0	75.7	79.0

Tape: TDK SA (Type II, chrome-equivalent)

IEC 0-dB distortion: 0.82%

Meter indication at 3% third-harmonic distortion: +3 dB

Output at 3% third-harmonic distortion: +4.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	57.3	61.6	59.0
Dolby B	61.8	70.0	69.2
Dolby C	63.5	76.1	78.5

Tape TDK MA (Type IV, metal)

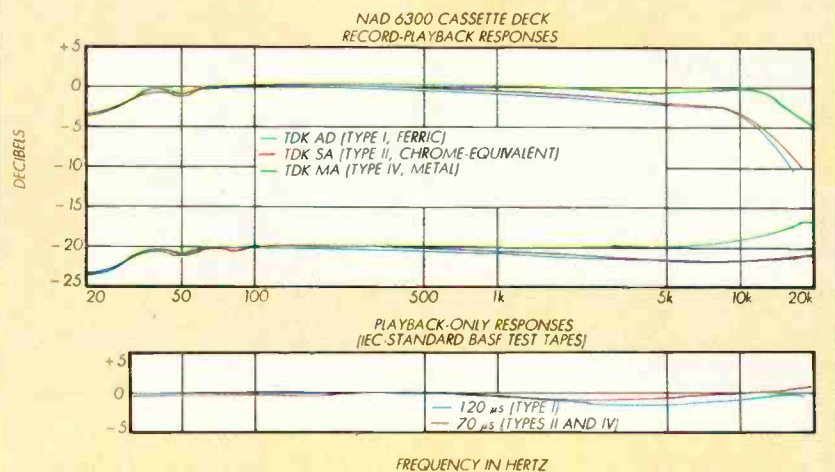
IEC 0-dB distortion: 1.3%

Meter indication at 3% third-harmonic distortion: +3 dB

Output at 3% third-harmonic distortion: +4.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	56.0	60.6	58.0
Dolby B	61.5	69.4	68.3
Dolby C	63.5	75.0	77.4



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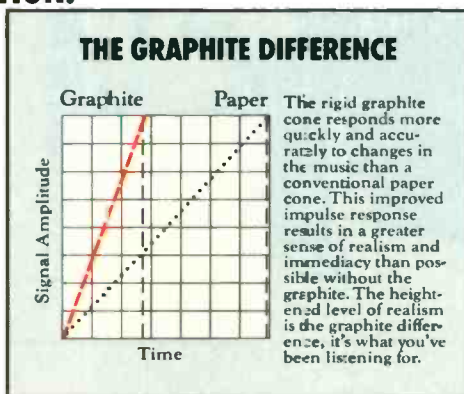
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in calibrating equipment is included. A reasonably good adjustment could probably be made by ear, however, by switching between source and tape while recording low-level (-15 - to -20 -dB) interstation hiss on FM.

An additional front-panel push-button switches in circuits that compress the dynamic range and boost the bass and treble of recordings made for automotive playback systems. The FM-multiplex filter is switchable, but the switch is located, perhaps inconveniently, on the deck's rear panel. The large record-level knob surrounds a concentrically mounted balance control.

The NAD Model 6300 measures $17\frac{1}{4}$ inches wide, 10 inches deep, and $4\frac{1}{2}$ inches high, and it weighs a little over 15 pounds. Price: \$798, including remote control. NAD, Dept. SR, 675 Canton St., Norwood, MA 02062.

Lab Tests

The playback frequency response of the NAD 6300, measured with our IEC-standard BASF ferric (120-microsecond) and CrO₂/metal (70-microsecond) calibrated test tapes,

was exceptionally flat: within ± 1 dB throughout the entire 31.5- to 18,000-Hz range.

Overall record-playback response was measured at the IEC 0-dB level (250 nanowebers per meter) and at -20 dB, using our usual "center-line" samples of TDK AD (ferric), TDK SA (chrome-equivalent), and TDK MA (metal). Samples of Maxell XLI-S and XLII-S supplied with the deck showed somewhat more elevated treble response, but for consistency in comparisons with other cassette-deck test reports we present the TDK-based measurements in the accompanying table and graph (see page 40).

At both signal levels the ferric and CrO₂-type samples showed virtually identical response. At the usual -20 -dB level the response was within $+0$, -2 dB from about 26 Hz to our 20,000-Hz upper measurement limit. The metal tape showed a slightly rising high-end response ($+3.5$ dB at 19,000 Hz), but it was well within the range of the FINE BIAS adjustment to correct. The contribution of the Dolby HX Pro and the Dyneq circuits was most evident in the high-level high

frequencies, where the metal tape retained perfectly flat response to 12,000 Hz and dropped off only to -4 dB at 20,000 Hz.

The S/N measurements were very good; only a handful of extremely high-priced decks have surpassed the NAD 6300 in this respect, and not by much. What impressed us even more, however, were the wow-and-flutter figures, which are easily among the lowest we have yet measured. We even wondered whether our flutter meter had drifted out of alignment until we rechecked our reference deck, which did show slightly higher figures!

Dolby tracking (at -20 -, -30 -, and -40 -dB levels) was also extremely close, within 1 dB for Dolby B and within 2 dB for the more powerful Dolby C. High-speed winding times were very fast, a minute in either direction for a C-60, and sensitivity and meter calibration were normal. Output at 0 dB was slightly below normal but well within the range of any audiophile-quality preamplifier or receiver.

Comments

In our listening tests, we were very impressed by the clarity and transparent quality of the NAD 6300's high-frequency response, which probably result as much from the deck's exceptionally steady tape handling as from its electronic headroom-extension circuits. Using wide-range CD's as a test source and listening at an elevated level, it was still possible to hear some tape hiss even with Dolby C, but that can be said of the most costly decks.

The remote control's "ergonomic" design made it very comfortable to grip and use—indeed, we found its buttons easier to manipulate than those on the front panel. True, we would have appreciated a headphone jack and a front-panel output control, but these are minor cavils.

In all, we find it hard to do much but praise this newest addition to the NAD line. Others might seek a more feature-filled and stylish-looking deck, but for us, the wide-range, unsullied sound quality was an excellent match for the unadorned exterior. We suspect many other audiophiles will agree.

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PS AUDIO 4.5 PREAMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories

THE PS Audio Model 4.5 stereo preamplifier exemplifies the "minimalist" philosophy of hi-fi product design, which holds that the smallest number of circuit elements should be interposed between the program source and the power-amplifier/loudspeaker system (and, of course, that all components should be of the highest quality). Implicit in this concept is an absence of filters, tone controls, and similar response-altering features.

The PS Audio 4.5 consists basically of a phono-preamplifier/equalizer section, a fixed-gain line amplifier, and switching facilities. One of its more unusual features is a STRAIGHTWIRE mode in which the line amplifier is completely bypassed. When high-level sources are played in this mode, the Model 4.5 is merely a passive switching center with a volume control. No active circuits come between the source and the preamplifier output, so virtually no distortion or noise is added to the program. Since no conventional source is likely to exceed a program level of 2 volts, sufficient to drive any amplifier to its full output, an adequate volume level can be achieved without adding noise or

distortion and with little likelihood of overdriving the power amplifier.

Of course, phono operation requires a preamplifier/equalizer, and the Model 4.5 contains an excellent one, switchable by an internal slider between moving-magnet (MM) and moving-coil (MC) modes. In addition, the input's terminating resistance can be set by the user to any of twenty-five values, from 2.7 to 74,000 ohms, with the help of a number of fixed resistors supplied with the preamplifier. The terminating resistors mount in small clips and can be removed and replaced without any soldering. A chart in the instruction booklet shows which values should be used for any desired terminating resistance.

All components in the Model 4.5 were chosen for their high quality: 1 percent metal-film resistors, silver contact switches, gold loading-resistor sockets, polypropylene capacitors in the RIAA equalizer section, and matched FET phono-input stages.

The front panel of the low-profile Model 4.5 contains several knob-operated switches. The function switch has off, STRAIGHTWIRE, HIGH LEVEL, and mono positions (HIGH LEVEL inserts the fixed-gain

line amplifier section into the signal path). There are two program selectors: TAPE FEED for the tape-recording outputs (the Model 4.5 can control two tape decks) and SOURCE for the normal preamplifier audio path. The TAPE FEED switch has settings for phono, CD, tuner, and TAPE 2; SOURCE has the same plus TAPE 1.

The PS Audio 4.5 has an unusual "straightwire" mode in which its line amplifier is completely bypassed for high-level sources. No active circuits come between the source and the preamplifier output, so virtually no distortion or noise is added.

The balance control differs from most in being an eleven-position switch that operates through precision (1 percent tolerance) resistors. The first two or three steps away from center change the balance in small increments, which become larger near the end of the control's range. The large volume knob operates a high-quality multi-wiper volume control and has thirty-two mechanically detented positions.

The Model 4.5 has an external high-current power supply (HCPS),

TEST REPORTS

which connects to the preamplifier through a 6-foot cable fitted with a four-pin locking connector. The power supply and preamplifier are actually on whenever the supply is plugged into a 120-volt AC outlet; the off position of the function switch merely disconnects the signal from the preamplifier outputs.

The rear apron of the Model 4.5 contains gold-plated phono jacks for the various inputs and outputs, a grounding binding post, and the connector for the power-supply cable. Finished in black, the preamplifier measures 19 inches wide, 7 $\frac{3}{8}$ inches deep, and 2 $\frac{1}{4}$ inches high. The HCPS module is 5 $\frac{1}{2}$ inches wide, 4 $\frac{3}{4}$ inches deep, and 4 inches high. Price: \$499. PS Audio, Dept. SR, 4145 Santa Fe Rd., San Luis Obispo, CA 93401.

Lab Tests

The rated maximum output of the PS Audio Model 4.5 is 18 volts. Driving a standard EIA load of 10,000 ohms in parallel with a 1,000-picofarad (pF) capacitor, it clipped at 15.5 volts. The 1,000-Hz harmonic distortion was very low up to the clipping point, typically reading 0.002 percent or less, and only 0.01 percent at 15 volts. The distortion was nearly independent

of frequency. At 10 volts output, it was about 0.0055 percent from 20 to 20,000 Hz, and at 0.5 volt it was 0.0085 percent over the same range.

A high-level input of 150 millivolts (mV) was required to drive the Model 4.5 to a reference output of 0.5 volt. The A-weighted noise level was -90.3 dB referred to a 0.5-volt output. Through the MM phono input, the sensitivity was 1.3 mV, with a noise level of -77.5 dB; in the MC mode, the sensitivity was 68 microvolts and the noise was -70.8 dB. The MM phono input overloaded at 142 to 148 mV at the low and middle frequencies. At 20,000 Hz, the waveform did not clip, but at about 83 mV it became triangular and the distortion reached 1 percent. The MC input clipped at 8.2 mV (at 1,000 Hz).

The line amplifier added about 12 dB of gain when it was switched in. The 1,000-Hz stereo crosstalk from one of the high-level inputs to any other input was -64 dB with the receiving input unterminated and -75 dB with a 1,000-ohm termination resistance. At 10,000 Hz, the crosstalk readings were respectively -44 and -56 dB. The channel separation was 59 dB at 1,000 Hz and 38 dB at 10,000 Hz. The MM phono-

input impedance was 49,000 ohms in parallel with a 340-pF capacitance.

The frequency response, measured through a high-level input, was ruler-flat from 20 to about 10,000 Hz, and it was down a mere 0.3 dB at 20,000 Hz. Through the phono input, it varied only +0.1, -0.5 dB from 20 to 20,000 Hz.

Comments

As our tests showed, in most of its measured parameters the PS Audio Model 4.5 is as close to ideal as a preamplifier can be. Its only weakness was both audible and measurable—the crosstalk between inputs. Still, although the signal leakage into an unused input was plainly audible at any reasonably high volume setting, it was never objectionable, and it was not audible at all in the STRAIGHTWIRE mode.

The controls operated with a positive, precise action and good feel. The volume steps were less than 1 dB apart near the top of the control range, increasing to 2 dB over most of the usable range. The balance-control steps were also about 1 dB near its center position.

We did not attempt to change the phono-input termination of the preamplifier, and we would recommend that changing it be approached with care. Like most resistors, the ones supplied with the Model 4.5 had color-code markings sufficiently *off* color that we could not identify them without an ohmmeter. The clearly written and very informative instruction manual, however, will ease you through the process if you want to undertake it.

As delivered to us, the preamplifier was already set up with optimum termination for most MM cartridges, although its capacitance was a bit on the high side. With an MC cartridge, the high capacitance would be of no importance. The high-level inputs are set at a 10,000-ohm impedance.

In respect to its features, flexibility, sound quality, and general construction, the PS Audio Model 4.5 is a remarkable preamplifier. It can serve as an excellent example of a “minimal” component that delivers “maximal” performance.

Circle 142 on reader service card

FEATURES

- Stereo preamplifier with external power transformer
- No tone controls or filters
- STRAIGHTWIRE mode to bypass all active circuits for high-level inputs
- Inputs for CD, tuner, two tape decks, phono
- Tape dubbing in either direction with playback monitoring
- Precision switch and resistors for balance control
- Phono gain switchable for MM or MC cartridge
- Phono-input resistance adjustable from 2.7 to 74,000 ohms with supplied resistors
- Precision components used throughout

LABORATORY MEASUREMENTS

Frequency response (through high-level input, EIA-standard load): 20 to 20,000 Hz +0, -0.3 dB

Output at clipping: 15.5 volts

Harmonic distortion (THD + noise at 1,000 Hz): 0.0022% at 1 volt; 0.0035% at 10 volts

Sensitivity (for a 0.5-volt output): high-level input, 150 mV; MM phono, 1.3 mV; MC phono, 0.068 mV

A-weighted noise (referred to a 0.5-volt output): high-level, -90.3 dB; MM phono, -77.5 dB; MC phono, -70.8 dB

Input-overload level: MM phono, 83 to 148 mV, depending on frequency; MC phono, 8.2 mV at 1,000 Hz

Phono-input impedance (MM): 49,000 ohms and 340 pF

RIAA phono-equalization error: +0.1, -0.5 dB from 20 to 20,000 Hz

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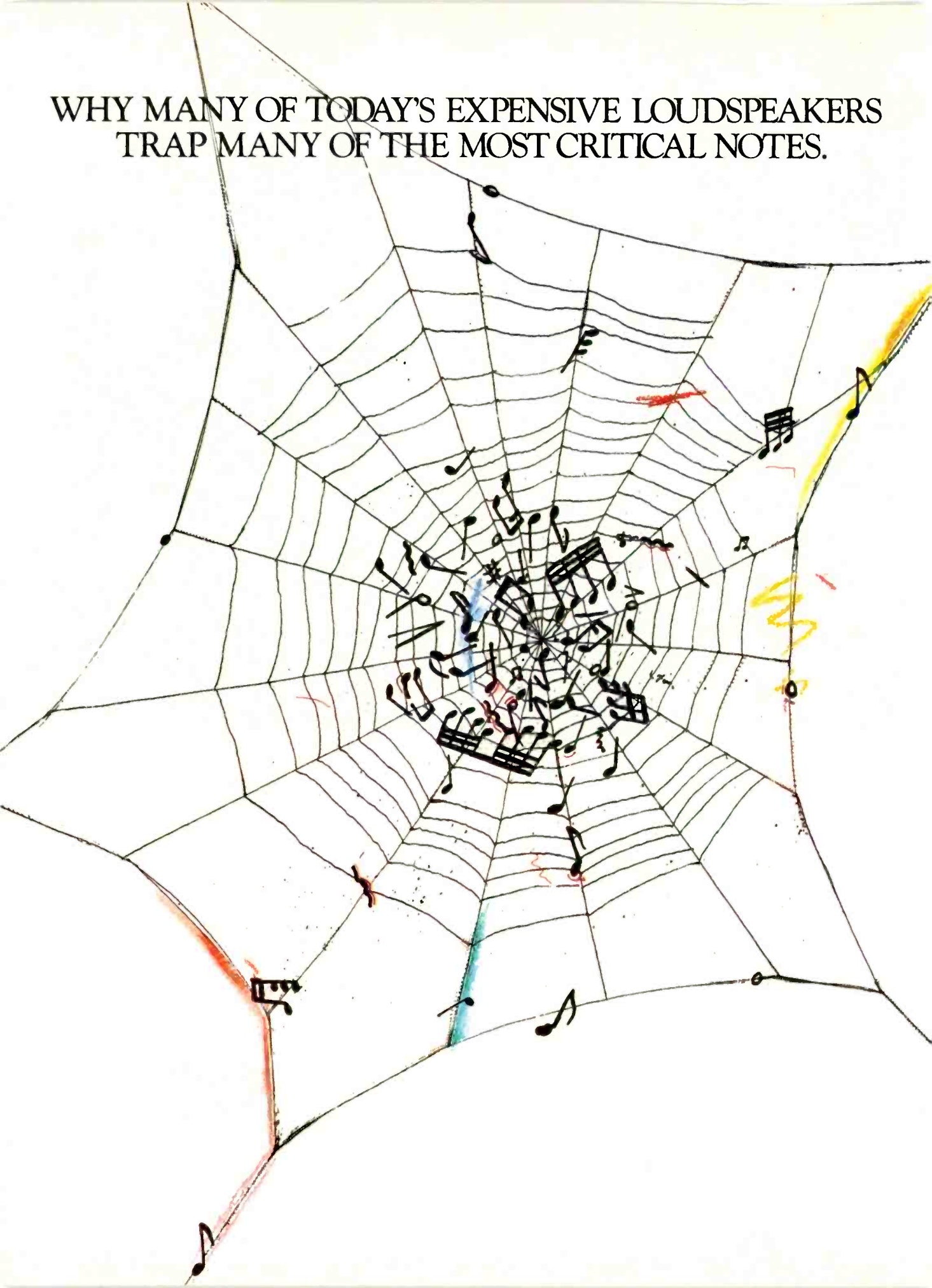
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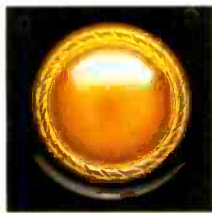
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The music that goes into many of today's highly priced loudspeakers isn't always the same music that comes out. Many of the finer notes and nuances are often trapped or lost. Why? Because advanced recording techniques and digital processing demand a dynamic range of over 90 dB and an extended frequency response. Demands that are often beyond the limits of ordinary loudspeakers.

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*Polyimide/Titanium
Mid-range*

was among the lowest we have measured. The speakers have...very good bass, and a warm, extended and unstrained character."

The secret to Altec Lansing's consummate performance? Remarkably sophisticated technology. Like woofers of a woven carbon fiber material (instead of paper or polypropylene) that is extremely rigid yet sufficiently light for maximum transient response and extraordinary low frequency definition. The result is a pure, clean, deep bass that beautifully complements the performance of our mid and high frequency polyimide/titanium

domed drivers. Virtues like these compelled Stereo Review to also comment on Altec Lansing's "... high sensitivity and ability to absorb large power inputs... a



Carbon Fibers in Woofer Cone

speaker that can develop high sound pressure levels in any environment." Even the hand crafted walnut veneered cabinets utilize the latest computer aided design techniques, thick walls and extra bracing to eliminate resonance.

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PHASE TECH PC 800HO SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

PHASE TECH may not be a household word among audiophiles, but the speakers bearing that brand name are the descendants of a long line of speaker systems designed and manufactured over the past thirty years by William Hecht. Most of Hecht's products were developed for other manufacturers and were sold under well-known brand names. The new line of speakers manufactured by Phase Technology Corporation and

sold under its own Phase Tech brand incorporates several of Hecht's patented design innovations, among them the widely used soft-dome tweeter.

The PC 800HO, next to the top of the line, is a floor-standing three-way system. Its cabinet, which has rounded front edges, is attractively finished in a choice of walnut or dark-oak veneer. It is supported on an integral 1¼-inch pedestal. Unsnapping the dark-brown cloth grille

reveals a fully finished front panel that matches the rest of the cabinet. The three drivers are vertically aligned on the center-line of the panel. The system's specifications include a sensitivity of 91 dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts, a nominal impedance of 4 ohms, and power-handling capability of 25 to 150 watts per channel.

At first sight, the drivers of the PC 800HO set it apart from other speaker systems. The 10-inch bass driver and 5½-inch midrange driver have solid, flat-piston diaphragms that are unique to Phase Tech products. The piston is molded as a solid truncated cone of rigid plastic foam, with the aluminum voice-coil former securely embedded into its apex. The voice-coil former and the concentric magnetic pole piece are vented to improve heat transfer and reduce back pressure on the piston.

One obvious advantage of Phase Tech's flat radiators is that they all lie in the plane of the mounting board and operate in phase—hence the "Phase Coherent" designation of speakers in the company's PC Series. The design of the driver pistons also offers several other advantages over conventional paper cones. The solid plug of plastic foam is essentially free of the flexing and break-up that are characteristic of thin diaphragms at their upper frequency limits. It also blocks transmission of the pressure back-wave within the sealed cabinet, which can pass through a thin cone and affect the sound radiated into the listening area.

The crossover from the woofer to the midrange driver takes place at 200 Hz, and at 2,000 Hz the soft-dome tweeter takes over. The Phase Tech tweeter design provides a hollow cavity in the end of the pole piece, behind the dome. The extra volume of this cavity lowers the resonant frequency of the dome's suspension, which employs a larger and more compliant surround than is usually found in a 1-inch dome driver. The combination of these two features allows the larger excursions required for handling the lower frequencies in the driver's operation range, and the aluminum voice-coil former and long silver-

TEST REPORTS

wrapped tinsel connecting leads help to dissipate the heat generated in the voice coil.

The PC 800HO measures 34¾ inches high, 14½ inches wide, and 8½ inches deep. Each speaker weighs about 50 pounds. The novel spring-loaded binding posts set into the rear of the cabinet accept dual banana plugs and similar connectors as well as stripped wire ends. A 3-ampere fuse, mounted near the connectors, protects the speaker from excessive drive levels. Price: \$950 per pair. Phase Technology Corp., Dept. SR, 6400 Youngerman Circle, Jacksonville, FL 32244.

Lab Tests

The Phase Tech PC 800HO produced a relatively uniform room-response measurement, which varied only about ± 2.5 dB from 250 to 20,000 Hz. Except for a distinct peak at 12,000 Hz, it was free of obvious irregularities. Close-miked measurements of the woofer and midrange responses indicated crossovers at 275 and 1,800 Hz.

The woofer output, which was very flat from 60 to 100 Hz, decreased at 12 dB per octave below 60 Hz and sloped off about 3.5 dB between 100 and 200 Hz, where it matched the level of the midrange driver. The composite curve that resulted from splicing these curves to the room-measurement curve was flat within ± 3 dB from 46 to 20,000 Hz.

The essential flatness of the speaker's response was confirmed by our quasi-anechoic FFT response measurements. The only prominent deviation was the tweeter peak, evidently from a resonance, at 12,000 Hz. The midrange driver produced an almost ruler-flat response, varying less than 1 dB overall from 300 to 1,500 Hz.

The excellent horizontal dispersion of the system was demonstrated by the nearly identical frequency response up to 10,000 Hz we measured on-axis and 45 degrees off-axis. Finally, the group delay (a measure of phase linearity) was constant within ± 0.2 millisecond from 2,000 to 22,000 Hz. The major departure from perfect flatness was a 0.1-ms ripple at the 12,000-Hz tweeter resonance frequency.

The system's impedance averaged 2.5 to 3 ohms between 70 and 500 Hz and reached its maximum of 9 ohms at 45 and 2,500 Hz. Most reasonably good amplifiers should have no difficulty in driving this low impedance, but it would not be advisable to parallel these speakers with any others. The measured sensitivity of 88 dB SPL at 1 meter with 2.83 volts input, though slightly lower than rated, is typical of many speakers of this size.

We measured the bass distortion of the woofer by driving the speaker with a 3.5-volt input signal, which would produce a 90-dB SPL in the standard sensitivity measurement.

In respect to smoothness, width of response at both ends of the spectrum, and freedom from distortions of all kinds, including phase shifts, the Phase Tech PC 800HO earned high marks in our laboratory measurements.

The distortion was low and nearly constant, measuring between 0.5 and 1 percent from 100 Hz down to 50 Hz. It rose gently to a maximum of 5.3 percent at 25 Hz.

Pulse power-handling tests, using 1-cycle tone bursts followed by 128 cycles of silence, confirmed the effectiveness of the speaker's rugged design features. At 100 Hz, the woofer's waveform rounded, although no significant harshness was audible, at an input of 750 watts into its 2.8-ohm impedance. At 1,000 Hz, the amplifier clipped at 1,320 watts (into 5 ohms) before there was any visible or audible evidence of overload from the 5½-inch piston driver. Similarly, the amplifier clipped at 1,100 watts into the tweeter's 5.5-ohm impedance before the driver itself was in distress.

Comments

Everything in our measurements of the Phase Tech PC 800HO indicated that it was a notable speaker even in its price class, which includes many fine speakers. In re-

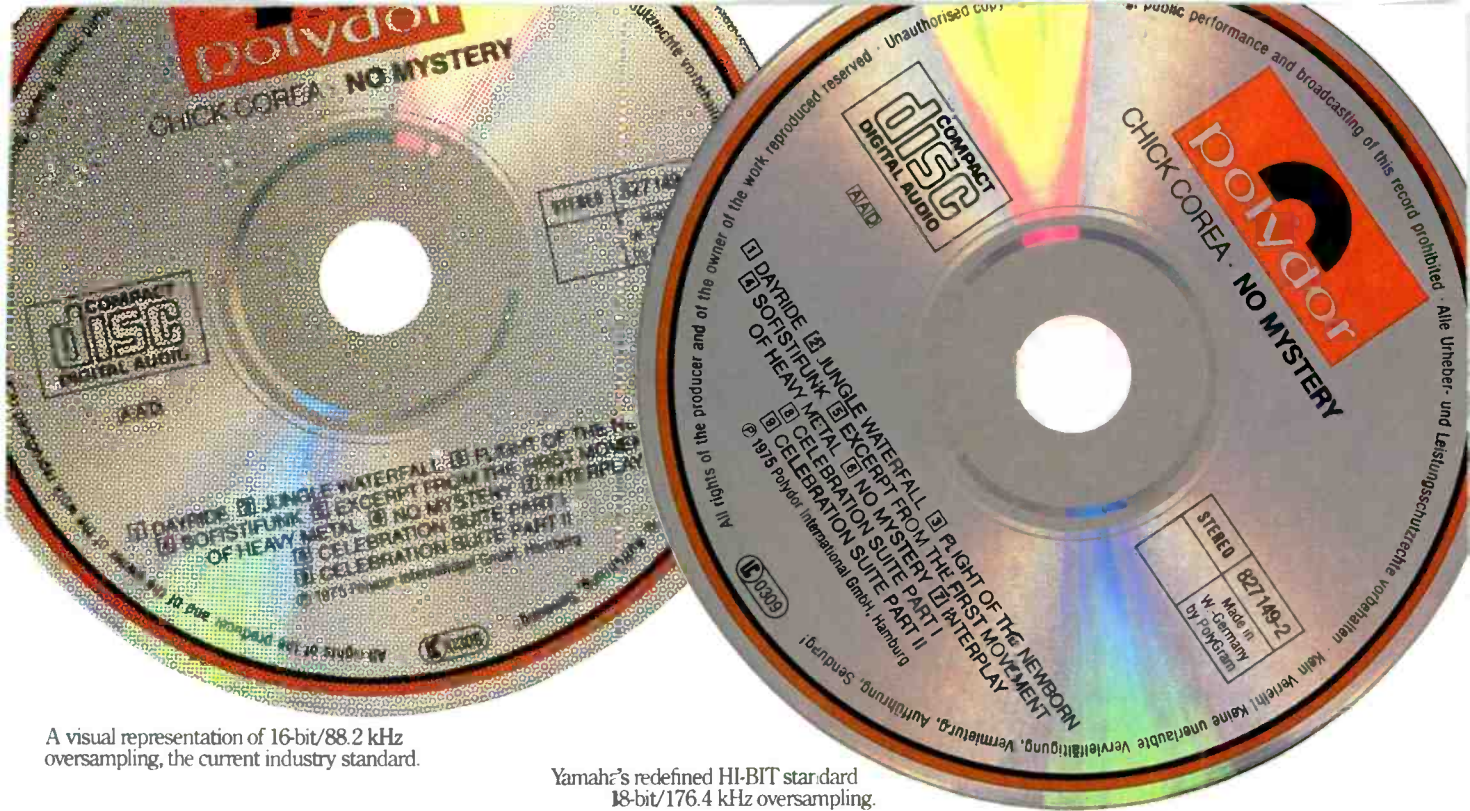
spect to smoothness, width of response at both ends of the spectrum, and freedom from distortions of all kinds, including phase shifts, it earned high marks.

These results were perfectly consistent with our initial listening appraisal of the speaker's sound, before we made any measurements. The sound of any speaker is often judged in comparison with others that are heard in the same room, and such a comparison frequently emphasizes, for better or worse, qualities that may not be particularly obvious when the speaker is heard by itself for an extended period. In the case of the PC 800HO, we immediately noticed an airy quality in the sound that was either lacking or less prominent in the output of a few other speakers we had on hand. Sometimes, especially after extended listening to a speaker lacking this quality, the PC 800HO initially sounded a trifle bright, but in a few moments it established itself as having the "right" sound, making the others seem slightly "dull" in character.

To be as objective as we can about a purely subjective matter, we feel that the PC 800HO is a very flat (no pun intended) and smooth speaker, with very fine phase and dispersion characteristics. These qualities were most apparent in its stereo sound stage or "imaging," which tended to spread outside the limits of the speaker locations without electronic assistance. With certain program material, it also imparted a sense of depth that may not be present with other speakers. The bass end of the speaker's range is propagated with outstanding freedom from coloration—its response is very flat from 150 Hz upward, and even the small bass peak is well below the range of the fundamental frequencies of most instruments and human voices.

Considering how attractive this speaker is, how good it sounds, and how reasonably it is priced—right in the middle of the "most sound for the money" category among today's speakers—we would expect Phase Tech to become a much more familiar brand name among audiophiles before long.

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The C-90 features three separate power transformers — two to power left and right audio channels for vanishingly low crosstalk, and a third transformer to drive the preamp's unique video capabilities, relays, display and microprocessor. All switching functions are accomplished by electronic relays. Thus the signal paths are as short as possible, improving signal-to-noise ratio and channel separation. Anti-vibration measures taken to further the C-90's sonic excellence include a solid aluminum volume control knob, polycarbonate chassis feet, and rubber-cradled PC boards. Soft copper-plated screws insure a snug fit of chassis, transformers, transistors, and help to dampen vibration.

The C-90 Preamp readies you for the video revolution, with six video inputs, a built-in

video enhancer, and two-buss switching (separate "Record" and "View" selectors). The C-90's unique system remote-control unit features volume adjustment, input source selection, and control of audio and video input devices such as Pioneer's "SR" compatible VCRs, CDs, LaserVision players and cassette decks.

The M-90 is a superb high-power stereo amplifier, utilizing dual-mono construction. It is conservatively rated at 200 W/CH into 8 ohms¹ and delivers 800 W/CH of dynamic power at 2 ohms.² The wide dynamic range of digital sources can now be reproduced effortlessly, with any loudspeakers. The M-90's high current capacity of 47 amps can handle the challenge of the most complex speaker loads. To further enhance S/N ratio and channel separation, relay-operated electronic switches and a long shaft volume control keep the length of signal paths down to a minimum. Why include a high quality volume control on a power amp? Simple. To pursue the straight-wire-with-gain philosophy when using a CD player connected directly. Pure sound, redefined.

The exquisite finish of the M-90 and C-90 reflects their quality. Elegant rosewood side panels and front panels with a deep hand-brushed lacquer finish emphasize the care of craftsmanship we've lavished on these two components. The Pioneer C-90 Preamp and M-90 Power Amp. Evolutionary? Hardly. Revolutionary? Most definitely.

For your nearest Pioneer Elite Hi-Fi dealer, phone 1-800-421-1404.

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²Measured by EIA method.

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- 140 watts of total system power—4 amplifiers, 35 watts per channel into 4 ohms at 1000 Hz with .07% THD. 105 dB SPL maximum acoustic output. Excursion control computer with continuously variable loudness compensation and automatic overload protection.

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AUDIO SYSTEMS

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NEC AVR-1000 RECEIVER

Julian Hirsch, Hirsch-Houck Laboratories

THE NEC AVR-1000 surround-sound receiver is the first stereo receiver to carry the NEC brand name. It is also one of the most versatile audio/video (A/V) receivers we have seen to date, containing a high-quality AM/FM stereo tuner, built-in surround-sound processing for both Dolby Surround and matrix systems, extensive audio and video program-selection capability, and four channels of amplification with a rated combined output of 300 watts. In addition, the AVR-1000 is furnished with a unified remote control that can be used to operate nearly every function of the receiver as well as a full system of compatible NEC components.

From the front, the AVR-1000 normally presents a knobless, un-

complicated appearance. A row of flat pushbuttons extends across the full width of the front panel. The buttons on the left switch the power on and off, select the AM or FM band and any of eighteen station frequencies (in two banks of nine), and tune in either direction. The ones on the right select the program source (phono, tuner, CD, tape, auxiliary, TV, or VCR), the surround-sound mode, one of three memorized volume/balance settings, and audio muting. A volume-reset button restores an initial comfortable listening level and center balance—a necessity because there is no visual indication of these settings.

The volume control is a flat rectangular plate in the lower right corner of the front panel. Next to it is the four-channel balance control, a

square plate that shifts the balance in the direction corresponding to the side or corner of the plate that is pressed. The eight control axes are at 45-degree intervals. The balance adjustment is achieved by reducing the level from the direction opposite the one selected.

The upper portion of the front panel contains a number of displays showing the selected input source, the surround-system status, the tuned station frequency (including band and preset number), stereo reception, and correct tuning. In the center of the display panel is a multicolored SURROUND INDICATOR that shows the relative degree of activity in each of the four amplifier channels.

Pressing the upper right corner of a hinged door below the pushbutton controls reveals a number of less frequently used adjustments. Small knobs adjust the bass and treble—separately for the front and rear channels—and the individual gains

TEST REPORTS

of the left and right channels. Most of these controls affect the FM tuner's operation, including automatic and manual scan tuning, preset

memory storage, FM muting, and selection of mono or (automatic) stereo mode and wide or narrow IF bandwidth.

FEATURES

- Four-channel amplifier section rated for 200 watts total in front, 100 watts in rear
- Dolby Surround and matrix surround-sound decoder
- Digital-synthesis AM/FM tuner with eighteen preset station memories
- Selectable wide or narrow IF bandwidth for FM reception
- Three audio volume/balance memories
- Separate bass and treble tone controls for front and rear channels
- Separate left/right input-level controls
- Eight-way directional balance control for front/rear amplifiers
- Volume-reset button to restore original volume and balance settings
- Illuminated SURROUND INDICATOR to show relative output levels for four channels
- Selectable audio inputs for tuner, auxiliary, CD, and phono
- Audio-muting switch
- Audio tape-recorder inputs and outputs
- Audio and video inputs and outputs for TV/monitor, VCR, auxiliary video source
- Two switched AC outlets
- Antenna inputs for 300- or 75-ohm FM antennas
- Detachable pivoted AM loop antenna
- Unified system remote control for most functions of receiver and compatible NEC TV set, VCR, cassette deck, and CD player

LABORATORY MEASUREMENTS

- Tuner Section** (all figures for FM only except frequency response; all measured with wide IF bandwidth except selectivity)
 - Usable sensitivity (mono): 13 dBf (2.5 μ V)
 - 50-dB quieting sensitivity: mono, 14.5 dBf (2.9 μ V); stereo, 37 dBf (39 μ V)
 - Signal-to-noise ratio (at 65 dBf): mono, 87 dB; stereo, 77 dB
 - Harmonic distortion (THD + noise) at 65 dBf: mono, 0.082%; stereo, 0.13%
 - Capture ratio at 65 dBf: 1.25 dB
 - AM rejection at 65 dBf: 73 dB
 - Selectivity: alternate-channel, 41 dB (wide), 85 dB (narrow); adjacent-channel, 2 dB (wide), 3.5 dB (narrow)
 - Stereo threshold: 32 to 27 dBf (22 to 12.3 μ V)
 - Pilot-carrier leakage: -80 dB
 - Hum: -72 dB
 - Stereo channel separation at 100, 1,000, and 10,000 Hz: 42, 44.5, and 44.5 dB
 - Frequency response: FM, 30 to 15,000 Hz +0.2, -1.25 dB; AM, -6 dB at 24 and 2,600 Hz
- Audio Amplifier** (front channels only except where specified)
 - 1,000-Hz output power at clipping: front, 124 watts into 8 ohms, 190 watts into 4 ohms; rear, 81 watts into 8 ohms, 121 watts into 4 ohms

- Clipping headroom** relative to rated output: front, 0.93 dB (8 ohms); rear, 2.1 dB (8 ohms)
- Dynamic power output:** front, 156 watts into 8 ohms, 265 watts into 4 ohms, 380 watts into 2 ohms; rear, 100 watts into 8 ohms, 180 watts into 4 ohms, 264 watts into 2 ohms
- Dynamic headroom:** front, 1.93 dB (8 ohms); rear, 3 dB (8 ohms)
- Harmonic distortion** (THD + noise) at 1,000 Hz into 8 ohms: front, 0.039% at 1 watt, 0.036% at 10 watts, 0.112% at 100 watts; rear, 0.038% at 1 watt, 0.036% at 10 watts, 0.076% at 50 watts
- Maximum distortion** from 20 to 20,000 Hz (into 8 ohms): front, 0.184% at 100 watts (15,000 Hz); rear, 0.15% at 50 watts (10,000 Hz)
- Slew factor:** greater than 25
- Sensitivity** (1-watt output into 8 ohms): CD, 15.5 mV; phono, 0.24 mV
- Phono-input overload:** 97 to 148 mV
- A-weighted noise** (referred to a 1-watt output): CD, -71.5 dB; phono, -70.7 dB
- Phono-input impedance:** 50,000 ohms in parallel with 165 pF
- RIAA equalization error:** +0.1, -0.6 dB from 20 to 20,000 Hz
- Tone-control range:** +13, -11 dB at 100 Hz; +14, -11 dB at 10,000 Hz

A cryptically marked yellow VACUATION SWITCH behind the hinged door is actually the main power switch for the receiver. It is normally left on at all times in order to keep the receiver's memories "alive" and enable it to respond to a turn-on signal from the remote control. A small green LED on the front panel glows to indicate that standby power is on.

The front channels of the NEC AVR-1000 are rated to deliver 100 watts per channel into 8-ohm loads, from 20 to 20,000 Hz, with no more than 0.02 percent total harmonic distortion. Unlike most receivers, it is also rated for driving 4-ohm loads, at 150 watts per channel, but with a distortion specification of 0.05 percent that applies only at 1,000 Hz. While it has a four-channel amplifier section, the rear (surround-sound) channels do not require as much power as the front channels, so the rear amplifier is rated at 50 watts per channel into 8 ohms, with no distortion or frequency range specified.

The rear apron of the receiver contains output connectors for the front and rear speaker pairs (there is no provision for driving additional speakers in other rooms) and two switched AC outlets. There are binding-post inputs for a 300-ohm FM antenna and the supplied AM loop antenna, which clips onto the receiver. An F-type coaxial connector is furnished for a 75-ohm FM antenna. There is also a jack for connecting the AVR-1000 to an NEC K-700E cassette deck so that it can be controlled from the receiver's remote unit.

The NEC AVR-1000, which is finished in black with white markings, measures 17 inches wide, 17 inches deep, and 5½ inches high, and it weighs 35½ pounds. Price: \$869. NEC, Dept. SR, 1255 Michael Dr., Wood Dale, IL 60191.

Lab Tests

Preconditioning the AVR-1000 by driving its front channels at one-third rated power for 1 hour (we did not drive the rear channels for the warm-up period) made the top of the cabinet only slightly warm, and it never became any hotter during our subsequent tests. The receiver



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TEST REPORTS

showed its true mettle from the beginning, delivering 124 watts per channel at the clipping point into 8-ohm loads at 1,000 Hz. With 4-ohm loads, the clipping power was an impressive 190 watts per channel. Although the receiver is specifically not recommended for use with 2-ohm loads, we did try to drive 2 ohms (on one channel). Its protective relay shut it down at 68 watts, before any significant distortion was detected and, fortunately, before it suffered any damage.

Dynamic power measurements further underscored the power of this receiver. During a 20-millisecond tone burst, the front-channel output reached 156 watts into 8 ohms and 265 watts into 4 ohms. Even 2 ohms could be driven successfully with short program bursts, to a clipping level of 380 watts!

The front channels' response was down 3 dB at 35,000 Hz, and they had a slew factor greater than 25. They were stable with reactive loads, and the protection system shut down the receiver when we drove it to high levels with 10,000-Hz square waves. We also measured the rear-channel amplifier, with equally satisfactory results. The 8-ohm output at clipping was 81 watts, rising to 121 watts with 4-ohm loads. The respective dynamic outputs were 100 and 180 watts. We tried 2-ohm operation in the dynamic tests too, obtaining a remarkable 264 watts from this nominally 50-watt amplifier section.

The distortion characteristics of the front and rear amplifiers were quite similar, both as a function of power and across the audio frequency spectrum. Our measurements slightly exceeded the specified values but were still entirely negligible, typically between 0.03 and 0.1 percent at 1,000 Hz for all power levels up to the rated maximum output. Similar results were obtained at rated power or less into 8- or 4-ohm loads from 20 to 20,000 Hz, with virtually no change in distortion from 20 to 5,000 Hz and a slight increase at 15,000 Hz.

The bass and treble tone controls had more than ample range, with little effect on the midrange level, and most of the effect took place near the adjustment limits of the

small knobs. The basic response of the front channels, with the tone controls set at their center detents, was flat within 1.5 dB from 20 to 20,000 Hz. The rear channels were identical in the matrix mode, but, in accordance with Dolby specifications, in the Dolby Surround mode the highs were cut off sharply above 7,000 Hz and more gently at low frequencies, to -6 dB at 20 Hz.

Through the CD input, the front channels required 15.5 millivolts for a reference output of 1 watt and had an A-weighted noise level of -71.5 dB. Through the phono input, the sensitivity was 0.24 millivolt, and the noise level was -70.7 dB. The phono input overloaded at 135 to 150 millivolts from 20 to 1,000 Hz and at about 100 millivolts at 20,000 Hz. The RIAA equalization was very accurate, varying only +0.1, -0.6 dB from 20 to 20,000 Hz. The phono-input termination was 50,000 ohms in parallel with 165 picofarads of capacitance.

Like the amplifier section, the FM tuner of the AVR-1000 was better than we expected to find in a receiver. Its usable sensitivity and distortion were both good, though not unusual. The noise level, on the other hand, was unusually low, -87 dB in mono and -77 dB in stereo. The capture ratio of 1.25 dB, AM rejection of 73 dB, and image rejection of 76 dB, while not record-setting, also set this receiver apart from most others we have tested.

All these measurements were made using the wide IF bandwidth, although spot checks showed that the narrow-band mode did not degrade the performance significantly. In the wide-band mode the alternate-channel selectivity was a very practical 41 dB, and in the narrow-band mode it was a remarkable 85 dB. The FM stereo channel separation was among the most consistent we have seen. It measured 44.5 dB from 400 to 20,000 Hz and was still a very good 35 dB at 30 Hz. The frequency response of the AM tuner section was +1, -6 dB from 24 to 2,600 Hz.

Comments

We did not use the NEC AVR-1000 in an audio/video system, but

we did use its matrix and Dolby Surround systems with various audio sources. Both did a fine job of enhancing the ambience of the reproduction, although their overall effects were somewhat different. The choice can be made on the basis of your personal preference with the particular program material.

Like any signal-processing system, surround sound can easily be used to excess. In our opinion, if the rear speakers can be heard as separate sources, they are too loud. But when the surround sound is scaled to the program material, the results can be very satisfying. Recordings of music from such films as *Star Wars* and its sequels, *Star Trek*, and others of similar character really benefit from surround-sound reproduction, and the AVR-1000 does at least as good a job in that respect as any receiver we have used.

The AVR-1000's performance as a two-channel receiver, however, is sufficient to justify its purchase for an audio-only system. The FM tuner section is truly excellent, and the amplifiers are, as our measurements show, genuine "powerhouses." They are well protected, too, and suffered no ill effects from hard driving into clipping and other punishment. The AVR-1000 encouraged us to indulge in wall-rattling CD playback the likes of which we have rarely, if ever, enjoyed from a receiver.

The size and weight of the AVR-1000 are sufficient to keep it from becoming uncomfortably hot under any imaginable conditions of operation. Hours of high-level operation left the top cover, over the heat sinks, barely warmer than the ambient temperature. While we did not have the opportunity to use it with compatible NEC components, the remote control appears to pack every normal control function of all the possible components with which it might be used into a disarmingly simple and compact unit.

NEC has stepped off on the right foot with the introduction of its first stereo receiver. If the company extends the same design philosophy to more affordable receivers, it should have a clear impact on the audio market.

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SPECIAL REPORT



AMERICAN AUDIO

by Steve Birchall

MORE Americans are more excited about hi-fi now than they have been for years. The dramatically improved sound quality of the digital compact disc has made people sit up and listen, and other technological advances—stereo TV sound, surround sound, Beta Hi-Fi and VHS Hi-Fi—are rapidly finding a place in the hearts, and systems, of audio enthusiasts across the country. On the horizon are CD video, digital audio tape (DAT), interactive CD's (CD-I), digital FM broadcasts, and an in-home remote-control network.

Some of the new media and products were developed in Japan and Europe, but our American ingenuity, craftsmanship, and traditional emphasis on quality have refined and helped establish them in the marketplace. Few electronic products of any kind are made in only one country today. If you open one up, you'll find parts from many countries, with a label indicating the country of final assembly. The product might have been designed in one country but targeted for a market in another country. Although the U.S. remains one of the largest markets, no longer does the U.S. alone set the standard for consumer electronics, letting the rest of the world follow along. Now we are a partner in a complex network of international relationships.

The electronics industry is affected by its own technology. Improved communications of all kinds—from satellites to CD's, from radio, TV, telephones, and videotapes to on-line computer data bases—have speeded up the flow of information. Even such perishable goods as clothing fashions or styles in pop music now spread around the world with astonishing rapidity. Multinational companies design new products so that they can be sold everywhere.

Electronically linked, humanity is developing a single world culture. Many of the predictions of "futur-

PAINTING BY JOHN HOWARD





Sota's Star Sapphire turntable (top photo), shown in black lacquer with an SME Type V tonearm, uses a vacuum-clamping system to couple the record to the turntable's platter mat. The turntable is made in Berkeley, California.

The Mark Levinson No. 20 mono power amplifier (bottom photo), built in Middletown, Connecticut, operates in pure Class A mode up to its rated output of 100 watts into 8 ohms or 200 watts into 4 ohms.

ologists" such as Marshall McLuhan, Buckminster Fuller, and Alvin Toffler have become reality, making Fuller's *Operating Manual for Spaceship Earth* seem less like science fiction and more like a handbook of practical advice.

Quality Consciousness

Many audio-industry leaders have noted a trend toward better quality. For American manufacturers, that's good news, since high-quality sound and performance have always been hallmarks of American audio products. In the Seventies, the Japanese expanded the American audio market by attracting new customers with inexpensive electronics, but lower cost often meant lower-quality sound. That larger U.S. market "is now ready for quality," says Michael Bartlett, the director of electronics marketing for Acoustic Research.

Harman America's marketing manager, Stephen Williams, says that "The Japanese have created a climate that allows U.S. products to be on the same shelf, as an alternative." Both AR and Harman Kardon have launched new lines of electronic components—including a revival of H/K's famous Citation Series—that were designed in the U.S. but are made elsewhere to American sonic standards.

Sales of compact disc players continue at a brisk rate. Approximately 5 percent of U.S. homes have them, and retail prices of discs are moving downward as new pressing plants catch up with the voracious demand. The major labels are selling more recordings in all formats than ever before. Many small labels specializing in jazz or classical titles have arisen because of the renewed interest in recorded music that the CD has stimulated. These labels tend to record American artists more frequently than the major labels do. And the recordings are mastered here: Toby Mountain, of Northeastern Digital Recording, reports a "dramatic increase in the digital editing business."

Because of their sound quality, CD's "make the market for high-quality [playback] equipment much larger," according to speaker designer Matthew Polk of Polk Audio, since most people can now hear the difference good speakers can make. Kathy Gornick, marketing director for Thiel speakers, sees a "shift in



the American public's attitude toward high-end products in general—not just in audio but in all kinds of products.” William Jaspers, president of Dolby Labs, remarked, “Consumers are more quality conscious, so more Dolby-equipped cassette decks have been sold. Pre-recorded tapes are of much better quality now because they have to compete with CD’s.”

Magnepan's Jim Winey said, “The CD has made a great impact on the speaker market because it does so many of the things we wanted for so long.” Winey, an archetypal American audio craftsman, continues to improve his own designs, looking for ways to extend his speakers' dynamic range and improve their bass response. Nelson Pass, president of Threshold and designer of its Stasis amplifiers, reports sales growth in high-end products. Threshold's sales doubled last year, and “Quite a few people [in the high-end area] are making more money,” according to Pass. He attributes the increases to the CD, which generates “a lot more customers for high-end equipment.”

According to Frank Myers, a vice president of the Electronic Industries Association (EIA), it's not just the high end that's booming: “Audio is bigger and better than ever.” Component sales generally were up 15 percent last year, he noted, and the specialty shops did particularly well because “power retailers” promoted components and made customers more aware of their options. Another factor is MTS (multichannel television sound), which has become a huge success in a short time. “Stereo TV is not only catching on,” Myers said, “it's here to stay!” In 1986, one out of every six TV sets sold in the U.S. had MTS circuits and over 350 U.S. stations were broadcasting in stereo.

Michael Koss, senior vice president of Koss Corporation, observed that music video channels such as MTV have created a big new market for headphones. Teenagers can listen in stereo without disturbing the rest of the family. In effect, they have discovered that MTS is the least expensive source of high-fidelity music for the American home.

American Speakers

Speaker technology is the recognized American forte in the world of audio, and it has been at least

The JBL Pro III mini-monitor speakers (top photo) from Northridge, California, combine a 1-inch pure-titanium tweeter with a 5-inch polymer-laminate woofer in a rounded-corner ported enclosure.

California Audio Labs' Tempest CD player (bottom) is an extensively modified Philips machine. The El Toro company has enhanced the digital circuitry and replaced transistors with tubes in the audio signal path.





The first models in dbx's America Series—made in Newton, Massachusetts—are the CX1 preamplifier (top) and the BX1 two-, three-, or four-channel amplifier.



Bass-loading technology used in Bose's Acoustic Wave Music System (above) has also been applied to Bose's AM-5 home speakers, Zenith TV sets, and Bose movie-theater sound systems. Bose is based in Framingham, Massachusetts.

John Koss pioneered the development of headphones, and innovation continues at the Koss Co. in Milwaukee with products such as the JCK/200-S wireless headphones (right). The audio signal is sent to the headphones in a modulated beam of infrared light broadcast by a transmitter, shown behind the headphones.



since Edgar Villchur, founder of Acoustic Research, invented the dome tweeter for the AR-1 acoustic-suspension speaker back in the Fifties. But today may be a golden age. Victor Orler, national sales manager of Altec Lansing—another longtime name in American audio—says that he has “never been more encouraged about the speaker business. The industry is on the move.”

In the Sixties William Hecht developed Villchur's hard dome into a soft dome to avoid resonances. Not content to rest on his laurels, he founded his own Phase Technology Corp. and designed a line of Phase Tech speakers using cone-shaped solid-piston drivers made of rigid, low-mass polymer foam. Since the front of the piston is a flat surface, it becomes a phase-coherent planar driver. Along with a good crossover design and polypropylene capacitors, Hecht's drivers give the speakers an outstanding stereo image with a real sense of depth.

Describing Phase Technology's manufacturing process, Hecht spoke with pride of painstaking care during each stage of assembly, use of high-quality parts, and attention to internal cabinet bracing. He views his speakers as not just a product but a personal accomplishment—an attitude typical among American audio manufacturers. Hecht's son, Kenneth, Phase Technology's vice president for research and development, carries that spirit into the second generation. He introduced fast-Fourier-transform (FFT) analysis and roboticized production to improve the company's design and manufacturing.

Lewis Athanas, design engineer at Genesis Physics, sees the future of speaker design moving in the direction of built-in amplification. By applying antenna theory to control sound radiation patterns and using phase-shifted amplifiers for each of the drivers in an array, a designer can compensate for room reflections and achieve a realistic sound image in the listening room. Realistic imaging is one of the most important and rapidly developing areas in speaker design. Many other American manufacturers, such as dbx, with its Soundfield systems, and Polk, with its Stereo Dimension Array line, have found innovative solutions to the imaging problem.

Another company, ADS, makes speakers in America using high-



quality parts from all over the world. For example, its cabinets are imported from West Germany because the necessary "laser wood-cutting technology does not exist on the North American continent," according to Larry Daywitt, marketing vice president. Precisely fitting cabinet parts help to seal the enclosure and avoid the mushy bass caused by air leaks.

Daywitt says the company is developing products suitable for sale anywhere in the world. While the ADS Model 1590 is intended primarily for the U.S. market and American tastes, it recently received a favorable review in a German hi-fi magazine. Bestowing a curiously German compliment, the reviewer called the speaker "a Frankfurter from America."

Meanwhile, Japan's Yamaha commissioned American designers for its new FFT Series of speakers. According to Philip Grieves, Yamaha's product merchandising manager, "It was obvious that the speaker segment of the industry is quite large and that most of the successful products are American." Yamaha's approach was to "take an American design team and [to let them] select the finest-quality components from all over the world so they could deliver high-quality speakers at a low price."

The sonic goals for the new speakers, Grieves said, were flat frequency response and outstanding imaging. The series name came about because FFT analysis was used at every stage, from evaluation and selection of the drivers, to design of the crossover, to final evaluation of the sound. During the final design stage, the team fine-tuned the speakers by "taking one turn of wire at a time off the inductors," with both FFT analysis and listening tests used to evaluate the results. In the tradition of American designers, the Yamaha team didn't stop until they were completely satisfied with the sound. Designed and manufactured in the U.S. for a Japanese company, the Yamaha FFT Series speakers use European woofers and midranges and Japanese tweeters. But the quality is American.

New American Electronics

At dbx, American manufacturing expertise is strongly competitive.



The DA990 compact disc player (above) from H. H. Scott, of North Bergen, New Jersey, includes an extra analog filter that can be used to reduce the overly prominent high frequencies found on some CD's.

Altec Lansing speakers—like the Model 501 at right—are now made in Milford, Pennsylvania. The line features carbon-fiber-cloth woofers reinforced with epoxy and high-frequency polyamide-dome drivers with vacuum-deposited titanium for high rigidity and low coloration.



All three models in Infinity's Reference Standard Kappa Series speakers have cast-frame woofers made of polypropylene and graphite fiber for improved bass response. The Model 8 k shown at left also has a 5-inch dome midrange, a 3-inch midrange, and an EMIT k tweeter with neodymium magnets. Infinity's home is in Chatsworth, California.





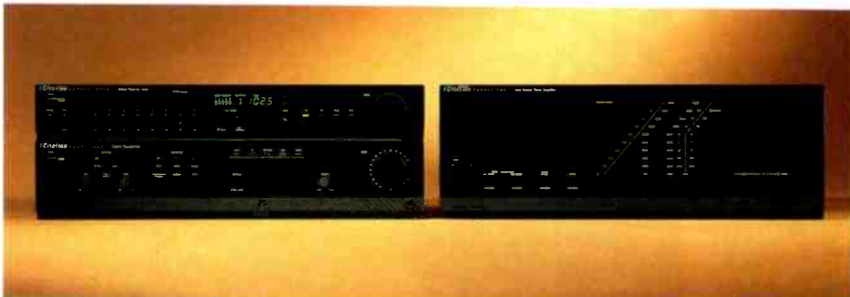
Electronic components from Acoustic Research, based in Canton, Massachusetts, include the CO-6 preamplifier (top) and the P-10 power amplifier (bottom).



Built in the Northwest rain forest of Lynnwood, Washington, Audio Control's Ten Plus equalizer/analizer has a clean, white front-panel finish.



Shure's Ultra D6000 CD player is part of the expanded line of products from the famed phono-cartridge manufacturer in Evanston, Illinois, just north of Chicago.



Harman Kardon, based in Woodbury, New York, has revised its classic Citation line. New components include a tuner, a preamplifier, and a power amplifier.



The Newton, Massachusetts, company actually bids against foreign companies for manufacturing contracts. "All dbx engineers are actively involved in the manufacturing and quality control of their products," said dbx communications manager David Moran. If problems arise, they can walk over to the factory and troubleshoot on the spot.

The dbx America Series CX1 preamplifier and BX1 power amplifier exemplify characteristically American attention to the subtleties of circuit design. The CX1, an audio/video preamplifier designed by Gary Hebert and David Bates, has full dubbing and switching facilities for both audio and video signals as well as a surround-sound decoder with digital time delay. Its phono inputs have variable resistance and capacitance. Crosstalk among inputs is low, and noise levels are below 90 dB. The BX1 amplifier, designed by J. Richard Aylward and Gary Hebert, delivers 400 watts per channel in stereo mode into 8 ohms with 0.05 percent distortion and a 2-dB headroom. Film capacitors, toroidal transformers, and thirty-two discrete high-speed output devices contribute to its clean sound.

Shure Brothers, realistically facing a declining market for its phono cartridges, is developing other product lines. Shure's surround-sound decoders have been popular, and Bernhard Jakobs, engineering vice president, says the company is "working on other products to bring an exciting audio/video experience into the home."

Shure also has begun an imaginative international manufacturing program to bring costs down while maintaining high quality. Rather than contracting with a factory in the Far East, Shure has established its own plants in Mexico, where costs are low, and has built parallel plants across the border in the U.S. Eventually this system will enable Shure to teach sophisticated manufacturing techniques to Mexican workers while being able to monitor the quality of the products.

Optical circuits in audio equipment are an emerging new technology, offering the advantages of lower noise and better isolation among circuits than conventional wiring. An interesting new optical application is Nelson Pass's improved Stasis circuit for his Threshold amplifiers. He uses fiber optics to control



the bias current because it gives him nearly complete isolation between the feedback loop and the amplifier's electrical signals. In his new models, he keeps the bias level nearly constant and operates the output circuits in Class A mode at higher power levels than before. Buoyed by the success of Threshold, Pass has started a new company, called Forte, to make another series of amplifiers he designed. They will be less expensive but will not include the Stasis circuit.

The Tempest CD player from California Audio Labs is a highly modified European-built Philips machine featuring tube analog circuits. But, unlike other modified CD players, it boasts improved *digital* circuits as well, thanks to American computer expertise. As a player reassembles the scrambled digital audio data into a bit stream to feed to its digital-to-analog (D/A) converters, small timing errors creep in. California Audio engineers corrected those errors, enabling the D/A converters to operate more efficiently and with less distortion.

In Boston, WGBH has been experimenting with digital FM broadcasts. The concept is elegantly simple: the station encodes the signal with a Sony PCM-F1 digital audio processor and transmits it on an unoccupied TV channel. Anyone who has a PCM-F1 at home (or, soon, a DAT deck with a built-in adaptor) can decode the broadcasts. The digital broadcasts of live performances during WGBH's morning classical-music program have elicited enthusiastic response from local audiophiles. The station's director of engineering, David MacCarn, initiated the broadcasts "on an almost zero budget." All he needed was spare equipment, air time—and Yankee ingenuity.

Analog cassette tapes have improved significantly in the past few years, partly in response to the challenge from the compact disc. The Mark 10 cassette shell developed by an American company, Maine's Shape, Inc., uses a bridge insert that insures accurate tape-to-head alignment. The result is improved high-frequency response and lower noise and distortion. By winding the tape onto the hubs more evenly, the bridge's precision guides help to reduce wow-and-flutter and possible tape damage. Already used in millions of prerecorded cassettes, the



Magnepan's planar-magnetic speakers are built in White Bear Lake, Minnesota. Shown above, left to right: the Models MG-IIc, MG-Ic, MG-IIIa (with ribbon tweeter), and SMGa.

Each SDA-SRS-2 speaker (below) from Polk Audio in Baltimore reproduces part of the other channel's signal, but out of phase, in order to cancel interaural crosstalk and improve imaging.



The ADS 1590 speaker (above) accepts an optional biampifier/crossover unit. Final assembly is done at ADS headquarters in Wilmington, Massachusetts.





Soundcraftsmen's Pro-Power Eight power amplifier, made in Santa Ana, California, is rated to deliver 375 watts per channel into 8 ohms.



Adcom's GTP-500 tuner/preamplifier has a notably clean and easy-to-use control layout. Adcom's headquarters are in New Brunswick, New Jersey.



Velodyne's ULD-15 subwoofer system includes a separate 350-watt amplifier with adjustable level, an 85-Hz crossover, and a patented servo control. Velodyne is based in Santa Clara, California.



Mark 10 shell is now available in Shape's line of blank cassettes. Designed in America, the Mark 10 shells are made in Maine through an agreement between Shape and the Penobscot Indian Nation.

Catch the Home Bus

Now, what is the solution to the problem of a coffee table full of remote controls? How can you operate your CD player in the den when you're listening in the kitchen? Or turn on your tape recorder when you are away from home?

The Electronic Industries Association, which won an Emmy Award for fostering stereo TV, has a committee—the Consumer Electronics Bus Committee, or CEBus—working on standards for a Home Network. The idea is to enable automatic and remote control of *all* home appliances, not just audio and video equipment but refrigerators and garage-door openers as well. CEBus hopes to nail down the standards this year.

The new standards will cover control signals transmitted via wireless infrared beams (audio/video remote controls, wireless headphones, etc.), external wires (phone lines, cable TV, fiber-optics cables), and over existing house wiring (such as the BSR and GE systems). One goal is a truly universal remote control that can operate any appliance from any room via sensors located throughout the house. Appliances would pass control signals and data around the network, with an inexpensive computer supervising the whole system.

DAT Issues

The controversy over digital audio tape and copy protection has created a disturbing rift between the recording and the audio industries. Clearly, neither can survive without the other, but three anti-DAT bills supported by the recording industry are now before Congress (Senate Bill 506, another one in the House, and President Reagan's proposed Trade, Employment, and Productivity Act of 1987). I could find no support in the audio industry, however, for keeping DAT recorders out of the country or for rendering them useless with copy-protection measures. The controversy between these two industries has even invaded the local and national news—a rare event in audio.



Unfortunately, the proposed copy-protection system to prevent recording CD's on a DAT deck degrades the playback quality of all encoded recordings even if you don't *have* a tape deck of any kind. According to some experts, the encoding process causes phase shift, ringing, distortion, and an irregular frequency response. Masterdisk's Robert Ludwig explained that the system requires the mastering engineer to select which tracks on a disc or tape to encode. "It's like playing God," he said. "Which track am I going to wreck today?"

Recording engineer John Eargle, of JME Associates, echoed the words of most audio-industry leaders: "I am violently opposed to any copy-protection scheme that alters the music." He believes that the proposed laws result from "needless panic and fear on the part of the record companies."

Allan Schlosser, vice president for communications of the EIA's Consumer Electronics Group, contends that "The ultimate loser is the U.S. consumer." He believes that the anti-DAT bills are "stalking horses [for record inhibition] in both analog and digital, audio and video recorders."

Despite the controversy and potential recording limitations of the DAT medium, Paul McGowan, president of PS Audio, predicts that DAT decks will be popular because "People want to record." The act of recording gets you involved, and tape will always have that attraction over playback-only media. McGowan anticipates a large market for DAT because it is a solution to the problem of what to do with a large LP collection in the age of CD's.

McGowan is eager to make DAT recorders because he can optimize both the record and the playback circuits. "DAT means that, for the first time, U.S. manufacturers have the opportunity to do it right," he said. "If U.S. manufacturers can make better CD-player electronics, then they will be hot as DAT manufacturers."

Other kinds of protectionism affect the audio field as well, such as import quotas and other trade barriers to foreign-made components. At the moment, the global economic factors that cause the yen to be strong and the dollar weak have made Japanese audio products more expensive and U.S. products

more price-competitive. Yet without the buying stimulus that has been provided by inexpensive Japanese receivers and CD players, the sales of American speakers and electronic components will slow. To some extent this is already happening, according to Matthew Polk. If a strong yen can slow sales, actual import barriers will damage, rather than help, the U.S. audio industry.

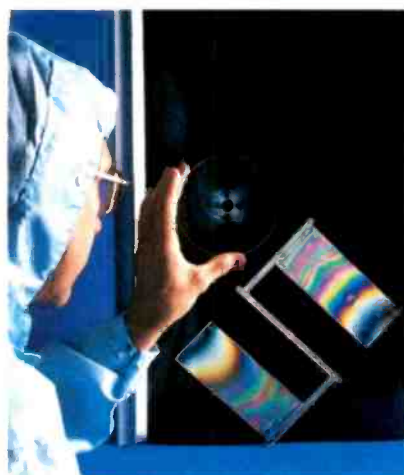
Because of their delicate interdependence with foreign manufacturers, no American audio companies want protective trade barriers. As Matthew Polk put it, "You can't legislate competitiveness." On the other hand, all those I spoke with emphasized that the doors must be open on both sides. They condemned the practice of "dumping"—selling goods abroad at less than cost to increase market share—that the Japanese and others have been accused of.

American manufacturers are eager to compete on a fair basis with anyone. Shure's Bernhard Jakobs said his company is "extremely competitive with the Japanese," and Michael Koss said proudly, "Koss was started in 1958 and has competed successfully against the Japanese, Koreans, Germans, and others for thirty years."

A Fine Balance

Survival in the global marketplace will require a fine balance between competition and cooperation. The future of America's \$35 billion consumer electronics industry "will be marked by a rising tide of alliances involving technical as well as manufacturing agreements," commented Richard W. Miller, GE's vice president for consumer electronics.

Foresighted American manufacturers are less likely to try going it alone in the future than to try to duplicate the international synergy that made the compact disc and stereo TV such resounding successes in so short a time. Without the cooperation between Philips and Sony, we might still be waiting for the CD to arrive. More than just successful products, CD's and stereo TV are powerful forces that have introduced millions to high-quality sound, rekindled the public's enthusiasm for recorded music, and revitalized the entire industry. American audio's emphasis on quality is an integral part of that process. □



A technique developed by GE in Schenectady, New York, prevents flaws in compact discs. In top photo, a GE engineer examines a pressing mold, in lower photo a partly finished disc.



The unique bridge mechanism in Shape's Mark 10 cassette shell improves the sound of cassette recordings. Shape has factories in various places in Maine.



AMERICAN AUDIO COMPANIES

A/A (American Acoustics, Division of Mitek), 1931 Prairie Sq., #133, Schaumburg, IL 60173. *Speakers.*
Ace Audio, 532 5th St., East Northport, NY 11731. *Accessories, signal processors.*

Acoustat (Division of David Hafler), 3101 SW First Terr., Ft. Lauderdale, FL 33315. *Power amplifiers, preamplifiers, speakers.*

Acoustic Interface, P.O. Box 6632, Santa Barbara, CA 93160. *Speakers.*

Acoustic Research, 330 Turnpike St., Canton, MA 02021. *Receivers, power amplifiers, preamplifiers, integrated amplifiers, tuners, turntables, speakers, compact disc players, accessories.*

ADA (Audio Design Associates), 602-610 Mamaroneck Ave., White Plains, NY 10605. *Power amplifiers, accessories.*

ADC (Division of dbx), 71 Chapel St., Newton, MA 02195. *Turntables, cartridges, signal processors.*

Adcom, 11 Elkins Rd., New Brunswick, NJ 08816. *Power amplifiers, preamplifiers, tuners, cartridges, accessories, compact disc players.*

ADS, One Progress Way, Wilmington, MA 01887. *Receivers, integrated amplifiers, tuners, tuner/preamplifiers, turntables, cassette decks, accessories, speakers, compact disc players.*

Advent (Division of Int'l. Jensen, an Esmark Co.), 4136 N. United Parkway, Schiller Park, IL 60176. *Speakers.*

Aero, Baltimore Washington Industrial Park, 8332 Bristol Court, Jessup, MD 20794. *Speakers.*

Alaron, 185 Park St., P.O. Box 550, Troy, MI 48099. *Pocket stereo.*

Allison Acoustics, 7 Tech Circle, Natick, MA 01760. *Speakers, signal processors.*

Allsop, 4201 Meridian St., P.O. Box 23, Bellingham, WA 98227. *Accessories.*

Alphasonik, 701 Heinz Ave., Berkeley, CA 94710. *Speakers.*

Altec Lansing, Milford, PA 18337. *Speakers.*

Apature Products, RFD #1, Route #2, Preston, CT 06360. *Accessories, speakers.*

Aphex Systems, 13340 Saticoy St., North Hollywood, CA 91605. *Signal processors.*

Apogee Acoustics, 35 York Industrial Park, Randolph, MA 02368. *Speakers.*
Apt, 148 Sidney St., Cambridge, MA 02139. *Power amplifiers, preamplifiers.*

ARC, 2888 Bluff St., Boulder, CO 80301. *Speakers, crossovers.*

A&S Speakers, 2371 Dahlia St., Denver, CO 80207. *Speakers.*

Astatic, Harbor & Jackson Sts., Conneaut, OH 44030. *Cartridges.*



BY WILLIAM BURTON

HOME audio components are designed, manufactured, and distributed in many countries around the world. Components might be designed in one country, made in another, and distributed by different companies in each market.

This can make it very hard to say which audio companies are "American." The following list includes home audio companies that are primarily American owned as well as those that are partly American owned and design or manufacture equipment here.

Audio Concepts, 1631 Caledonia St., La Cross, WI 54603. *Speakers, signal processors.*

Audio Control, 6520 212th St. SW, Lynnwood, WA 98036. *Signal processors.*

Audionics, P.O. Box 969, University Station, Portland, OR 97207. *Power amplifiers, preamplifiers, accessories, signal processors.*

Audio Research, 6801 Shingle Creek Parkway, Minneapolis, MN 55430. *Power amplifiers, preamplifiers, accessories, signal processors.*

AudioSource, 1185 Chess Dr., Foster City, CA 94404. *Accessories, speakers, signal processors.*

Babb Audio, 3230-A Towerwood, Farmers Branch, TX 75234. *Speakers.*
Barcus-Berry, 5500 Bolsa Ave., Suite 245, Huntington Beach, CA 92649. *Signal processors.*

Bedini, 13410 Sayre St., Sylmar, CA 91342. *Power amplifiers, preamplifiers, accessories.*

Belles Research, A-1 Country Club Rd., P.O. Box 307, E. Rochester, NY 14445. *Power amplifiers, preamplifiers.*

Benjamin Music Systems, 232 Sherwood Ave., Farmingdale, NY 11735. *Cassette decks, speakers.*

Berning, 1107 Candlelight Lane, Pottomac, MD 20854. *Power amplifiers, preamplifiers.*

BES, 345 Fischer St., Costa Mesa, CA 92626. *Speakers.*

Beveridge Loudspeakers, 8141 E. 2nd St., Suite 515, Downey, CA 90241. *Speakers.*

Bose, 100 The Mountain Rd., Framingham, MA 01701. *Speakers.*

Boston Acoustics, 247 Lynnfield St., Peabody, MA 01960. *Speakers.*

Boulder Amplifiers, 3101 3rd St., Boulder, CO 80302. *Power amplifiers, preamplifiers, accessories.*

Bozak, 68 Holmes Rd., Newington, CT 06111. *Speakers.*

Brown Electronic Labs, 1233 Somerset Dr., San Jose, CA 95132. *Power amplifiers.*

California Audio Labs, 21962 Annette Ave., El Toro, CA 92630. *Compact disc players.*

Carver, P.O. Box 1237, 19210 33rd Ave. W., Lynnwood, WA 98036. *Receivers, power amplifiers, preamplifiers, tuners, accessories, speakers, signal processors, compact disc players.*

Cello, 55 Circular Ave., Hamden, CT 06514. *Power amplifiers, preamplifiers, cartridges, signal processors.*

Certron, 1701 S. State College Blvd., Anaheim, CA 91331. *Blank tape, accessories.*

Cerwin-Vega, 555 E. Easy St., Simi Valley, CA 93065. *Speakers.*

Chapman Sound, P.O. Box 140, Vashon, WA 98070. *Speakers.*

Conrad-Johnson Design, 2800R Dorr Ave., Fairfax, VA 22031. *Power amplifiers, preamplifiers, speakers.*

Counterpoint, P.O. Box 12294, La Jolla, CA 92037. *Power amplifiers, preamplifiers, head amplifiers.*

Custom Woodwork & Design, 7447 S. Sayer, Bedford Park, IL 60638. *Audio furniture.*

Dahlquist, 601 Old Willets Path, Hauppauge, NY 11787. *Speakers, signal processors.*

Dash II Designs, P.O. Box 792336, Dallas, TX 75379. *Accessories.*

DB Systems, Main St., Rindge Center, NH 03461. *Power amplifiers, preamplifiers, accessories, signal processors.*

dbx (Division of BSR), 71 Chapel St., Newton, MA 02195. *Power amplifiers, preamplifiers, speakers, signal processors, compact disc players, accessories.*

DCM, 670 Airport Blvd., Ann Arbor, MI 48104. *Speakers.*

Dennesen Electrostatics, 715 Hale St., Beverly, MA 01915. *Power amplifiers, preamplifiers, cartridges, tonearms, accessories, speakers, signal processors.*

Discrete Technology, 2911 Oceanside Rd., Oceanside, NY 11572. *Power amplifiers, compact disc players.*

Discwasher, 4309 Transworld Rd., Schiller Park, IL 60176. *Accessories.*

DLK Acoustical Products, 1405 Mendota Heights Rd., St. Paul, MN 55120. *Speakers.*

Domus, 1405 Mendota Heights Rd., St. Paul, MN 55120. *Speakers.*

Dynaudio, 8982 Table Bluff Rd., Cross Plains, WI 53528. *Speakers.*

Dynavector, 1721 Newport Circle, Santa Ana, CA 92705. *Cartridges, tonearms.*

Ego Systems, 23 Pleasant St., #2, Northampton, MA 01060. *Speakers.*

Electro-Voice, 600 Cecil St., Buchanan, MI 49107. *Speakers.*

Emerson Radio, One Emerson Lane, N. Bergen, NJ 07047. *Turntables, speakers, compact disc players.*

Eminent Technology, 508 Cactus St., Tallahassee, FL 32304. *Cartridges, tonearms.*

Empire Scientific, P.O. Box 486, 55 Bloomingdale Rd., Hicksville, NY 11802. *Cartridges, speakers.*

Epicure (Division of Harman America), 25 Hale St., Newburyport, MA 01950. *Speakers.*

ESS, 2575 E. Presidio St., Long Beach, CA 90810. *Speakers.*

Fanfare Acoustics, 4650 Arrow Hwy. #4, Montclair, CA 91763. *Speakers.*

Focus Speaker Systems, 1101 E. Second St., Dayton, OH 45403. *Speakers.*

Fosgate, P.O. Box 70, Heber City, UT 84032. *Power amplifiers, signal processors.*

Fostex, 15431 Blackburn Ave., Norwalk, CA 90650. *Cassette decks, open-reel decks, signal processors, headphones, accessories.*

Fried Products, 7616 City Line Ave., Philadelphia, PA 19151. *Speakers.*

General Electric, 600 N. Sherman Dr., Indianapolis, IN 46206. *Pocket stereo, compact disc players.*

Genesis Physics, 225 Heritage Ave., Portsmouth, NH 03801. *Speakers.*

Geneva Group (Nortronics), 7255 Flying Cloud Dr., Eden Prairie, MN 55344. *Accessories.*

GLi Integrated Sound Systems, 1227 Walt Whitman Rd., Melville, NY 11747. *Turntables, speakers, headphones, signal processors.*

GNP Loudspeakers, 1244 E. Colorado Blvd., Pasadena, CA 91106. *Speakers.*

Gold Sound, P.O. Box 141, Englewood, CO 80151. *Power amplifiers, speakers, signal processors.*

Grado Laboratories, 4614 Seventh Ave., Brooklyn, NY 11220. *Cartridges.*

Gruv-Glide, P.O. Box 19003, Las Vegas, NV 89132-0003. *Accessories.*

Gusdorf, 11440 Lackland Rd., St. Louis, MO 63146. *Audio furniture.*

Guss Speaker Systems, 215 W. 92nd St., New York, NY 10025. *Speakers.*

Hafler, 5910 Crescent Blvd., Pennsauken, NJ 08109. *Power amplifiers, preamplifiers, tuners, signal processors.*

Harman Kardon, 240 Crossways Park West, Woodbury, NY 11797. *Receivers, power amplifiers, preamplifiers, integrated amplifiers, tuners, turntables,*

cassette decks, signal processors, compact disc players.

Harris-Atlantis, 11050 Riverwood Dr., Burnsville, MN 55337. *Speakers.*

HiFonics, 845 Broad Ave., Ridgefield, NJ 07657. *Speakers, accessories.*

Induced Magnet Systems, 115 Henry St., Freeport, NY 11520. *Cartridges.*

Infinity Systems, 9409 Owensmouth, Chatsworth, CA 91311. *Speakers, accessories.*

Innovative Techniques, 703 Revere Dr., Herbertsville, NJ 08723. *Speakers.*

Interaudio by Bose, 100 The Mountain Rd., Framingham, MA 01701. *Speakers.*

Intraclean by American Recorder Technologies, 4395 Valley Fair St., Simi Valley, CA 63063. *Accessories.*

JBL (Harman America), 240 Crossways Park West, Woodbury, NY 11797. *Speakers.*

Jensen Sound Labs, 4136 N. United Pkwy., Schiller Park, IL 60176. *Speakers.*

JSE, 519 East Middle Turnpike, Manchester, CT 06040. *Speakers.*

Kindel Audio, 3615 Presley Ave., Riverside CA 92507. *Speakers.*

Kinergetics, 6029 Reseda Blvd., Tarzana, CA 91356. *Power amplifiers, preamplifiers, tuners, compact disc players.*

Kinetic Audio, P.O. Box 2147, Des Plaines, IL 60018. *Accessories, speakers, signal processors.*

Klipsch, P.O. Box 688, Hope, AR 71801. *Speakers.*

Klyne Audio Arts, 828 E. 7th Ave., Olympia, WA 98501. *Preamplifiers, head amplifiers.*

Koss, 4129 N. Port Washington Ave., Milwaukee, WI 53212. *Headphones, speakers, accessories.*

Krell Industries, 20 Higgins Dr., Milford, CT 06460. *Power amplifiers, preamplifiers.*

The Last Factory, P.O. Box 41, Livermore, CA 94550. *Accessories.*

Lazarus Electronics, 15046 Friar St., Van Nuys, CA 91411. *Power amplifiers, preamplifiers, head amplifiers.*

Lineage, 230 W. 55th St., New York, NY 10019. *Receivers, power amplifiers, preamplifiers, compact disc players.*

LT Sound, P.O. Box 338, Stone Mountain, GA 30086. *Signal processors.*

Magnepan, 1645 9th St., White Bear Lake, MN 55110. *Speakers.*

M.A.N., 6301 Riggs Pl., Los Angeles, CA 90045. *Power amplifiers, preamplifiers, speakers, compact disc players.*

Marantz, 20525 Nordhoff St., Chatsworth, CA 91311. *Receivers, integrated amplifiers, tuners, turntables, cassette decks, speakers, signal processors, compact disc players.*

Mark Levinson Audio, P.O. Box 781, Middletown, CT 06457. *Power amplifiers, preamplifiers, signal processors.*

Martin-Logan, Box 741, 320 NE Industrial Lane, Lawrence, KS 66044. *Speakers.*

John Marovskis Audio Systems, 2889 Roebling Ave., Bronx, NY 10461. *Cartridges, speakers.*

McIntosh Laboratory, 2 Chambers St., Binghamton, NY 13903. *Receivers, amplifiers, tuners, speakers, compact disc players.*

Memtek Products, 2155 S. Bascom Ave., Campbell, CA 95008. *Memorex blank tape, Memorex accessories.*

Monolithic Sound, 515 Sandy Dale, Nipomo, CA 93444. *Power amplifiers, preamplifiers, integrated amplifiers.*

Monster Cable, 101 Townsend St., San Francisco, CA 94107. *Cartridges, accessories.*

Motif by Conrad-Johnson, 1474 Pathfinder Lane, McLean, VA 22101. *Power amplifiers, preamplifiers.*

MTX Loudspeakers (Division of Mitek), 1931 Prairie Sq., #133, Schaumburg, IL 60173. *Speakers.*

M & K (Miller & Kreisel Sound), 10391 Jefferson Blvd., Culver City, CA 90230. *Speakers, signal processors.*

NAD, 675 Canton St., Norwood, MA 02062. *Receivers, power amplifiers, preamplifiers, integrated amplifiers, tuners, turntables, cassette decks, speakers.*

Nady Systems, 1145 65th St., Oakland, CA 94608. *Speakers, headphones.*

Nelson-Reed, 15810 Blossom Hill Rd., Los Gatos, CA 95030. *Speakers.*

New York Audio Labs, 250 Clearbrook Rd., Elmsford, NY 10523. *Power amplifiers, preamplifiers.*

Nitty Gritty, 4650 Arrow Hwy., F4, Monrovia, CA 91763. *Accessories.*

Nova Electro-Acoustics, P.O. Box 25488, Los Angeles, CA 90025. *Power amplifiers, preamplifiers.*

Numark Electronics, 503 Raritan Center, Edison, NJ 08837. *Amplifiers, turntables, accessories, speakers, headphones, signal processors, compact disc players.*

Ohm Acoustics, 241 Taffe Pl., Brooklyn, NY 11205. *Speakers.*

Omega Audio Systems, P.O. Box 119, Leominster, MA 01453. *Speakers.*

O'Sullivan Industries, 1900 Gulf St., Lamar, MO 64759. *Audio furniture.*

Parasound, Wharfside, 680 Beach St., #400, San Francisco, CA 94109. *Receivers, amplifiers, preamplifiers, tuners, turntables, cartridges, cassette decks, speakers, headphones, signal processors, compact disc players.*

Parsec, 540 Madison Ave., New York, NY 10022. *Antennas.*

Pentagram, 207-19 35th Ave., Bayside, NY 11361. *Speakers.*

Planstiehl, 3300 Washington St., Waukegan, IL 60085. *Cartridges, accessories.*

Phase Technology, 6400 Youngerman Circle, Jacksonville, FL 32244. *Speakers.*

Phoenix Systems, P.O. Box 1316,

Hwy. 99 East, Columbia, TN 38402.
Signal processors.

Pickering, 101 Sunnyside Blvd., Plainview, NY 11803. *Cartridges, accessories, headphones.*

Polk Audio, 5601 Metro Dr., Baltimore, MD 21215. *Speakers.*

PS Audio, 4145 Santa Fe, RD #2, San Luis Obispo, CA 93401. *Power amplifiers, preamplifiers, tuners, accessories, compact disc players.*

RCA, 600 N. Sherman Dr., Indianapolis, IN 46201. *Receivers, integrated amplifiers, tuners, turntables, cassette decks, speakers, signal processors, compact disc players.*

Realistic by Radio Shack (Tandy Corp.), 1300 One Tandy Center, Fort Worth, TX 76102. *Receivers, turntables, cartridges, cassette decks, speakers, headphones, pocket stereo, signal processors, compact disc players.*

Recoton, 46-23 Crane St., Long Island City, NY 11101. *Accessories, headphones, signal processors.*

Robertson Audio, P.O. Box 8449, Van Nuys, CA 91409. *Power amplifiers, preamplifiers, speakers.*

Russound/FMP, P.O. Box 2369, Woburn, MA 01888. *Accessories.*

SAE, 1734 Gage Rd., Montebello, CA 90640. *Receivers, power amplifiers, preamplifiers, integrated amplifiers, tuners, cassette decks, signal processors, accessories.*

Scotch (3M Corp.), 3M Center, St. Paul, MN 55101. *Blank tape, accessories.*

H. H. Scott, 3601 Westside Ave., N. Bergen, NJ 07047. *Receivers, integrated amplifiers, tuners, turntables, cassette decks, speakers, compact disc players.*

Sears, Roebuck and Co., Sears Tower, 40-15, Chicago, IL 60684. *Cassette decks, compact disc players.*

Sentrek, 751 Racquet Club Dr., Addison, IL 60101. *Signal processors.*

Shahinian Acoustics, 33 A&B Cedarhurst Ave., Medford, NY 11763. *Speakers.*

Shape, P.O. Box 366, Biddeford, ME 04005. *Blank tape.*

Shure Brothers, 222 Hartrey Ave., Evanston, IL 60204. *Integrated amplifiers, cartridges, accessories, signal processors, compact disc players.*

Snell Acoustics, 143 Essex St., Haverhill, MA 01830. *Speakers.*

Sonex by Illbruck, 3800 Washington Ave., N. Minneapolis, MN 55412. *Accessories.*

Sonographe by Conrad-Johnson, 2800R Dorr Ave., Fairfax, VA 22031. *Turntables, compact disc players.*

Sonrise, 13622 NE 20th, Suite F, Bellevue, WA 98005. *Accessories.*

Sonus by Sonic Research, 27 Sugar Hollow Rd., Danbury, CT 06810. *Cartridges.*

Sota Industries, P.O. Box 7075, Berkeley, CA 94707. *Turntables, accessories, speakers.*

CANADIAN AUDIO COMPANIES



Angstrom Associates, 2175 Dunwin Dr., Unit 7, Mississauga, Ontario L5L 1X2. *Speakers.*

Audio Products International (Audio Pulse, dB Plus, Energy, Mirage, Paisley Research, Sound Dynamics), 135 Torbay Rd., Markham, Ontario L3R 1G7. *Speakers, signal processors.*

Audiosphere, 25 Esna Park Dr., Markham, Ontario L3R 1C9. *Speakers.*

Axiom Audio, Box 82, Highway 60, Dwight, Ontario P0A 1H0. *Speakers.*

Bryston, 57 Westmore Dr., Rexdale, Ontario M9V 3Y6. *Power amplifiers, preamplifiers, accessories.*

Camber Acoustics, 7101 Park Ave., Suite 120, Montreal, Quebec H3N 1X9. *Speakers.*

Classé Audio, 9414 Cote de Liesse Rd., Lachine, Quebec H8T 1A1. *Power amplifiers, preamplifiers.*

Clements Audio Systems, 10176 Yonge St., Richmond Hill, Ontario L4C 1T6. *Speakers.*

Dayton Wright Group, 97 Newkirk Rd. North, Richmond Hill, Ontario, Canada L4C 3G4. *Speakers.*

Laser Audio, 1140 Eighth Line, Oakville, Ontario L6H R42. *Speakers.*

Magnum-Dynalab, 8 Strathearn Ave., Unit 9, Brampton, Ontario L5T 4L9. *Tuners, antennas.*

Meitner Audio, 3143 De Miliac, St. Laurent, Quebec H4S 1S9. *Amplifiers, turntables, compact disc players.*

Oracle, 505 Boul. Industriel, Sherbrooke, Quebec J1L 1X7. *Turntables.*

Paradigm Electronics, 4141 Weston, Unit 5, Weston, Ontario M9L 2S8. *Speakers.*

PSB by Lenbrook Industries, 633 Granite Court, Pickering, Ontario L1W 3K1. *Speakers.*

Shinon, 354A Yonge St., Toronto, Ontario M5B 1S5. *Cartridges.*

Sima Electronics, 2335 Howard St., St. Hubert, Quebec J3Y 4Z3. *Power amplifiers, preamplifiers, integrated amplifiers.*

Waveform Research, 60 Holmcrest Trail, West Hill, Ontario M1C 1V5. *Speakers.*

Sound Associates, N65 W5730 Colombia Rd., Cedarburg, WI 53012. *Speakers.*

Sound Concepts, P.O. Box 135, Brookline, MA 02146. *Signal processors.*

Soundcraftsmen, 2200 S. Ritchey, Santa Ana, CA 92705. *Power amplifiers, preamplifiers, tuners, signal processors.*

Souther Engineering, 429 York St., Canton, MA 02021. *Tonearms, accessories.*

Speakerlab, 735 N. Northlake Way, Seattle, WA 98103. *Speakers.*

Spectral Audio, 550 Weddell Dr., Suite 3, Sunnyvale, CA 94080. *Power amplifiers, preamplifiers, interconnects, speaker cables.*

Spectrum Loudspeakers, P.O. Box 2774, Toledo, OH 43606. *Speakers.*

Spica, 1601 Paseo de Peralta, Santa Fe, NM 87501. *Speakers.*

Stanton Magnetics, Terminal Dr., Plainview, NY 11803. *Cartridges, accessories.*

Sumo, 21300 Superior St., Chatsworth, CA 91311. *Power amplifiers, preamplifiers, tuners, speakers, crossovers.*

Surround Sound, 14025 Panay Way, Marina del Rey, CA 90292. *Signal processors.*

Swire Magnetics, 301 E. Alondra Blvd., #1187, Gardena, CA 90248.

Laser brand blank tape, Laser accessories.

Switchcraft, 5555 N. Elson Ave., Chicago, IL 60630. *Accessories.*

Symdex Audio Systems, P.O. Box 8037, Boston, MA 02114. *Preamplifiers, accessories, speakers.*

Synthesis, 2817M Dorr Ave., Fairfax, VA 22031. *Speakers.*

Terk, 740 Broadway, New York, NY 10003. *Antennas.*

Thiel Audio, 1042 Nandino Blvd., Lexington, KY 40511. *Speakers.*

3D Acoustics, 601 Old Willets Path, Hauppauge, NY 11788. *Speakers.*

Threshold, 1832 Tribute Rd., Suite E, Sacramento, CA 95815. *Power amplifiers, preamplifiers, signal processors.*

Triad (Harman America), 5000 Brush Hollow Rd., Westbury, NY 11590. *Blank tape.*

Triad Design, P.O. Box 99, Fairview, OR 97024. *Speakers.*

Vandersteen Audio, 116 West 4th St., Hanford, CA 93230. *Preamplifiers, speakers.*

Vector Research, 20600 Nordhoff St., Chatsworth, CA 91311. *Receivers, power amplifiers, integrated amplifiers, tuners, turntables, cassette decks, signal processors, compact disc players.*

Velodyne Acoustics, 2565 Scott Blvd., Santa Clara, CA 95050. *Speakers.*

Vibe Acoustics, 107 Manchester Dr., Staten Island, NY 10312. *Speakers.*

Visa-International Electronics, 5601 NW 78th Ave., Miami, FL 33166. *Blank tape.*

VSP Labs, 670 Airport Rd., Suite 1, Ann Arbor, MI 48104. *Power amplifiers, preamplifiers.*

The Well-Tempered Lab, 3108 McKinley Way, Costa Mesa, CA 92626. *Tonearms, turntables.*

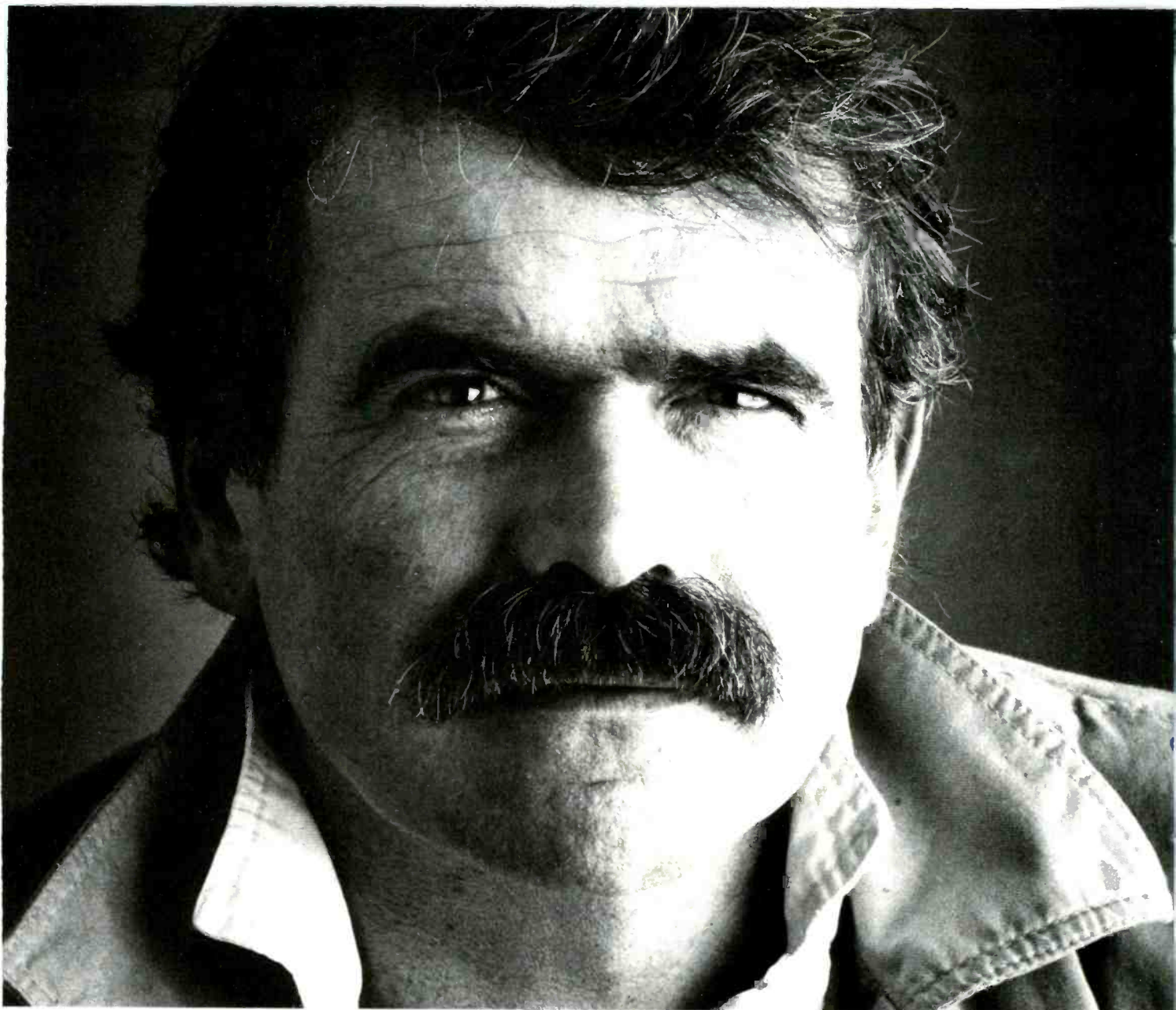
Wilson Audio, 2 Sinaloa Ct., Novato, CA 94947. *Speakers.*

Wingate Audio, 1904 Rustic Rd., Johnson City, TN 37601. *Power amplifiers.*

IN CELEBRATION OF

AMERICAN

TECHNOLOGY '87



“Will Those Speakers Work With My CD?”

The introduction of the compact disc player has created a lot of confusion and false information.

At KLIPSCH[®], we think you deserve to know the truth: any *good* loudspeaker or amplifier will work with a CD.

The virtues of a CD are really quite simple. You get a more durable “record,” so to speak. That is, scratches become a thing of the past. And you get tremendous increases in dynamic range. Now what does that mean?

Simply stated, the expanded dynamic range of a CD allows you to hear *lifelike* musical surges. Loud portions of music are closer to the

loudness of the original performance; quiet portions are more realistic too. And you should know that dynamic range provides the *emotional* qualities of music. Which brings us to the purpose of this message.

Since our first model in 1943, KLIPSCH Loudspeakers have delivered more dynamic range than any other loudspeakers made. We had a love for dynamic range before most companies knew what it was.

You don't have to have new speakers with a CD. But to hear a CD at its best, all the dynamic range and emotional power, make sure you listen to KLIPSCH. You'll hear a *real* difference for your hard-earned dollars.

You'll hear your money's worth in every part of your system.

Judge for yourself.

To find your nearest KLIPSCH dealer, look in the Yellow Pages. Or call toll free, 1-800-223-3527.

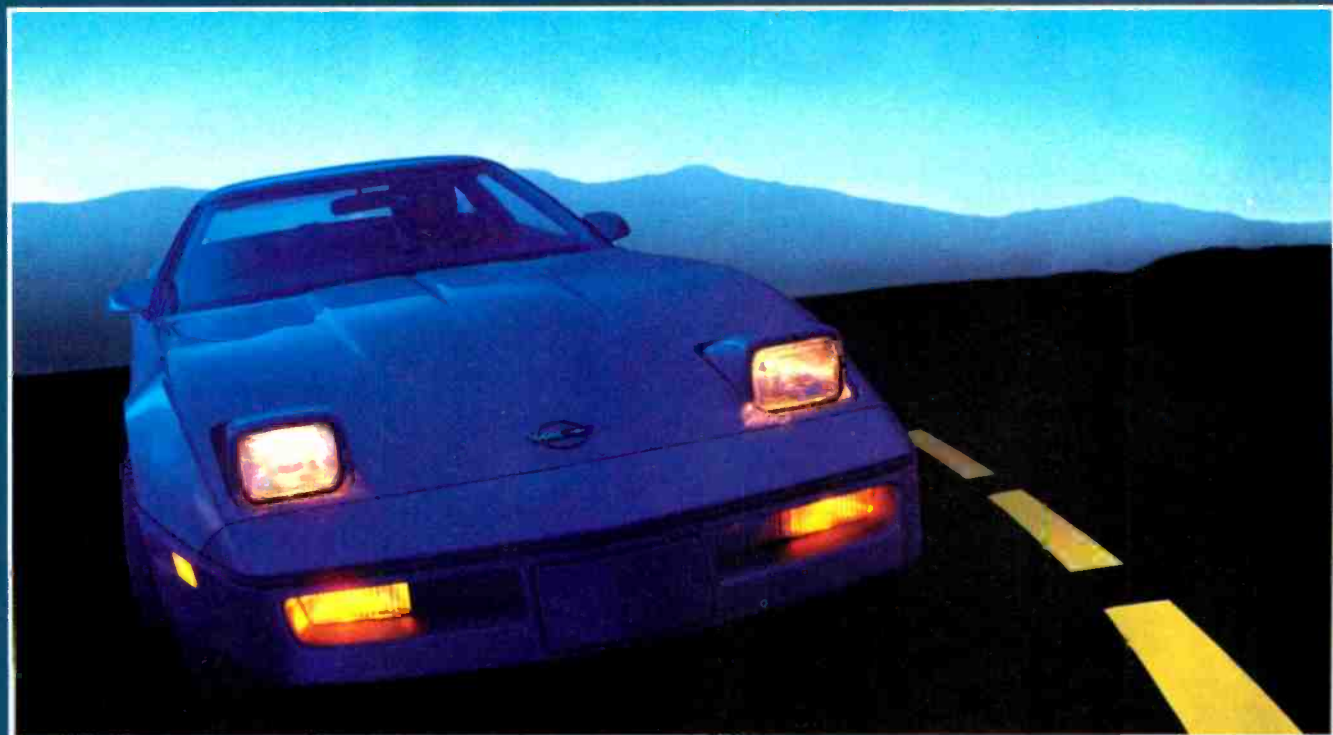


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Shown: The new CH161 DIN-mount in-dash cassette/tuner, and CA260 automotive amplifier.



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High Performance Necessities for the Mobile Audiophile.

Challenging Design.

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Bob Carver recently shocked the staid audiophile world by winning a challenge that no other amplifier designer could ever consider.

The new M-1.0t was judged, in extensive listening tests by one of America's most respected audiophile publications, to be the sonic equivalent of a PAIR of legendary, esoteric mono amplifiers which retail for \$3000 each!

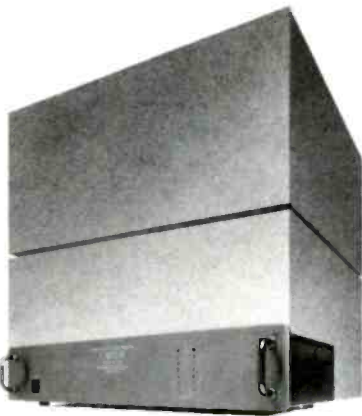
CARVER'S GREAT AMPLIFIER CHALLENGE.

Last year, Bob Carver made an audacious offer to the editors of *Stereophile Magazine*, one of America's exacting and critical audio publications. He would make his forthcoming amplifier design sound exactly like ANY high-priced, esoteric, perfectionist amplifier (or amplifiers) the editors could choose. In just 48 hours. In a hotel room near *Stereophile's* offices in New Mexico! As the magazine put it, "If it were possible, wouldn't it already have been done? Bob's claim was something we just couldn't pass up unchallenged."

What transpired is now high fidelity history. From the start, the *Stereophile* evaluation team was skeptical ("We wanted Bob to fail. We wanted to hear a difference"). They drove the product of Bob's round-the-clock modifications and their nominees for "best power amplifier" with some of the finest components in the world. Through reference speakers that are nothing short of awesome. Ultimately, after exhaustive listening tests with carefully selected music ranging from chamber to symphonic to high-impact pop that led them to write, "...each time we'd put the other amplifier in and listen to the same musical passage again, and hear exactly the same thing. On

the second day of listening to his final design, we threw in the towel and conceded Bob the bout. According to the rules... Bob had won."

BRAIN CHALLENGES BRAWN. Below is a photo of the 20-pound, cool-running M-1.0t. Above it are the outlines of the pair of legendary mono



amplifiers used in the *Stereophile* challenge. Even individually, they can hardly be lifted and demand stringent ventilation requirements. And yet, according to some of the most discriminating audiophiles in the world, Bob's new design is their sonic equal.

The M-1.0t's secret is its patented Magnetic Field Coil. Instead of increasing cost, size and heat output with huge storage circuits, Magnetic Field Amplification delivers its awesome output from this small but powerful component. The result is a design with the dynamic power to reproduce the leading edge attacks of musical notes which form the keen edge of musical reality.

A DESIGN FOR THE CHALLENGES OF MODERN MUSIC REPRODUCTION. The M-1.0t's astonishingly high voltage/high current output and exclusive operation features make it perfect for the demands of compact digital discs, video hi-fi and other wide dynamic range playback media. The M-1.0t:

- Has a continuous FTC sine-wave output conservatively rated at 200 watts per channel*
- Produces 350-500 watts per channel of RMS power and 800-1100 watts momentary peak power (depending on impedance).
- Delivers 1000 watts continuous sine wave output at 8 ohms in bridging mode without switching or modification.
- Is capable of handling unintended 1-ohm speaker loads without shutting down.
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SHARE THE RESULTS OF VICTORY. We invite you to compare the new M-1.0t against any and all competition. Including the very expensive amplifiers that have been deemed the M-1.0t's sonic equivalent. You'll discover that the real winner of Bob's remarkable challenge is you. Because world class, superlative electronics are now available at reasonable prices simply by visiting your nearest Carver dealer.

*** SPECIFICATIONS:** Power, 200 watts/channel into 8 ohms 20Hz to 20kHz, both channels driven with no more than 0.15% THD. Long Term Sustained RMS power, 500 watts into 4 ohms, 350 watts into 8 ohms. Bridged Mono power, 1000 watts into 8 ohms. Noise, -110dB IHF A-weighted. Weight, 20 lbs.



CARVER

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POWERFUL

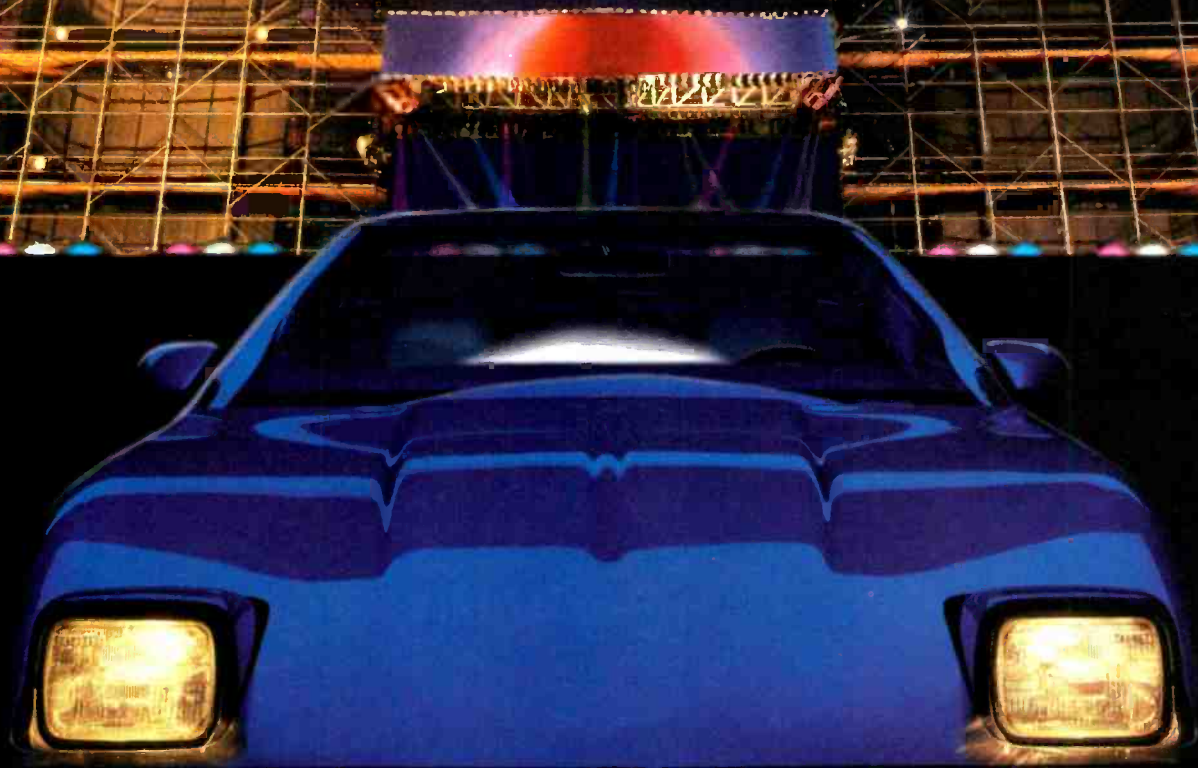
MUSICAL

ACCURATE

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ANYTHING ELSE IS JUST UN-PROFESSIONAL



From Live Aid to Lincoln Center, top ten artists to top studio producers, JBL has been the #1 choice in professional loudspeakers for more than 40 years. Now the JBL "T" and "TL" series promise to make the star of stage, screen and studio, the star of car audio, too.

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"T" series loudspeakers feature high and mid-high frequency transducers made of pure titanium—the same titanium domes that are used in JBL's professional studio monitors. Titanium's high strength-to-weight ratio ensures clear, powerful highs without listener fatigue. And now, for the first time, you can get the benefits of titanium at a lower cost with the "TL" series' titanium laminated domes.

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The JBL "T" and "TL" series automotive loudspeakers. Once you've heard the professionals, you won't want anything else.

For more information and your nearest dealer call toll free 1-800-525-7000, Ext. 50 or write JBL, 240 Crossways Park West, Box 9501, Woodbury, New York 11797.



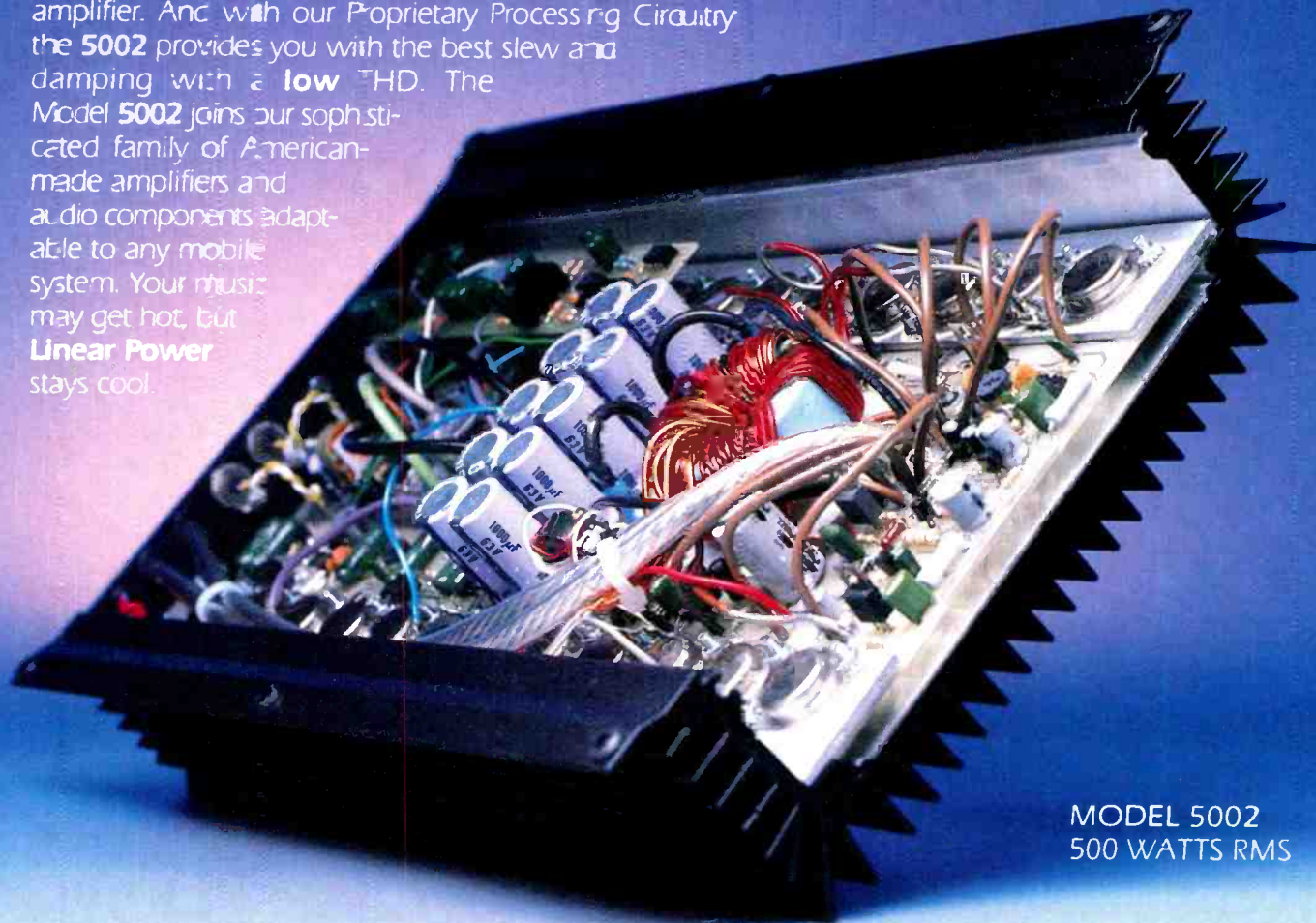
Pictured above, left to right are: The T9E, T55, T65, and, the TL900, TL500, TL600.

JBL

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P

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This year industry professionals voted Matthew Polk's MM X (MM 10 6-1/2" two way system — 99.95 ea.) Speaker of the Year in the prestigious Audio Video International Auto Sound Grand Prix. Now the Grand Prix winning MM X is joined by a new generation of high power, three-way polymer technology Mobile Monitors. They are engineered in Matthew Polk's uncompromising tradition of superior sound quality and unequalled value. We are "The Speaker Specialists". No other loudspeakers will give you the unequalled musical pleasure of a pair of Polks. In car speakers, as in home speakers, if you want the best possible sound, listen to the experts and buy Polk Audio.

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CIRCLE NO. 37 ON READER SERVICE CARD

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Introducing The Monitor Series.

NAD's product philosophy has always been to build no-nonsense components of the highest possible audible performance for the lowest possible price. We've implemented this philosophy by using clever, cost-efficient designs. By eliminating a lot of "features" that we felt provided questionable benefits.

By ignoring certain laboratory measurement techniques that we deemed irrelevant. And—most important—by making a thousand thoughtful, careful and (we think) correct design decisions.

Three years ago, we embarked on a project that would produce the ultimate extension of that product philosophy. The NAD Monitor Series. A group of ultra-high performance audio components that will challenge anything on the market, regardless of price.

Some of the components in the series include innovative, highly useful features. And some establish new standards of performance in the industry. But what really makes the Monitor Series great can't be summed up with a few words. It's the latest in high technology blended with proven ideas we've used for years. It's a thousand subtle design decisions combined with a number of major technical innovations. A very few examples . . .

■ The amplifiers and receiver use NAD's Power Envelope technology which allows them to produce useable, dynamic power far beyond their continuous power ratings. For example, the receiver is rated at 150 watts per channel, but will put out 600 dynamic watts per channel into four ohm speaker loads.

Center Rack: NAD 4300 Stereo Tuner
NAD 5300 Compact Disc Player
NAD 1300 Preamplifier
NAD 2600 Power Amplifier



NAD 5300 Compact Disc Player
NAD 6300 Cassette Deck
NAD 4300 Stereo Tuner
NAD 3300 Integrated Amplifier

- The preamplifier has a special "null" circuit which electronically subtracts any monaural information from an incoming signal. This feature lets you align your cartridge for perfect electrical balance, or to adjust your FM antenna for minimum multipath distortion.

- The remote controls (for the receiver, cassette deck and CD player) are the ultimate in ergonomic design—easy to grasp with the controls logically arranged for easy use. Plus they're designed to be operated in an upright position (so you can see the buttons while you're pushing them).

- The CD player includes a compression circuit for when you want to listen to compact discs as background music—or when you want to make a cassette copy of a CD.

- The cassette deck is the world's first to combine the Dolby* HX Pro system with Tandberg's DYNEQ** "dynamic equalization" circuit. It will record a stronger, more distortion-free signal than any other cassette deck we know of. It also



features an NAD exclusive circuit that will equalize and compress your tapes specifically for use in an automobile.

- The tuner and receiver combine the accuracy of digital tuning with the convenience of a traditional analog tuning knob. We find that most people much prefer spinning a heavy flywheel to holding down a little button. The tuner also uses a specially-designed NAD-exclusive front end with a switchable IF circuit. Its useable sensitivity is unequalled.



NAD 6300 Cassette Deck
NAD 2600 Power Amplifier
NAD 7600 Stereo Receiver

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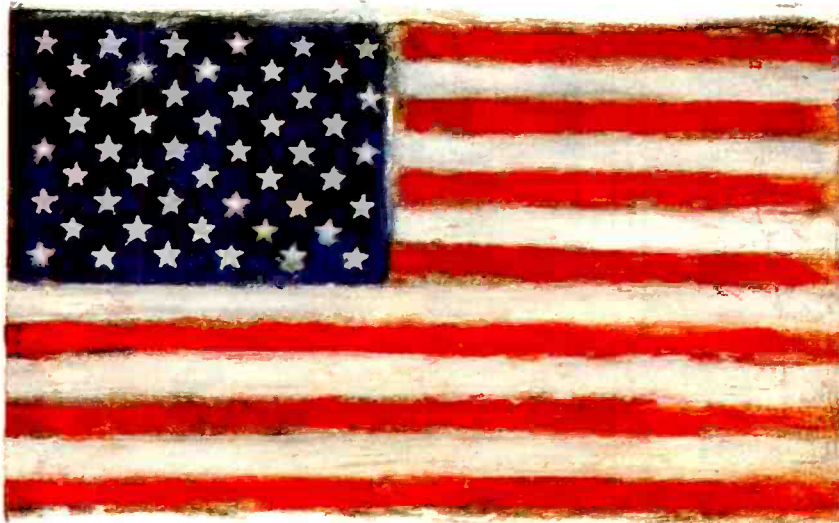
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*Continuous (not instantaneous or peak) power, both channels driven into 8 ohms, 20Hz-20kHz, <0.09% THD. Adcom specifications meet all FTC measurement requirements.

CD BOOM!

COMPACT DISC PRESSING PLANTS ARE SPREADING ACROSS NORTH AMERICA.



BY CHRISTOPHER GREENLEAF

THE digital compact disc was developed in Europe and Japan, and many millions of discs still come from there. Production started later in North America but has gone from a handful of discs in 1985 to a projected annual rate of just under 100 million units by the end of the current year.

The transition from the era of the 12-inch, black-vinyl LP to the new age of the 12-centimeter digital compact disc has been accelerating since March 1983, when the first CD player went on sale in the United States. Now, four years and a bit later, a visit to any record store of size will show how successful the CD has been at elbowing the LP out of its accustomed bins and shelves. This year, in fact, the number of stores selling CD's exclusively has surpassed even optimistic industry predictions. As we buyers paw through the bins, we now encounter whole label lines pressed not in Shizuoka, Hanover, or Wyastone Leys (Japan, West Germany, and Wales, respectively) but in this country or neighboring Canada.

Why, when the news is so full of reports of American industry's

crumbling physical plant, has there been such a burgeoning of CD pressing facilities here? Perhaps the prime reason for this is the huge size of the American market and the enormous profits investors consequently anticipate from domestic pressing plants. Some of the new plants here are Japanese or European owned, naturally, but a healthy upsurge of North American investment has also become an important part of the CD-plant picture. Among the major recent entrants are the 3M Company (Scotch), with a plant in Menomonie, Wisconsin, and the WEA record group (Warner/Elektra/Atlantic), with a plant in Olyphant, Pennsylvania (near Scranton).

Of course, you don't just adapt existing machinery and space for compact disc manufacturing. Even when revolutionary new processes, many of them developed in America, are used, the inescapable clean-room requirements and their impact on the flow of materials and personnel dictate the establishment of brand-new facilities dedicated solely to the CD. Older industrial equipment and factories simply aren't a factor.

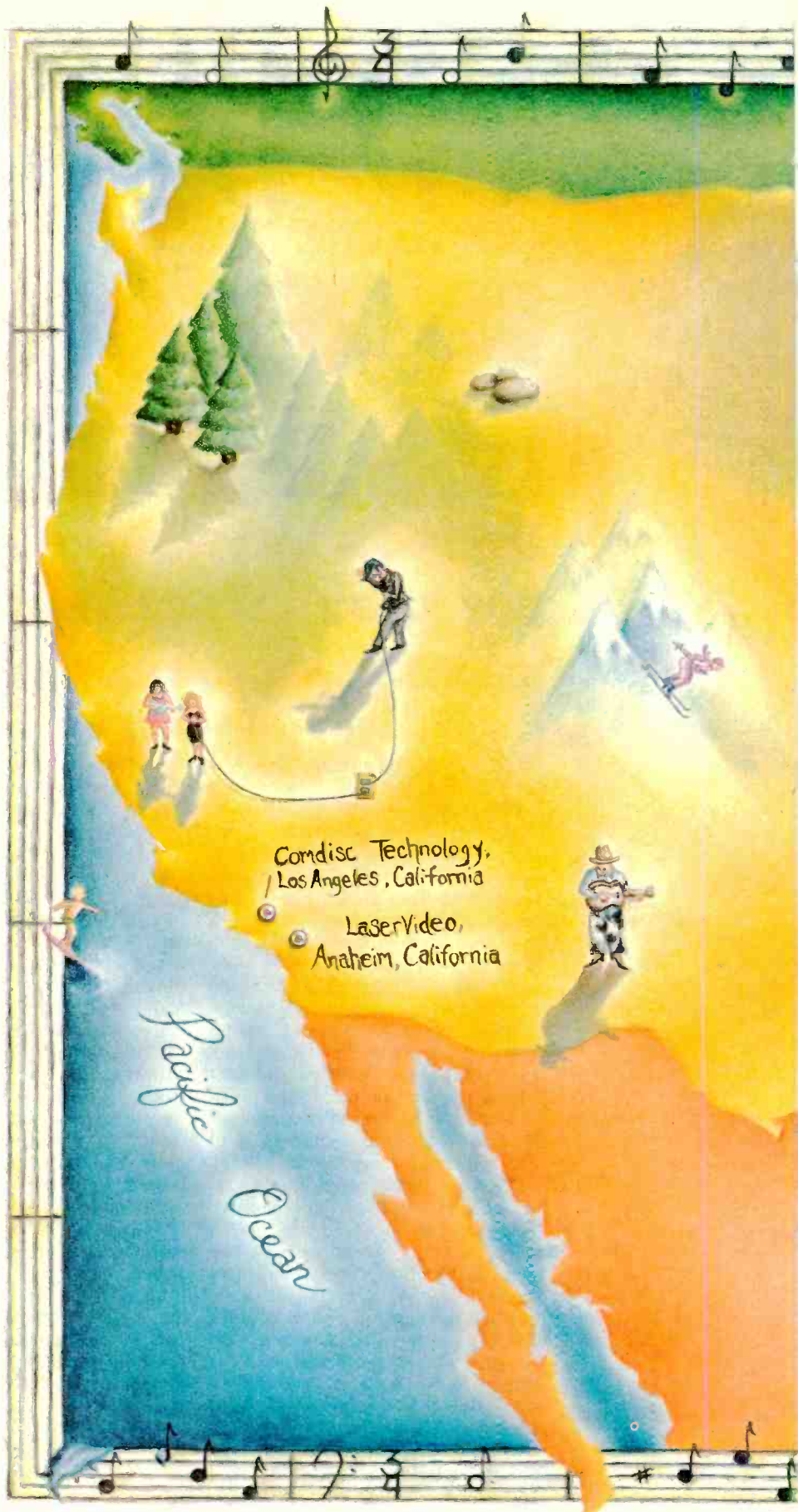
In Madison, Georgia, Denon Digital Industries is opening its doors in mid April with a capacity of about 9 million discs for the remainder of the year. DDI is expected to produce 12 million CD's in 1988, with further growth beyond that. As the U.S. arm of Nippon Columbia, DDI plans to serve the American market with audio discs only at this point, pressing releases from both the Japanese parent company and North American labels.

Having made an industry-wide impression with the radically redesigned Shape Mark 10 cassette shell, Anthony and Paul Gelardi, the founders of Shape, Inc., opened their first CD pressing operation—in Kennebunk, Maine—in mid 1986 and recently moved to larger quarters in nearby Sanford. Although he will not talk about sensitive details of CD manufacturing by Shape's optical-disc subsidiary, Shape Optimedia, William Peck, president of the division, says that the company designed its own pressing equipment, which "uses injection molding of a radically new type."

Shape is "achieving a disc-pressing cycle of under fifteen seconds," Peck told me. While the CD-making process always results in a certain percentage of discs being rejected for quality-control reasons, he explained, Shape's "very fast cycle enables us to live with the slightly higher rejection rate we sometimes

HOME-GROWN COMPACT DISCS

Whether you live in the wine country of California or under the white pines of Maine, you may be near a pressing plant already producing compact discs. If you are not close to a factory now making CD's, don't worry. A neighborhood plant may be under construction or in the planning stages. Some of the plants shown on the map—Comdisc Technology in Los Angeles, Digital Images in Washington, DC, and Memory/Tech in Plano, Texas—are still under development, and the Americ Disc pressing plant shown in Drummondville, Quebec, is only on the drawing board. But they will soon join the others in producing plenty of compact discs for your neighborhood record store.





Praxis, Mississauga,
Ontario

Canam, Scarborough, Ontario
Americ Disc
Drummondville, Quebec



-3M,
Menomonee,
Wisconsin

Technidisc,
Troy,
Michigan

WEA, Olyphant,
Pennsylvania

Shape Optimedia,
Sanford, Maine

Capitol/EMI,
Jacksonville, Illinois

Sanyo,
Richmond, Indiana

Discovery
Systems,
Dublin, Ohio



Sony,
Terre Haute, Indiana

Digital Images,
Washington, DC



PDO,
Kings Mountain,
North Carolina

LaserVideo,
Huntsville, Alabama

Denon,
Madison, Georgia



Memory/Tech,
Plano, Texas



JVC,
Tuscaloosa, Alabama

Atlantic
Ocean

Gulf of Mexico



encounter as we continue to experiment with our process. By the end of the year, our installed capacity will be up to 20 million. We see 40 million in 1988."

Shape Optimedia uses both the "sputtering" and the evaporative method to aluminize discs, and it developed special machinery for the final assembly and packaging of CD's. Sales of this complex and vital equipment have brought the company's name to wide attention in the industry. At press time, Shape was starting up in-house CD mastering too, using West German equipment.

Across the country, not far from Disneyland in Anaheim, California, LaserVideo opened the first U.S.-owned CD plant in 1983. Wan Seegmiller, the company's vice chairman, reminisced about the first year of production: "We used a proprietary lithographic method that had neither greater nor less yield than the injection-molding processes Japan and Europe were starting up at the time. Our disadvantage was volume. The etching process [akin to the development of a photographic printing plate] was easily controlled but slow. We now use our own variant of the dominant injection-molding process because of its ability to produce numbers."

LaserVideo has made an impressive number of discs for "the majors"—companies like WEA, RCA, MCA, and so on—but also made an early commitment to small labels. "The small labels are the industry's health, and we are there for them," Seegmiller said. Because LaserVideo started out as a disc producer only, with no in-plant packaging, some initial customers were attracted elsewhere. The greater cost, complicated logistics, and potential for damage when a disc travels from plant to plant convinced the company to add assembly to its offered services. Hand packing into jewel boxes, blister packs, and long cardboard boxes takes place in a large area that, by year's end, will be filled instead with automatic machinery.

Very large plants like Sony's Digital Audio Disc Corporation in Terre Haute, Indiana, Philips-Du Pont Optical (PDO) in King's Mountain, North Carolina, and LaserVideo's new plant in Huntsville, Alabama, provide the major share of North American CD pressing capacity. But smaller plants, often with intimate ties to small labels, have been

springing up as well, including Technidisc in Troy, Michigan, and Discovery Systems in Dublin, Ohio.

An area of Ontario around Toronto that is the Canadian recording industry's traditional seat has two CD pressing plants on line at present, Praxis Technologies in Mississauga and Cinram Ltd. in Scarborough. In Quebec, a plant is proposed for Drummondville (Americ Disc), and the Montreal printing firm of Ross-Ellis, Ltd., long a manufacturer of LP and cassette album materials and promotional posters, swung onto the CD bandwagon with alacrity last year, serving major and small labels with an enormous variety of CD booklets, U-cards (or rear cards, if you prefer), and long cardboard boxes.

American injection-molding technology and fast, reliable assembly automation have proven to be huge assets in the stamped-to increase CD production capacity. The practice of mixing foreign and domestic ownership was almost unheard of a decade ago, but U.S. companies are ruefully admitting that it is the way things will have to be in the future.

What are the combined production figures likely to look like when all the North American plants get cranking? To serve an estimated 7-million-plus players in this country, and to provide exports of U.S. releases, some 90 million CD's will probably be made here during 1987. The current doubling in production each year will obviously peak out at some point, so financial and business observers will be treading carefully by the time production finally outstrips demand—maybe in 1989. The familiar boom-slump pendulum will doubtless topple a few producers into instability when that occurs, but for now the industry attitude is one of heady optimism.

The emergence of the CD-V (video) and CD-ROM (read-only memory) formats is bound to spur the growth of CD pressing plants in this country, and the high degree of automation used in CD production should enable U.S. and Canadian plants to stay competitive in a huge market. Additional European, Asian, and Australian plants are coming on line quickly, however, and South America is getting into the act as well. Unlike the record market, the CD pressing business appears to have gone world-wide

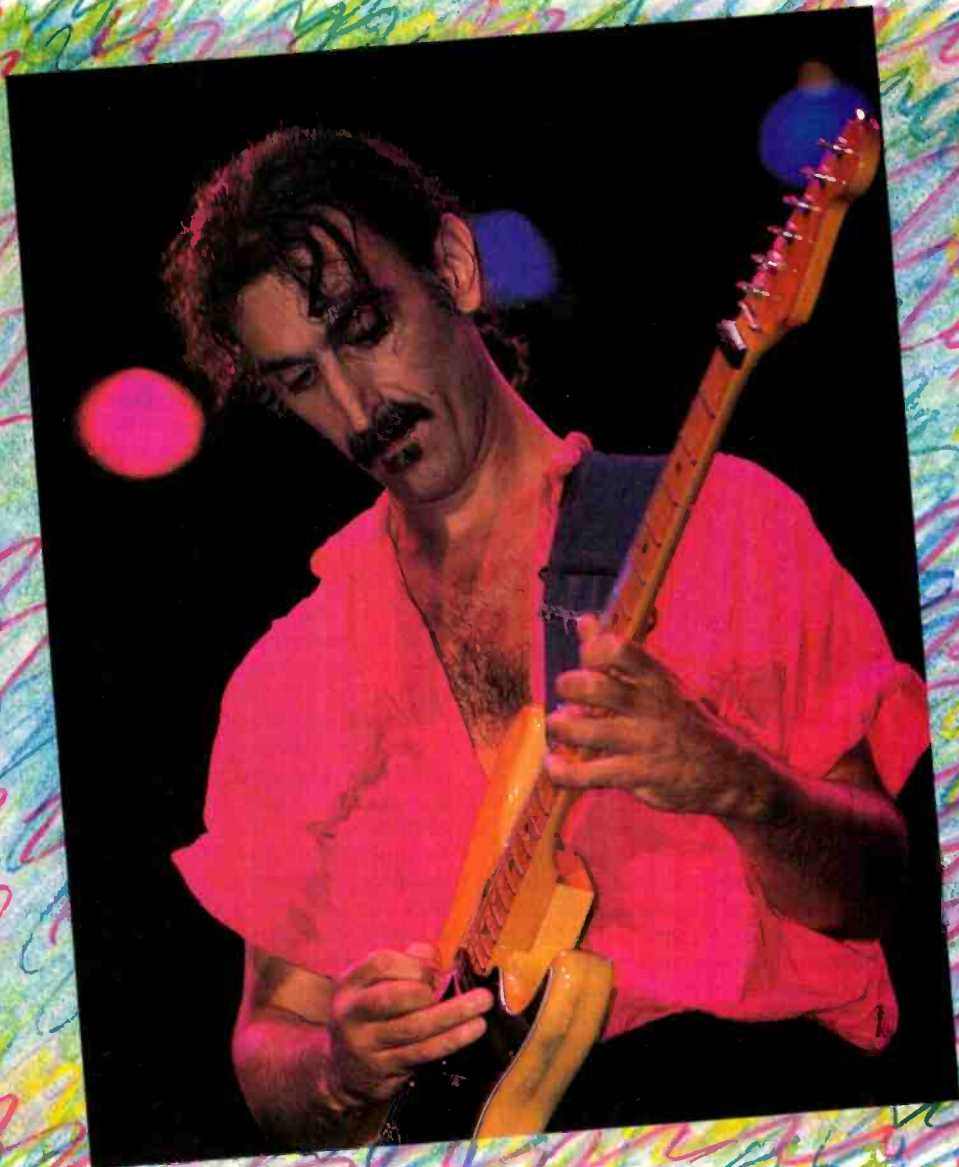
from the start. Not only can we buy pressings from all over, but North American manufacturers are happily packing heavy cartons of finished CD's off to buyers abroad, and in increasing quantities. No small part of the export business is due to the liveliness of the smaller American and Canadian labels, which range from digital pioneer Telarc to tiny specialist companies such as Rhino, Rykodisc, and Crystal.

The big question for consumers, of course, is whether CD retail prices will come down. The answer is that they already have, with more and more discs at the \$10 level or less. In part this reflects cost-cutting packaging innovations, in part the lower cost of reissuing proved material on CD, as in the new "mid-price" lines from the PolyGram labels, CBS Masterworks, and others. And a combination of manufacturing economies and competitive pressure may push prices even lower—Sony's giant Terre Haute plant recently announced price cuts of as much as 22 percent to its largest customers, and other plants may have to follow suit.

But there's no incentive for lower retail prices if customers don't demand them. I'm still shocked to see some discs going for \$19 in one store and for \$15 in another a mile away, with *both* selling well. CD buyers, some store managers tell me, don't shop around as much as they did for cassettes and LP's, so a \$4 price disparity can exist for the same album in two nearby stores. Whatever the price structure, however, the increasing flood of domestic pressings will certainly increase the *availability* of popular releases and insure the presence of rarities and specialist items in the larger stores.

As American production exceeds Japan's this year, look for increased variety, an end to annoying shortages, and a flurry of new, CD-only labels. Collectors and music lovers will find many more cherished analog recordings reissued on CD, and digital signal processing will make these sometimes magnificent old masters true sonic delights. The 74-minute maximum playing time of the CD will continue to be exploited most by classical record companies, but an increasing number of labels are delighting their customers with long playing times. In 1985, a U.S.-made CD was a rarity. In 1987, it's getting to be the norm. □

ZAPPA



EBET ROBERTS

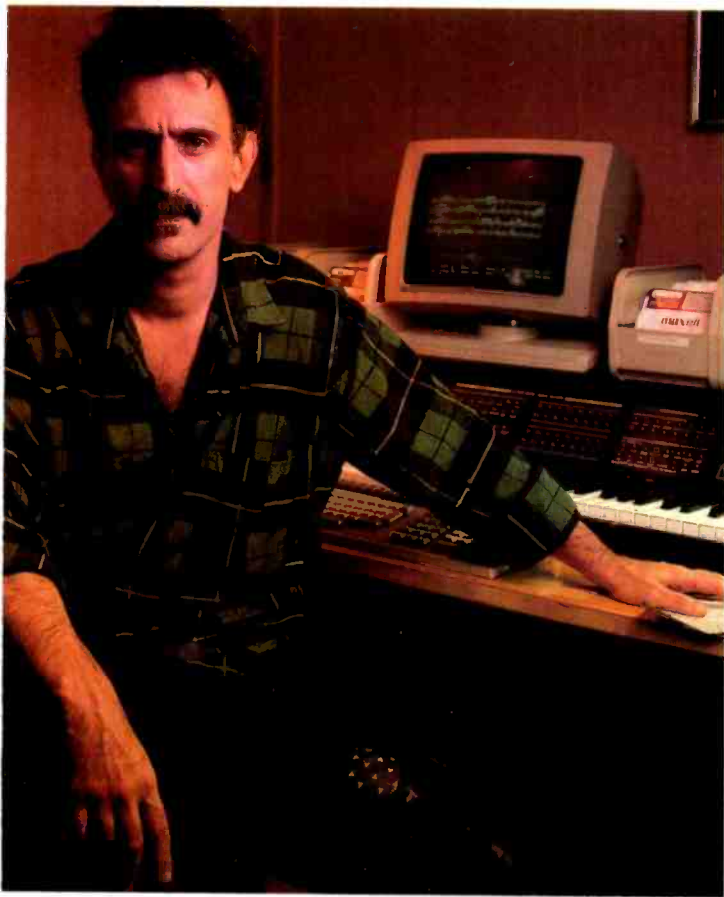
BY MICHAEL SMOLEN

FRANK ZAPPA is one of the most influential, innovative, and consistently controversial musicians of the past two decades. Since the beginning of his career this performer, composer, and self-styled philosopher for the modern world has recorded over fifty albums, many of them double-record sets, often creating musical milestones along the way.

With his irrepressible, frequently scatological musical observances, Zappa has also carved himself a niche that fits no major record company's wall, forcing him to create his own record label (Barking Pumpkin) and distribution company (Barfko-Swill).

"Narrow-mindedness has always been one of the prime factors in American society," Zappa told me recently over coffee at New York's Mayfair Hotel. "It's a big blind spot in America, the closed-mindedness, the small-mindedness, the resistance to change. There's a resistance to change and an artificial support of things that are new, because Americans have a resistance to going all the way. So when people say 'That's not music,' that's just another manifestation of closed-mindedness. It's an educational problem."

Zappa's first release, "Freak Out" with the Mothers of Invention back in 1966, was simultaneously the first



I learned by pushing the buttons.”

“concept” album and the first double-disc rock album. Subsequent records gained attention for their incorporation of diverse musical sources, including rock, classical, and jazz—and no small amount of outrageousness. An admirer of Igor Stravinsky, Anton Webern, and Edgard Varèse (he wrote a tribute to Varèse in this magazine in 1971), Zappa has introduced his own nontraditional uses of harmony, rhythm, and orchestration. His music is always serious, but never without a sense of humor.

Zappa’s other artistic pursuits have included the production of two movies, *200 Motels* and *Baby Snakes*, and several videos combining music, animation, live performances, and his personal observations. He is currently putting the finishing touches on a new two-hour movie with the same title, *Uncle Meat*, as the 1969 LP that introduced the now infamous character of Suzy Creamcheese. He has also composed symphonic works that have been performed by a number of major musical organizations, including the Ensemble InterContemporain, conducted by Pierre Boulez, and the London Symphony Orchestra.

Zappa on Compact Disc

Frank Zappa will always be thought of in terms of his phenomenal musical talent, and for many fans the recent release of ten vintage Zappa recordings on compact discs is a dream come true.

The reissues are part of an exclusive agreement between Zappa and Rykodisc USA, which will release

eight more Zappa CD’s a year over the next three years. The difficult task of deciding *which* recordings to release first from the large Zappa discography fell to Zappa and Rykodisc president Don Rose. The initial eight albums (two are double-disc sets)—which reached stores late last year—include, in chronological order, “We’re Only in It for the Money/Lumpy Gravy,” “The Grand Wazoo,” “Overnite Sensation/Apostrophe,” “Shut Up ‘n’ Play Yer Guitar,” “London Symphony Orchestra,” “Them or Us,” “Thing-Fish,” and “Frank Zappa Meets the Mothers of Prevention.”

“One of the reasons I was glad the CD came around was the length of the program material,” Zappa said. “An hour and twelve minutes is real nice for the kind of stuff I do, especially for my live material, because when I do live shows the music is nonstop. On all of the live albums I’ve put out I had to resequence the material, fade things in and out, and do a bunch of things that actually spoiled the continuity of the show.

“With the CD you can get a better idea of what one of my live shows is all about. In fact, Rykodisc will soon be releasing a multi-CD set called ‘You Can’t Do That on a Stage Anymore.’ It’s stuff that in a contemporary, conservative society you can’t do on stage any more, and it’ll have examples of that kind of material that go back to 1968 up through 1984.”

Wherever appropriate, the Rykodisc releases have been resequenced to follow Zappa’s original intentions, and extra tracks have been added, when available, to bring the playing time closer to a CD’s hour-plus capacity. For example, “London Symphony Orchestra” includes a never-before-released twenty-five-minute track, *Bogus Pomp*, whose added length would have exceeded that of the LP mastering. For two of the new releases, “Apostrophe/Overnite Sensation” and “We’re Only in It for the Money/Lumpy Gravy,” two complete and consecutively recorded albums have been combined on a single CD. The CD packaging, while based on the LP originals, has been extensively reconfigured for the medium. The two-CD set of the opera “Thing-Fish,” for example, contains a thirty-two-page libretto, something that was not provided with the original LP version when it was released in 1984.

But a spiffy presentation on the part of Rykodisc is only half of the story. Zappa has painstakingly remastered and re-equalized the recordings to take advantage of the expanded dynamic range of the compact disc format. Zappa is one of the digital world’s pioneers. His studio, the Utility Muffin Research Kitchen, has been digital since 1981 and is home to one of the nation’s first digital multitrack recorders. His current setup includes *four* digital machines: two Sony 3324’s, a Sony 1610, and a Sony 1630. It is here that Zappa and his recording engineer, Bob Stone, prepared the master tapes for the new Rykodisc CD’s.

“The ‘We’re Only in It for the Money’ album has new, digitally recorded drum and bass tracks added to it,” Zappa explained. “The original tracks were replaced completely when the album was remixed. All the rest of the early albums are just remastered from the original two-track master tapes. I did the new tracks for ‘We’re Only in It’ because the original masters for that album had deteriorated—the oxide had fallen off the tape. So we had to go back to the original material, which was eight-track, and I figured that as long as we’re going to do that, let’s see what would happen if we put new bass and drums on it. I liked the results, and I also did it to

'Reuben and the Jets,' which will probably be in the next batch of releases."

Zappa's *latest* CD release, also from Rykodisc, is the new album "Jazz from Hell." The recording is completely instrumental, and it is performed almost entirely on a New England Digital Synclavier, a state-of-the-art digital instrument that (in a gross oversimplification) can be looked at as a combination of a synthesizer, a multitrack recorder, and a computer. In fact, the only track *not* performed on the Synclavier is *St. Etienne*, spotlighting a typically bizarre guitar solo. Joining Zappa on *St. Etienne* is a group of well-known musicians, Steve Vai, Ray White, Tommy Mars, Bobby Martin, Ed Mann, Scott Thunes, and Chad Wackerman.

The album also includes *Night School*, the theme song from Zappa's long-awaited TV show, about which he says, "I have been negotiating with several companies who are intrigued with the idea of putting me on TV, but they're all afraid of what might happen when I open my mouth." The bulk of the album contains "really complicated compositions that human beings just couldn't play." Because of the consistent use of digital processing—sampling, recording, mixing, and mastering—"Jazz from Hell" is a totally digital recording.

Goodbye Guitar, Hello Synclavier

To many, Frank Zappa is a bona fide guitar hero. His mastery of the instrument is displayed on albums as diverse as "Hot Rats" (1969), "Zoot Allures" (1976), "Joe's Garage Act 1" (1979), and "Sheik Yerbouti" (1979). Nowhere is the Chief Mother's guitar work more brilliantly displayed than on the boxed LP set—and, fortunately, the double-CD set—of "Shut Up 'n' Play Yer Guitar."

But Zappa doesn't play the guitar any more.

"Right now I prefer working with the Synclavier. I haven't played the guitar in over two years," said Zappa. "With the Synclavier you can literally sit there and play

every part in an orchestra, resynchronize those parts, edit those parts, even re-orchestrate those parts. It gives me the chance to be not only the composer but the conductor, because I can orchestrate the dynamics into the piece. If you can think in that global way, you can really have complete control over your composition."

The Synclavier employs a new method of music synthesis called partial timbres. It features twenty-four separately adjustable harmonics, a six-stage volume-envelope generator, completely adjustable vibrato and portamento, separate keyboard decay-adjust of volume envelopes, separate keyboard control of stereo placement, powerful sampling ability, and virtually unrestrained editing capabilities.

"Basically the data is entered into the system with the dual keyboard, an octapad, and drumsticks, or it's just typed in," Zappa explained. "After the data is entered, you can edit it in several different ways. For example, you can look at sheet music on the screen, or you can edit lists of information on a screen that shows you three columns of data—rhythm, pitch, and duration. By typing in different values you can edit your material. Then just push a button, and it plays it back.

"It's not that user-friendly, but it's not that impossible. I would say that in terms of being a real techno guy I'm no whiz. I'm just an average techno guy. I don't know what the hell to do with a soldering iron, I don't know anything about circuits, I can't do arithmetic, and I hate to read. I never really read the Synclavier manual. I learned by pushing the buttons."

Zappa for President

Besides his musical endeavors, Frank Zappa has gained international attention for his outspoken work against record ratings—in particular, the system proposed by the Parents' Music Resource Center, which he testified against in Washington—and censorship in general. He has become an unofficial spokesman on these subjects and is often called on by national media to supply opposing views to what he considers right-wing-extremist attacks on the U.S. Constitution. So, naturally, he is the perfect person to ask for an opinion about the proposed digital audio tape (DAT) copy-prevention legislation.

"I have no objection to anything that protects copyrights, because I think a work of art has to be protected," said Zappa. "If you want artists to stay in business, you have to protect what it is they do—ownership of that is what gives them their income—so I'm in favor of protecting artists' rights. But I am totally against stunting technology in order to achieve that goal. If the 'copy-protect' chip they want to install in DAT machines does not in any way impair the sound or create any audio quality problems, then I have no problem with it."

As evidenced by the outstanding quality of his CD releases, Frank Zappa is an artist who has welcomed digital technology with open arms. He has realized its benefits, found its limitations, and is aware of what must be done to improve it. He knows the pros and cons of upcoming legislation affecting the music industry. But he also knows the bottom line.

"Instead of looking at new technology as an opportunity, everybody for their own reasons looks at it as a threat to their potential dominance of the marketplace," he concluded. "I think that behind all this is quite a bit of greed and not very much concern for the consumer, who ultimately just wants to buy music." □

Zappa is currently finishing a two-hour movie based on his 1969 album "Uncle Meat."



Is pinpoint imaging a realistic goal for home speakers? And if you could get it, would you want it anyway?

SPEAKER IMAGING

BY
DAVID
MORAN

IMAGING is the term used by audiophiles and hi-fi salesmen to describe localization: a listener's ability to locate sounds as reproduced in space by a stereo speaker system. Although you'll read a lot of differing theories about imaging, localization is the critical factor, and the listening room is as important as the speaker. (How a recording is miked and mixed—where the mikes were placed, what their pickup patterns are, and how their outputs were blended—is the first and constant variable.)

My experience is that the liveness or deadness (absorption) of the listening space and the dispersion (coverage) of the speaker system are the major playback determinants of imaging. The comparative sonic consistency of the left and right speakers and their distance from the walls (which governs when their reflected sounds arrive) are also very important. A lot of loud reflections will make images vague, although, thankfully, the ear's attention is mostly captured by the early arrivals of a sound. This is known as the Haas, or precedence, effect and is the reason why stereo sound seems to come from *just* the speakers (and the space between them)

unless you're very far away in a gym-sized room. Obviously, the "capture" of the ear by direct and early arrivals isn't total. If it were, furnishings and other room surfaces wouldn't affect the timbral or spectral balance of the sound so dramatically, and it wouldn't matter if our rooms were carpeted on all six sides, or were all tile!

A dead room will have better imaging with any speaker than a live one. So will close seating compared with distant seating. In each case we hear more sound directly from the speakers.

A speaker without broad coverage or dispersion will give the ear proportionally more of the direct sound too, which can produce very tight, precise imaging. This quality is pleasing—a little "headphony" but with the center somewhat better filled. In any conventional speaker system, however, there is always a *discrepancy* between the direct and the reflected sound, because no individual driver radiates as much sound to the sides as it does to the front. In other words, all drivers have directivity, and it always gets narrower with an increase in frequency. (There's no such thing as a perfectly omnidirectional driver un-



U. & H. 1968

less you aim it upward and are talking only about horizontal output.)

Honk, Honk

The discrepancy between direct and reflected sound may be large or small, and more or less irritating, depending on room deadness and seating position, but mostly on driver width and crossover points—how big the driver diameters are relative to the frequencies they're being asked to reproduce. To the ear the irritation is, broadly, "honkiness." When honkiness occurs in a lower frequency range, the sound can be described as "congested" or "nasal," while higher up the adjective might be "pinched." These colorations of the sound are the result of a clash of spectral and timbral balances, a discrepancy between direct and reflected sound, between the on-axis (frequency) response and the total (power) response. The clash may result from a peak or a dip in the frequency response, or from both.

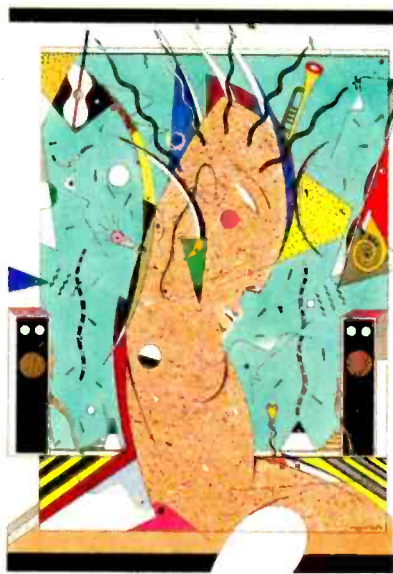
At its worst the sound takes on the quality of telephone, table-radio, or megaphone reproduction, or of your own voice spoken into cupped hands. In other instances voices "catch cold" and violins become violas, or otherwise sound as if their openings were facing the audience instead of pointing upward (interestingly, in earlier centuries that's how violins were held).

Power Response and Axial Response

A conventional two-way forward-firing speaker designed with a smooth axial output will inevitably have dips in its total power output as the drivers begin to get "beamy," that is, as they reproduce higher and higher notes (for the woofer this is at the crossover point).

A similar speaker that has a smooth aggregate total (power) response will have peaks in its axial output. For more than thirty years it has been said that you cannot have a smooth frequency response *and* a smooth power response, and this remains true with two-way and most three-way forward-facing one-driver-per-range systems that aspire to cover the complete audio frequency band.

Both of these kinds of speakers will have a honky sound *depending on where you are located* in their dispersion or coverage pattern. You



At any significant distance from a pair of conventional forward-facing speakers, you can't have great imaging without honkiness, and you can't have spacious sound without loss of imaging.

can check this for yourself by moving your head in front of and to the sides of a woofer when it's playing pink noise or FM hiss, and then do the same with the tweeter. In my experience, a speaker with a smooth axial response will image better and one with a smooth total power output may sound more realistic, the music sounding as if it is being played in a real space somewhere.

"Moran's law," then, is that at any significant distance from a pair of conventional forward-facing loudspeaker systems you cannot have great, tight imaging without some kind of honkiness somewhere, and you can't have spacious, airy sound without some loss of pinpoint imaging. This law works fairly independently from the room's sonic contributions, although it does not apply (cannot apply) if the speaker is taken outdoors.

This problem is the unavoidable consequence of physical law. With dynamic drivers, it's simply the way pistons work, and baffles—the cabinet panels that drivers are mounted on—*increase the problem*. All two-way systems (unless the woofer is small and not really a woofer) ex-

hibit some honkiness and begin to beam as the woofer strains to meet the tweeter at the crossover point.

Shrewd speaker design can help ease some of these problems, as can your own speaker positioning. Placing a woofer sideways, for example, to insure that you're always listening off-axis to the upper ranges of its output, works—but at the expense of "worsened" imaging because of greater and less regular amounts of reflected sound.

Another solution is a lower crossover point to the tweeter, but this creates its own problem of overly stressing a small, wide-dispersion tweeter by making it go down too low. You would need a larger tweeter, which will begin to beam (and sound pinched) as it has to reproduce higher and higher sounds. It's clear that two-way speaker design is a series of inescapable compromises and tradeoffs.

Two-Way Compromises

Depending on your sensitivity to this broad category of sonic problems—if two-way speakers and not real instruments heard in real spaces have been the main source of your sonic education, you may have a high tolerance for mild honkiness, as a lot of audiophiles seem to—a basic 8-inch woofer begins to sound unpleasant around 1,000 Hz and up, a 1-inch dome tweeter around 8,000 Hz and up. But this is a standard driver complement for a two-way speaker, with 1,500 to 2,000 Hz (or even higher, like 2,500 to 3,000 Hz) a common crossover point. Obviously, drivers with these diameters are taxed when they are asked to reproduce some very short-wavelength sounds. You understand the problem.

Similarly, beware the two-way speaker that has a 10-inch woofer (or larger) that is asked to handle 800 Hz or higher or that has a 1½-inch or 2- to 2½-inch tweeter. You're going to want to sit well off-axis or awfully close to such a speaker. Magazine test-report response curves won't tip you off to these problems unless you look very carefully at the crossover region, since they never show the total coverage, or the reviewer will write only that the tweeter "has good dispersion for its size." Such partial measurements may actually look quite good and can sway you, if the system is smooth on-axis.

As psychoacoustician Dr. Mark

Davis has written, what we're really hearing when we listen to a speaker in an enclosed space *is* its radiation pattern, no more, no less—that is, its total frequency responses, its aggregate output, at all angles. Variations in radiation patterns are demonstrably what account for the basic audible differences among similar-appearing speakers. It is not driver materials or propagation methods or crossover type or cabinet bracing and construction or laser-analyzed piston behavior, except to the extent that these factors affect radiation pattern.

The Pioneering Dr. Bose

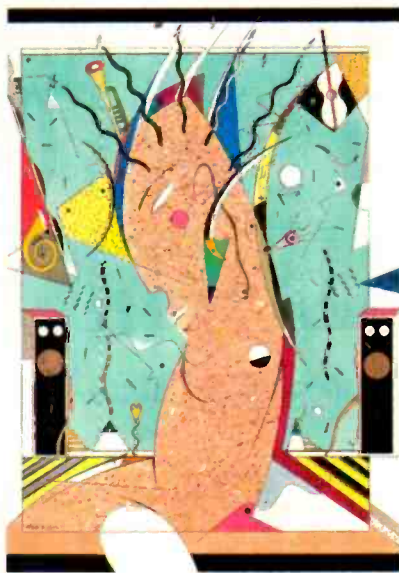
The absence of honk and on-axis/off-axis discrepancies tend to entail diffuse localization. The Bose 901 is in some sense the father of such sound. It was the first speaker that for the most part *could not honk*, and it produced its famously spacious string (and other) sound without precision of imaging. In fact, it was born more than a decade before the word "imaging" was widely used in the speaker world. Its nine "large" drivers (large for everything above, say, 3,000 Hz) get beamy in the upper treble range and tend to produce inconsistent dispersion patterns (uneven coverage), while below approximately 1,000 Hz even the eight rear-firing drivers put out *direct* sound mixed in with the reflected sound.

What's required to have no honk and proper imaging is coverage that's the *same* for all frequencies and angles—a consistent radiation pattern, unchanging with listener position or by frequency. It is not in the nature of drivers to do this on their own, although they can be made to do so in properly designed phased arrays or, theoretically, with horns and sonic lenses.

The question then becomes: What kinds of radiation pattern sound good, in what kinds of rooms, with what kinds of music, and with what microphone techniques and pickup patterns? Don't worry. Some of these issues are being slowly addressed, notably by Canadian researchers in the professional journals, with elaborate mathematics and a little rediscovery of the wheel.

Some of the Cream

A few of the very expensive new speakers are far along as it is, doing many, many things well. For some



An easy way to tighten up imaging is visually, for the eye cues the ear. A plant or a piece of sculpture between your speakers may work wonders, and so will a TV set, even if it's not on!

time I've been listening carefully to the same string pieces from a Telarc CD with Leonard Slatkin conducting the St. Louis Symphony. In particular, the Vaughan Williams *Tallis Fantasia* is a generally beautiful and, for my purposes, a specifically useful recording. Recent auditioning has been with three costly, very smooth, very wide-range speaker systems: the Snell A/III (rear super-tweeter on), the dbx Soundfield 1A, and prototypes of the new Allison Image Control 20.

The first two I compared at length; they sound extremely similar, which is not surprising. In fact, on sustained massed strings they're identical except in the higher registers, where to my ears the dbx 1A's sound airier and larger in image (their balanced-stereo area is huge, but for the sake of fairness I was not assessing this characteristic except through its indirect consequences). The Snell is more precise in image but occasionally sounds pinched.

As you move closer these differences decrease; as you move farther back they increase. The new Allisons, which I heard by themselves (and whose radiation patterns have

been somewhat redesigned since), produced a sound somewhere in between the 1A's and the A/III's in these characteristics but were otherwise strikingly similar and, of course, sounded very, very good by any criterion.

With enough time and room space, and some experiment controls—and moving beyond East Coast speaker companies—it would be most intriguing to continue this "airy string sound vs. imaging" experiment. Just for starters, I would like to try the top Polk, AR, Ohm, Infinity, VMPS, Duntech, and Wilson systems and then see how it went with good-quality beamier speakers (like some English ones) that are filled out either by separate, delayed side channels or by the slightly delayed front reflections that always accompany full-range, bidirectional electrostatic (Acoustat, Quad), ribbon (Apogee, Carver), and other panel designs (Magnepan, Dahlquist).

Obviously my taste tends to give up some pinpoint imaging in exchange for realistic spaciousness, although the *au courant* audiophile leans more in the opposite direction. If I have persuaded you to try for more sonic air in your stereo system but you're worried about what you might lose, here's a final tip. An easy way to tighten up imaging is *visually*, for the eye cues the ear neatly. A plant or a piece of sculpture between speakers may work wonders, and so will a TV set, even if it's off or not tuned to what you're listening to! As the great former Boston Symphony Orchestra concertmaster (now Utah Symphony conductor) Joseph Silverstein once noted, "Of course you have great 'imaging' during a concerto; you can see the pianist!"

Silverstein did not need to add that precise imaging is a vastly overrated goal when realism remains the criterion for sound reproduction. Indeed, if you're off in the balcony and shut your eyes, like a disappointed audiophile testing Symphony Hall in Boston, you can't say with specificity where *anything* is coming from—except for pointing toward the stage. □

David Moran, communications manager for dbx, is also president of the Boston Audio Society and a sometime music critic. Parts of this article are taken from a work in progress about the New England loudspeaker industry.

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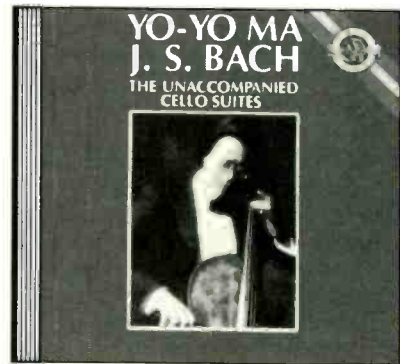
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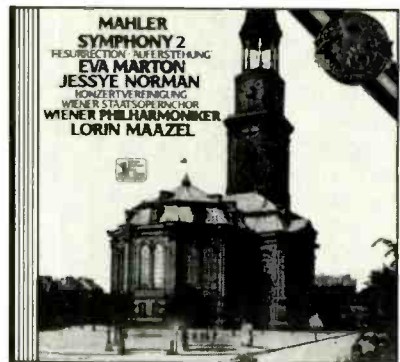
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CIRCLE NO. 5 ON READER SERVICE CARD

BEST RECORDINGS OF THE MONTH

Stereo Review's critics choose the outstanding current releases

PETER WOLF: ROCK CLASSICS TO ROCKABILLY

PSST . . . Yo, my man! Wanna hear a mainstream rock album that doesn't insult your intelligence? Check out Peter Wolf's "Come As You Are."

No kidding. The second solo effort from the former lead singer of the J. Geils Band is a little more conservative than his 1983 "Lights Out," which leaned slightly to the funk side of the dial, but it's just as savvy, danceable, and well crafted. Inhabiting a stylistic universe bounded by Stonesish swagger, early-Seventies production tricks, high-tech Latino dance moves, and occasional detours into the unclassifiable, the album is that genuine rarity these days—a patently commercial effort that refuses to condescend to its audience.

Peter Wolf: well-crafted mainstream rock



EMI AMERICA RECORDS

As you might expect from Wolf, there are a couple of instant party classics in the set. The title song, for instance, is an immediately addictive dance-rocker in the great tradition of such three-chord classics as Lou Reed's *Sweet Jane* or Ritchie Valens's *C'Mon Let's Go*, and *2 Lane* is a glorious bit of Eighties rockabilly that brings the word play and sentiment of an anthem like Chuck Berry's *Let It Rock* into the modern age without apology. But nearly every song has something to recommend it, from the delightful Glam Era saxophones that punctuate *Can't Get Started* to the delicacy and poignancy Wolf brings to his vocal on the lovely uptempo love song *Blue Avenue*.

In short, "Come As You Are" is an album as friendly and likable as its title suggests, and unless you're the kind of sourpuss for whom any music brought to you by a major entertainment conglomerate is automatically suspect, you should hear it without delay. Like I said: check it out! *Steve Simels*

PETER WOLF: *Come As You Are*. Peter Wolf (vocals); Jeff Golub, Skip McDonald (guitars); Jim Gregory



Aldo Ciccolini: back to Satie

(bass); Tommy Mandel (keyboards); Bobby Chouinard (drums); other musicians. *Can't Get Started; Love on Ice; Thick As Thieves; Blue Avenue; Wind Me Up; Come As You Are; Flame of Love; Mamma Said; Magic Moon; 2 Lane; Run Silent Run Deep.* EMI AMERICA ● ST-17230 \$8.98, © 4XT-17230 \$8.98, © CDP-46573 no list price.

CICCOLINI'S BASIC SATIE ON COMPACT DISC

ONE of the most celebrated "integral" cycles on records was Aldo Ciccolini's unique survey of the music of Erik Satie on Angel. What made it unique was that every time one might have thought Ciccolini was through with it he found more to do, and as conductor as well as pianist. His project covered six LP's of piano music, including the four-hand pieces, in which he played both parts by overdubbing, and a seventh in which he conducted the mini opera *Le Piège de Medusa* and the orchestral piece *Les Pantins dansent*. Other pianists have recorded Satie's music, to be sure, but Ciccolini was especially successful, and his seven discs, which may

JEAN D'HUGUES/EMI-PATHE MARCONI

BEST RECORDINGS OF THE MONTH

have had more impact appearing one at a time than they would have had released as a set, probably did more than any other single factor to stimulate the big swell of interest in this composer's work that developed in the Sixties.

Five of the Ciccolini solo records are still listed, and it always seemed that Angel would ultimately get around to making some of this material available on CD. Well, Angel has done better than that, producing a newly recorded CD in which Ciccolini offers some seventy-one minutes' worth of some of the best and most "basic" of Satie's keyboard works—including the *Gymnopédies*, *Gnossiennes*, and *Trois morceaux en forme de poire*—played with all the authority and communicativeness that distinguished his earlier series and enhanced by crystalline digital reproduction that enables the listener to forget all about electronic middlemen and just relish the music. This time he does not undertake the four-hand pieces alone but shares the keyboard with Gabriel Tacchino, who is as fine a partner as you'd expect him to be from his own survey of the music of Poulenc. Felix Aprahamian's annotation adds appreciably to the pleasure of this valuable and immensely enjoyable release. *Richard Freed*

SATIE: *Trois gymnopédies; Six gnossiennes; Croquis et agaceries d'un gros bonhomme en bois; Embryons desséchés; Sonatine bureaucratique; Avant dernières pensées; Veritables préludes flasques (pour un chien); Cinq nocturnes.* Aldo Ciccolini (piano). *Trois morceaux en forme de poire; La belle excentrique.* Aldo Ciccolini, Gabriel Tacchino (piano duet). EMI/ANGEL © CDC-47474 no list price.

U2'S TOUGH, COMPELLING "JOSHUA TREE"

SOME bands demand a lot from their listeners. They ask you to forget about fun and comfort and reflect on suffering and struggle. They ask you to be political. They ask that you take them seriously—more seriously,

certainly, than we are accustomed to taking rock music. U2 is pre-eminently that kind of a band. They make music so passionate that they run the risk of appearing pompous and self-important. Bono's wrenching vocal performances and the group's dark, foreboding songscapes make U2 probably the easiest band to parody in rock today. Yet they never hide behind feel-good dance rhythms or hip, detached lyrics. They do not compromise.

U2's new album, "The Joshua Tree," consolidates the band's

not only contributes the kind of searing, dramatic emphasis he did on songs like *Sunday, Bloody Sunday*, from the 1983 album "War," but he now has as many as three or more parts in each song—often a high harmonic top, a midrange, fuzz-toned melody line, and a jangling or percussive riff, all of which create new harmonic and contrapuntal possibilities for U2.

It's impossible to single out just two or three "best" songs, an indication of just how good this album is. The first track, *Where the Streets*



U2: Larry Mullen, Adam Clayton, the Edge, and Bono

evolving musical vision, pushing their unique sound to new limits while reiterating many of the themes explored in their previous work—the human spirit ravaged by unfulfilled relationships and a social fabric rent by class war, economic exploitation, and spiritual uncertainty. The world of "The Joshua Tree" is brutal and chaotic. Images of fire and flood, wind and rain, dust and blood run through virtually every song.

"The Joshua Tree" is U2's most mature and compelling album to date. Although the music remains essentially "minimalist"—deliberate, uncomplicated melodies played against a chafing, restless backbeat—there are stronger song structures and more intricate arrangements. The Edge's guitar, for instance, is more crucial than ever. He

Have No Name, establishes the tone of "The Joshua Tree" from the opening bars: low strings and organ, suggesting a church processional, yield to the Edge's Pete Townsend-style windmill chording. It's vintage U2—furious rhythm poised against a melody that moves with the slow grace of Gregorian chant. *I Still Haven't Found What I'm Looking For* moves in march time, its rich, anthemic vocal harmonies belying the song's anxious message.

With or Without You is the kind of song U2 probably couldn't have done before Dan Lanois and Brian Eno became their producers; its gradual accumulation of instrumental detail and vocal intensity builds to a screaming climax. In *Bullet the Blue Sky*, a surrealistic dream in which the hum of fighter planes and a red-faced businessman peeling off

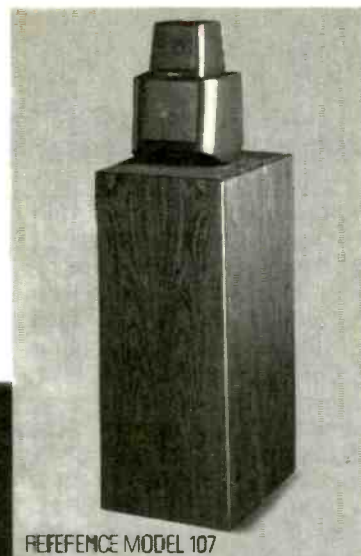
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hundred-dollar bills dissolve into images of mud huts and back alleys, the Edge combines the heavy metallic blues of Jimmy Page with twisted, outer-space chords, then segues into the acoustic blues guitar of *Running to Stand Still*, a grim evocation of heroin addiction.

A brilliant summation of U2's art, "The Joshua Tree" reminds us of what rock can accomplish when it aspires to be more than just entertainment. *Mark Peel*

U2: *The Joshua Tree*. Bono (vocals, guitar); the Edge (guitars, keyboards, vocals); Adam Clayton (bass); Larry Mullen, Jr. (drums); vocal and instrumental accompaniment. *Where the Streets Have No Name; I Still Haven't Found What I'm Looking For; With or Without You; Bullet the Blue Sky; Running to Stand Still; Red Hill Mining Town; In God's Country; Trip Through Your Wires; One Tree Hill; Exit; Mothers of the Disappeared.* ISLAND 90581-1 \$8.98, © 90581-4 \$8.98, © 90581-2 no list price.

BRAHMS FIRST FROM SERKIN AND SHAW

TWO of the finest recordings of Brahms's youthful blockbuster, the First Piano Concerto, have been made by Rudolf Serkin, and now his son Peter, who turns forty in July, has added to the distinguished family discography with a mettlesome per-

formance of the same work on a Pro Arte CD with the Atlanta Symphony under Robert Shaw. The younger Serkin speaks eloquently for himself in the solo part, and in Shaw he has a conductor who is wholly in tune with both the rugged and the tender aspects of the concerto. The heaven-storming first movement and the fiery third come across with all the drama and brilliance anyone could want. The slow movement, however, is the true centerpiece of their collaboration. A kind of requiem for Robert Schumann, it is conveyed with infinite heart.

Two aspects of this recording gave me particular satisfaction: the performers' care to keep the first movement flowing without any loss of dramatic impact, and the care taken by the producers, Tom Frost and Peter Serkin himself, to provide an airy yet warm sonic ambience. The overly plush sound that has marred some past recordings made in Atlanta's Symphony Hall is not present here, yet there is no lack of tonal richness—for instance, in the sound of the strings early in the first movement.

Anyone who favors the heavy, German Romantic treatment of the Brahms D Minor may find the Serkin-Shaw version a little bit lightweight, but for me it's just right.

David Hall

BRAHMS: *Piano Concerto No. 1, in D Minor, Op. 15.* Peter Serkin (piano); Atlanta Symphony Orchestra, Robert Shaw cond. PRO ARTE © CDD 266 no list price.

Peter Serkin: a tonally rich, mettlesome Brahms First



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- **DENIECE WILLIAMS: *So Glad I Know*.** SPARROW SPD 1121. "Heavenly" (November 1986).

CLASSICAL

- **BRAHMS: *Piano Concerto No. 1.*** R. Serkin, Szell. R. STRAUSS: *Burleske.* R. Serkin, Ormandy. "Solid" (February 1969).
- **MONTSERRAT CABALLÉ: *Bel Canto Arias*.** RCA 5757-2 (60+ series). Includes the Bellini-Donizetti program that was her first recording for RCA (Best of Month, January 1966).
- **HOLST: *The Planets*.** Ozawa. PHILIPS 416 456-2. "Sonic showcase" (January 1982).
- **R. STRAUSS: *Horn Concertos Nos. 1-2.*** Brain, Sawallisch. **HINDEMITH: *Horn Concerto*.** Brain, Hindemith. ANGEL CDC-47834. Cornerstones of the catalog dating from the Fifties.
- **STRAVINSKY: *Song of the Nightingale; The Fairy's Kiss.*** **HOVHANESS: *Symphony No. 2*** ("*Mysterious Mountain*"). Reiner. RCA 5733-2. One of the latest in the treasureable Reiner/Chicago Symphony series, recorded 1956-1958.
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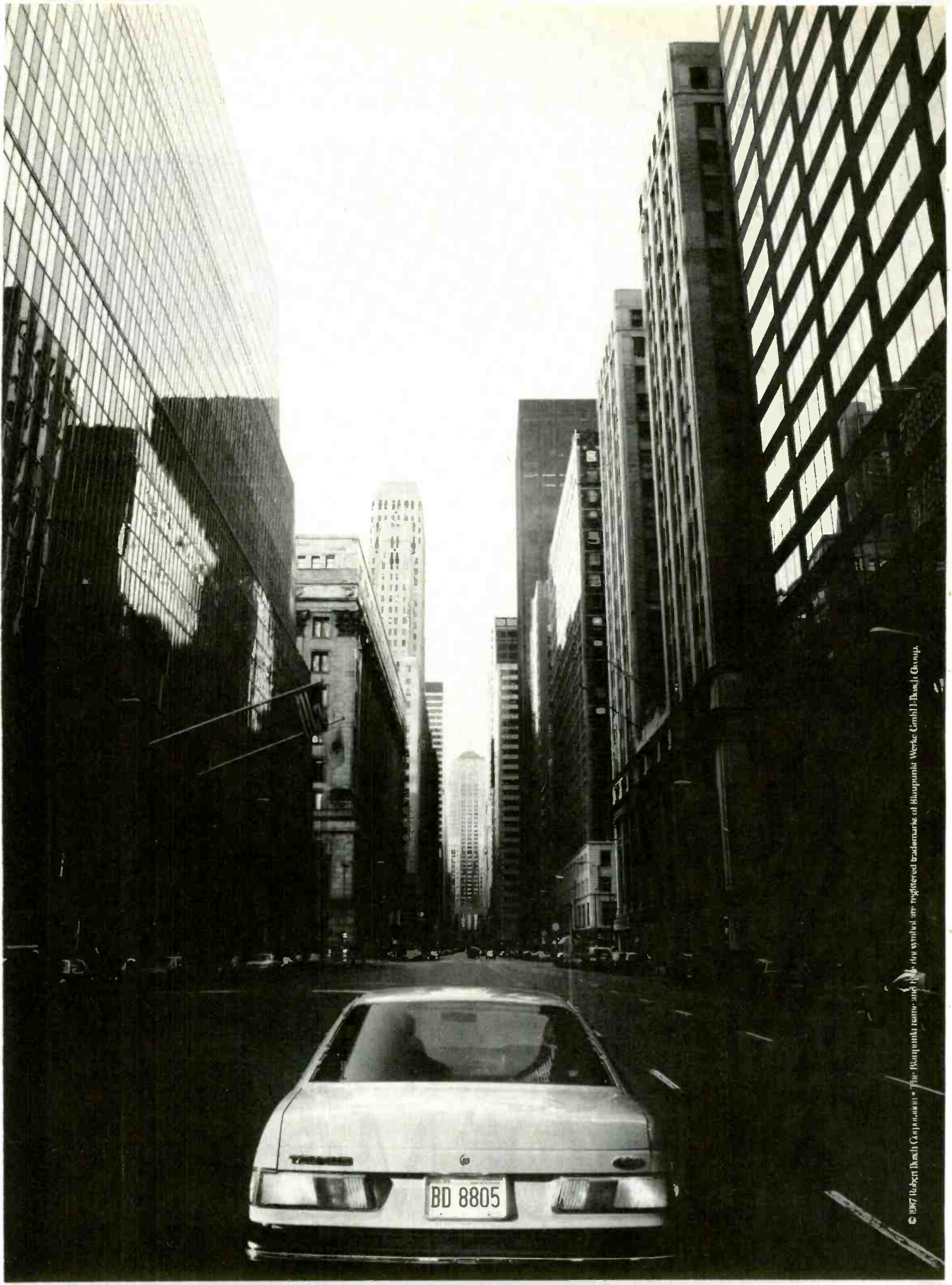
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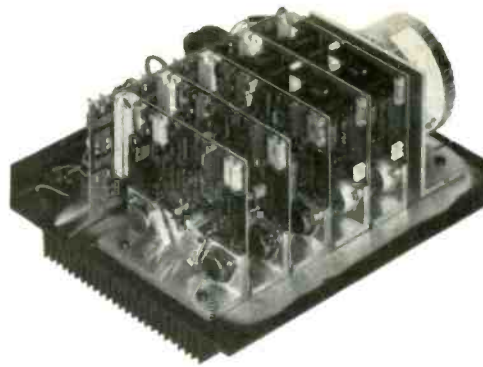
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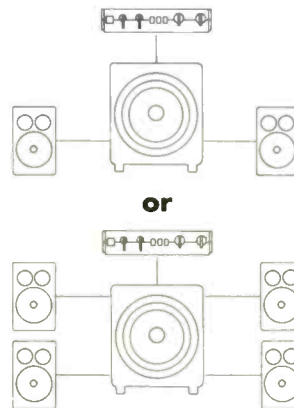


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variety of satellites. For example, Canton's affordable and very compact Plus S or the high-performance Karat 100. If desired, the Plus Beta can accommodate two pairs of satellites. By way of driving the Plus Beta, virtually any preamp or receiver will do, whether a high-end unit such as the Canton EC-P1 or a more modest design.

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Discs and tapes reviewed by Robert Ackart, Richard Freed, David Hall, Stoddard Lincoln

BACH: *Overture in B Minor (BWV 831); Prelude, Fugue, and Allegro in E-flat Major (BWV 998); Four Duets (BWV 805).* Huguette Dreyfus (harpsichord). DENON © 33CO-1153 no list price.

Performance: *Bold*
Recording: *Fine*

Huguette Dreyfus is a bold harpsichordist with a very strong profile. Her playing is solid and straightforward, implying strength right from the rock-like dotted rhythms that open the French Overture. And though she fully projects the driving rhythms of the ensuing dances and brings clarity to the linear work of the Four Duets, her lyric side is beautifully evident in the Prelude of BWV 998. Dreyfus is no newcomer, but, Alsatian by birth, she has worked mostly in France. Now, thanks to the enterprise of Denon, she may become known in other countries as well. *S.L.*

BARTÓK: *Contrasts for Clarinet, Violin, and Piano* (see MESSIAEN)

BEETHOVEN: *Triple Concerto in C Major, Op. 56. Romances for Violin and Orchestra: No. 1, in G Major, Op. 40; No. 2, in F Major, Op. 50.* Christian Zacharias (piano); Ulf Hoelscher (violin); Heinrich Schiff (cello); Gewandhaus Orchestra, Leipzig, Kurt Masur cond. ANGEL ● DS-38389 \$11.98; © 4DS-38389 \$11.98, © CDC-47427 no list price.

Performance: *Elegantly poised*
Recording: *Very good*

I always have been partial to performances of the Beethoven Triple Concerto in which the solo group is a recognized chamber ensemble rather than a trio of individual superstars. For that reason, the 1964 Marlboro Festival recording on CBS by Rudolf Serkin, Jamie Laredo, and Leslie Parnas, with Alexander Schneider conducting, has been a special favorite. But as a lovely pendant to his Beethoven symphony cycle for EMI, Kurt Masur and soloists Christian Zacharias, Ulf Hoelscher, and Heinrich Schiff have given us a comparably appealing performance that's even more poised and elegant and graced by incomparably better sound. The balances

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Pianist Virginia Eskin

AN AMERICAN ORIGINAL

NO one disputes the importance of John Knowles Paine (1839-1906) in the history of American music, but it is primarily as an educator that his influence is felt now, for, sad to say, his own music is rarely heard. Gunther Schuller's Saint Louis recording of Paine's Mass in D on New World is the only major work listed in the composer's lamentably small current discography. His chamber music, especially, has been an unknown quantity; none of it has been published, and there cannot have been many performances of any of it since his death.

Northeastern Records, operated by Northeastern University in Boston, has taken a much needed corrective action in issuing a compact disc containing three of Paine's chamber works in committed and persuasive performances by violinist Joseph Silverstein, cellist Jules Eskin, and pianist Virginia Eskin—the same team that gave us some music by Paine's pupil Arthur Foote on the same label not too long ago. (Jules Eskin is principal cellist of the Boston Symphony, and Virginia Eskin, his wife, has been active in salvaging little-known American music. Silverstein, the BSO's former concertmaster, is now conductor of the Utah Symphony.)

All three works in this collection were composed in the years 1875-1877, though the earliest of them, a violin sonata, was substantially revised as late as 1905. No one coming to this music without being advised of its origin

would be likely to identify its composer, or even his nationality. To say that it is all more or less Brahmsian is not to suggest that it is in any sense imitative but simply that it reflects Paine's own German training—his fine grasp of form, his refined craftsmanship, and an apparent unconcern with developing a consciously or recognizably national style. After all, as Aaron Copland was to write several decades after Paine's death, American music would define itself simply as music written by Americans.

It is all very well that today we have conscientious individuals and organizations encouraging the composers working in our country in our own time, but it is appalling that we have so lost track of the pioneers of American music and the largely unsuspected heritage they left us. This recording is a stunning example of what ought to be going on on a broader scale, both on records and in our concert halls. The music is valuable in its own right, the performances could hardly be more eloquent, and the recording itself is a model of clarity and balance.

Richard Freed

PAINE: *Sonata for Violin and Piano, Op. 24; Romanza and Humoreske for Cello and Piano, Op. 30; Larghetto and Humoreske for Piano, Violin, and Cello, Op. 32.* Joseph Silverstein (violin); Jules Eskin (cello); Virginia Eskin (piano). NORTHEASTERN © NR 219-CD no list price.

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both among the soloists and with the orchestra are flawless, the musicianship impeccable, with Schiff's cello in the slow movement a major highlight. And Masur's light hand with the polonaise-style finale makes a real pleasure of this movement.

Hoelscher's violin solos in the two romances are models of lyrical grace, effortless in flow and free from the element of sentimentality that is sometimes found in performances of these works. Altogether this album, only recently available on CD, offers a most pleasant listening experience. *D.H.*

BRAHMS: Piano Concerto No. 1, in D Minor, Op. 15 (see Best of the Month, page 104)

BYRD: Pavans and Galliards. Davitt Moroney (harpsichord). HARMONIA MUNDI 1241/42 two LP's \$23.96, © 401241/42 two cassettes \$23.96, © 901241/42 two CD's no list price.

Performance: *Stunning*
 Recording: *Very good*

The greatest legacy of Renaissance keyboard music was left by the English virginalists, whose fantasias, variations, and dances represent the beginnings of modern keyboard writing and remain a challenge to any harpsichordist today. Although the artistic quality of their work is so consistently high that it is difficult to single out any one composer as the most outstanding, a convincing case can be made for William Byrd. Just as Chopin transformed the waltz, the polonaise, and the mazurka from functional dance music into independent artistic forms, so Byrd ennobled the dignified pavan and the sprightly galliard.

In this Harmonia Mundi album, harpsichordist Davitt Moroney has gathered all of Byrd's pavans and galliards into two cycles, nine sets from *My Lady Nevell's Book* and nine from other collections, such as the *Fitzwilliam Virginal Book* and the *Parthenia*. He addresses the music seriously without dimming any of its occasional flashes of flamboyant brilliance. These compositions can at first seem pretty austere, and they require a serious approach, but in the right hands they disclose a world of rhythmic subtlety, haunting pre-modal harmonies, and ordered inspiration. Moroney's are the right hands. His performances are stunning. *S.L.*

CHOPIN: Piano Concerto No. 1, in E Minor, Op. 11; Barcarolle in F-sharp Major, Op. 60; Berceuse in D-flat Major, Op. 57; Fantaisie in F Minor, Op. 49. Murray Perahia (piano); New York Philharmonic, Zubin Mehta cond. CBS © M 35893, © MY 35893, © MK 42400 no list price.

Performance: *Elegant*
 Recording: *Excellent*

I remember being unenthusiastic about this recording of the E Minor Concerto

when it appeared by itself on LP five or six years ago. Since I did not keep that disc, I was unable to make direct comparisons with the beautifully accomplished CD reissue, but I can only wonder now how I could have failed to respond to such elegant music making. Murray Perahia's poetic realization of the solo part is one of those treasurable phenomena that render comparisons pointless and make duplication a delight, and Zubin Mehta provides an especially sensitive accompaniment. The CD transfer makes the 1979 analog recording sound like new, and the digitally recorded solo pieces, performed on the same exalted level, are certainly an enhancement. *R.F.*

DISTLER: Vier Spielstücke (see HINDEMITH)

DONIZETTI: La Fille du régiment. June Anderson (soprano), Marie; Alfredo Kraus (tenor), Tonio; Michel Trempont (baritone), Sulpice; Hélian T'Hézan (mezzo-soprano), La Marquise; Chorus and Orchestra of the Théâtre National de l'Opéra de Paris, Bruno Campanella cond. EMI/PATHÉ MARCONI © 2704873 two LP's \$26.98, © 2704875 two cassettes \$26.98 (from International Book and Record Dists., 40-11 24th St., Long Island City, NY 11101).

Performance: *Ebullient*
 Recording: *Good*

Donizetti's captivating "sugared soufflé," *The Daughter of the Regiment*, was first produced in Paris in 1840, to great popular success. It is difficult to imagine, however, that its first performances had more élan or were more deservedly applauded by their audiences than what is captured in this new live recording made in May 1986. The extended applause, raucous shouts, and foot stamping are annoying, but it's clear that the audience was having a very good time. And for the most part, so will home listeners.

June Anderson, as Marie, has not sung so freshly or beguilingly since her Philips recording of Rossini's *Maometto Secondo*. She captures the role's piquancy and humor and projects them in a finely focused, tastefully phrased performance. I felt she was enjoying herself, too, and why should she not, with Alfredo Kraus as her Tonio? He sings here with all of his customary vocal freedom, clarity, and stylishness. He negotiates the famous high-C aria of Act I with ease: the nine notes in *all* seem less a high-jump hurdle than part of the musical texture of this exuberant and joyous piece. The tenor's Act II aria is even more appealing because of Kraus's projection of Tonio's boyish, idealistic love for Marie. Michel Trempont sings very well as Sulpice and, like his principal colleagues, creates a real character—a great big, gruff, sentimental, lovable bear—which is, indeed, just what Sulpice is. My only reservation

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regarding the cast is with Héliá T'Hézan, whose portrayal of the Marquis is heavy-handed and vocally rather brassy. Bruno Campanella, conducting the chorus and orchestra of the Paris Opéra, paces the comedy crisply.

La Fille du régiment is not "significant" music, but it is totally engaging, and this performance of it provides delightful and fun-filled listening. *R.A.*

ELGAR: *Symphony No. 2, in E-flat Major, Op. 63.* London Philharmonic Orchestra, Bryden Thomson cond.

CHANDOS • ABRD 1162 \$11.98, © CHAN 8452 \$18.

Performance: *Expansive*
Recording: *Excellent*

From its exultant initial allegro to its despairing larghetto and through its convoluted rondo to its serene finale, Elgar's Second Symphony is, as the composer said, truly "the passionate pilgrimage of a soul." The final message, however, is one of hope. What a wonderful respite from the whining of his hopeless Viennese contemporaries!

Elgar's music is filled with broad melodies, dramatic contrasts, and stunning orchestration. Faithful to these qualities, Bryden Thomson evokes the most opulent possible sound from the London Philharmonic and keeps the grand line moving through the music's entire range of emotions. While lingering over some details, his reading overall is expansive, culminating with complete satisfaction in Elgar's final message of peace and optimism. *S.L.*

HANDEL: *Athalia.* Joan Sutherland (soprano), Athalia; Emma Kirkby (soprano), Josabeth; Aled Jones (treble), Joas; James Bowman (countertenor), Joad; Anthony Rolfe Johnson (tenor), Mathan; David Thomas (baritone), Abner; Choir of New College, Oxford; Academy of Ancient Music, Christopher Hogwood cond. L'OISEAU-LYRE • 417 126-1 two LP's \$19.96, © 417 126-4 two cassettes \$19.96, © 417 126-2 two CD's no list price.

Performance: *Excellent*
Recording: *Excellent*

Handel composed his third oratorio, *Athalia*, in gratitude for being offered an honorary degree from Oxford University. Although the work was never a real success in its various revivals, you can hear in it the first signs of the dramatic grandeur that characterizes his later works in this genre. The theme of the oratorio centers on the conflict between the monolithic faith of the ancient Israelites and the pagan beliefs of a tyrannical monarch, Athalia. The story of Athalia's deposition and the restoration of the monarchy to the rightful heir, the child Joas, is unfolded in an amazing variety of arias, dramatic recitatives, and glorious choruses.

In view of conductor Christopher Hogwood's unswerving devotion to authentic performance practice, early instruments, and the kind of Baroque singing personified by Emma Kirkby and James Bowman, it comes as some surprise to find Joan Sutherland heading the cast of this new recording. It's worth recalling, however, that Dame Joan made her first splash singing Handel and that her recordings of *Acis and Galatea* and *Alcina* were instrumental in fueling the Handel revival of recent years. It is thus a great yet well-deserved tribute for Hogwood to feature her in the title role. There is no denying that there is a wobble in her voice and that diction is, as usual, not one of her major preoccupations. Her approach, in fact, could not be more different from Kirkby's, but their stylistic differences only emphasize the contrast in character between Sutherland's shrewish queen, especially in her final rage, and Kirkby's Josabeth, the faithful and devoted guardian of Joas. It is, in fact, this very contrast that makes this performance so exciting.

The work of the other singers in the cast, the Oxford chorus, and the Acade-

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my of Ancient Music is first-rate as well under Hogwood's direction, and the recording itself is exemplary. S.L.

HINDEMITH: *Organ Sonatas Nos. 1-3*. DISTLER: *Vier Spielstücke*. KROPFREITER: *Toccata francese*. Peter Hurford (organ). ARGO © 417 159-2 no list price.

Performance: *Just fine*
Recording: *Very good*

Hindemith's three organ sonatas must be among the most ingratiating works of their kind. The first two were composed in 1937, just before the ballet *Nobilissima visione*. The last came three years later, at the beginning of Hindemith's American period, and its citations of old folk songs suggest a sort of keyboard counterpart to the viola concerto *Der Schwanendreher*. The four tiny pieces by Hugo Distler, almost exactly contemporaneous with the Hindemith sonatas, provide a splendid foil for them. The shortest runs only twenty-one seconds, the longest a bit under four minutes, but all are music of real substance and originality.

Augustinus Kropfreiter, an Austrian born just before the other music on this disc was composed (1936), has held Bruckner's old post as organist at St. Florian for the last two dozen years. His *Toccata francese*, more in the nature of an encore than a companion piece, is a clever bit of fluff, suggesting derivations as diverse as Debussy and sixteenth-century dance music. The Rieger organ in the Ratzeburg Cathedral seems to have been a fine choice for all of this music, and Peter Hurford obviously enjoys both the music and the instrument. Some passages in the sonatas might have been a little crisper (as they have been in earlier recordings), but in all this is an intriguing and handsomely produced package. R.F.

KROPFREITER: *Toccata francese* (see HINDEMITH)

MAHLER: *Lieder eines fahrenden Gesellen; Other Early Songs*. Janet Baker (mezzo-soprano); Geoffrey Parsons (piano). HYPERION A66100 \$11.98, © CDA66100 \$18.

Performance: *Lovely*
Recording: *First-rate*

It is a joy to hear a consummate artist performing with the sensitivity and communication that only experience and thoughtful evaluation can bring to the music and poetry at hand. Such was my immediate reaction to this recording by Dame Janet Baker of Mahler's "songs of youth," including his well-known cycle *Lieder eines fahrenden Gesellen* (*Songs of a Wayfarer*). Each song is beautifully shaped. Dame Janet's diction is impeccable, and the love and involvement that she and pianist Geoffrey Parsons feel for this repertoire are at all times evident. The recording itself

has a clarity that imparts a living presence to their performances. Most warmly recommended. *R.A.*

MESSIAEN: *Quartet for the End of Time*. **BARTÓK:** *Contrasts for Clarinet, Violin, and Piano*. Chamber Music Northwest. DELOS © D/CD 3043 no list price.

Performance: *Good*
Recording: *Close up*

William Doppmann, the pianist of Chamber Music Northwest, makes a very cogent case, in his annotation for this release, for packaging these two works together, noting not only the circumstances of their near-contemporaneous creation and similarity of instrumentation but even actual likenesses in the clarinet parts of the respective opening movements.

Messiaen's eight-movement *Quartet for the End of Time*, composed for the instruments available to him and three fellow inmates of a German prisoner-of-war camp during World War II, is a long work, more subtle than overtly dramatic. This performance—in which Doppmann's associates are clarinetist David Shifrin, violinist Ik-Hwan Bae, and cellist Warren Lash—does not undertake to amplify the "otherworldly" aspects of the score but presents a solid, straightforward account in which the piece stands up well musically and the effects more or less take care of themselves. I liked the sense of momentum throughout the forty-five-minute sequence and might take issue only with the very forward placement of Shifrin's clarinet.

The clarinet is close in the Bartók, too. In fact, the entire trio is recorded very close up in that work, and this sort of focus tends to be especially apparent on CD. Shifrin's earlier recording, with Sergiu Luca and Paul Schoenfield on Nonesuch, is somewhat smoother in this respect, and Luca's playing is especially beautiful, but the trade-off is the greater sense of enlivenment in the new Delos recording, which seems closer to the spirit of the famous original one by Bartók himself and the work's dedicatees, Benny Goodman and Joseph Szigeti (recently remastered on CBS). *R.F.*

POULENC: *Fiançailles pour rire; Trois poèmes de Louise de Vilmorin; Ce doux petit visage; Airs chantés; À sa guitare; La courte paille; Nous voulons une petite soeur; Les Chemins de l'amour; Métamorphoses; C.* Mady Mesplé (soprano); Gabriel Tacchino (piano). *La Dame de Monte-Carlo*. Mady Mesplé (soprano); Monte Carlo Philharmonic Orchestra, Georges Prêtre cond. EMI/ANGEL © CDC-47550 no list price.

Performance: *To the manner born*
Recording: *Very good*

We don't get to hear Mady Mesplé in song recitals often. It's in opera and operetta and those wonderful works in

between that we usually encounter her in recordings, and it's that background, I'm sure, that makes her such a stunningly effective interpreter of these songs and song cycles of Poulenc. This is quite a comprehensive collection, ranging in mood from broadside comedy to poignant naïveté to profound tenderness—and many have that underlay of nostalgia that runs through much of Poulenc's lighter material. Gabriel Tacchino, who has given us so many outstanding recordings of Poulenc's piano music, is of course a full partner.

The curious and virtually unknown morologue for soprano and orchestra, *La Dame de Monte-Carlo*, set to a text by Jean Cocteau, pictures a widow of a certain age whose addiction to the casinos has cost her dearly. Here Mesplé is especially in her element, and it was a nice thought to take her to Monte Carlo itself to record the piece. The recorded sound is just fine, and full texts and translations are included. *R.F.*

SATIE: *Piano Music* (see **Best of the Month**, page 101)

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*Discs and tapes reviewed by
Chris Albertson, Phyl Garland,
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GREGG ALLMAN BAND: *I'm No Angel*. Gregg Allman Band (vocals and instrumentals). *I'm No Angel; Anything Goes; Evidence of Love; Yours for the Asking; Things That Might Have Been;* and five others. EPIC FE 40531, © FET 40531, © EK 40531, no list price.

Performance: *A backward glance*
Recording: *Good*

That Gregg Allman could make this album at all is a pretty remarkable accomplishment, given everything he's put himself through in the last fifteen years. Even more surprising, it's not the self-serving, self-pitying affair that comebacks like this tend to be.

Allman's gritty blues vocals have lost little of their edge. When he sings, in the title track, "Let me show you my tattoo," you know he's not kidding. And no one can pack as much heartache into a song. Still, while there's only one out-and-out loser—an interminable, moribund duet with Don Johnson called *Evidence of Love*—it's tough to escape the conclusion that the Gregg Allman Band is a lot closer to lounge bands like Pablo Cruise and 38 Special than it is to the band you want them to be like. What really brings that home is the nice, clean, safe version of *Don't Want You No More*. Listening to Allman's stirring vocal on *It's Not My Cross to Bear*, it's hard not to think back to what was the greatest live rock band of its time. At the very least, "I'm No Angel" gives us back that voice. *M.P.*

HÜSKER DÜ: *Warehouse: Songs and Stories*. Hüsker Dü (vocals and instrumentals). *Those Important Years; Charity; Chastity; Prudence and Hope; Standing in the Rain; Back from Somewhere; Ice Cold Ice; You're a Soldier; Could You Be the One?; Too Much Spice;* and twelve others. WARNER BROS. 25544-1 two LP's \$11.98. © 25544-4 one cassette \$11.98, © 25544-2 two CD's no list price.

Performance: *Frustrating*
Recording: *Okay*

Hüsker Dü is indisputably a great band, and, taken in small chunks, their new album, a twenty-song meditation on

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Mick Hucknall (center, with hat): extending his range

SIMPLY RED

NO doubt about it, Mick Hucknall is going to be a star. The question is, will the rest of Simply Red make the trip too? The group's debut album, "Picture Book," was one of the pop-music landmarks of 1986, unveiling a major vocal talent in Hucknall and a back-up band capable of creating the kind of swinging rhythm context a soulful voice like Hucknall's can thrive in. In Simply Red's new album, "Men and Women," Hucknall, at least, extends his range as both singer and songwriter.

From the sexy growl of *The Right Thing* to the cracking emotional quiver of *Suffer*, Hucknall is a confident crooner, belter, and interpreter. His writing displays greater complexity, too. In *The Right Thing*, for instance, the explicit sensuality borrows a page from Frankie Goes to Hollywood: the "right thing" turns out to be a healthy bout of love making. On its heels comes *Infidelity*, a punchy, midtempo rhythm-and-blues number in which Hucknall explains why he can't be faithful to one woman even as he's sneaking in the back door at dawn: "I can't help it, that love it makes me strong."

There's quite a lot of variety on "Men and Women"—Hucknall covers songs

by Sly Stone, Bunny Wailer, and Cole Porter—but it comes up well short of its predecessor in the arrangements. Apart from one or two steamy saxophone breaks and some good rhythm guitar, the band slips into virtual anonymity here. Every song in "Picture Book" had something of instrumental interest—a walking bass, a cascading horn chart, a torrid guitar fill. In "Men and Women," the accompaniment is a wall of sound—lively, but a blur. Nothing competes for attention with Hucknall. That may have been the point. But it robs Simply Red of a lot of its impact and makes "Men and Women" less energized and satisfying than it could have been.

Mark Peel

SIMPLY RED: *Men and Women*. Mick Hucknall (vocals); Chris Joyce (drums, percussion); Tony Bowers (bass, percussion); Tim Kelleth (keyboards, trumpet); Fritz McIntyre (keyboards, vocals); Sylvan (guitar); vocal and instrumental accompaniment. *The Right Thing; Infidelity; Suffer; I Won't Feel Bad; Ev'rytime We Say Goodbye; Let Me Have It All; Love Fire; Move on Out; Shine; Maybe Someday.* ELEKTRA 60727-1 \$8.98, © 60727-4 \$8.98, © 60727-2 no list price.

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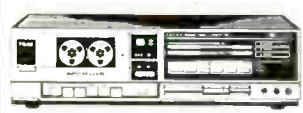
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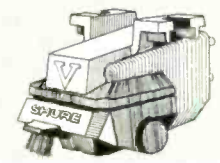


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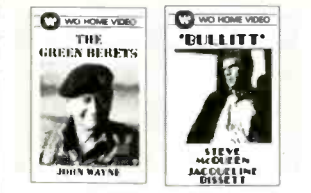
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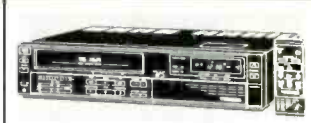
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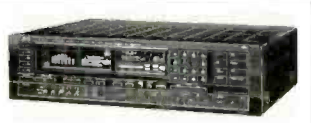
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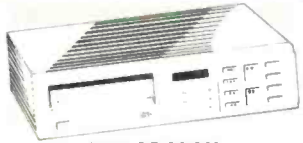
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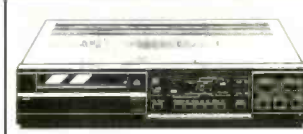
HOME SECURITY



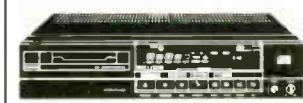
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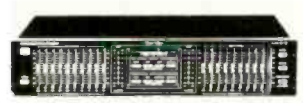
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• 4 different preset playback EQ's • LED display
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love in the Eighties that some critics (not without reason) are calling a post-hard-core "Layla," is a bracing experience. Nonetheless, and I say this more in sorrow than in anger, it is also an extremely frustrating one because of the band's stubborn refusal to take advantage of studio technology. When the band was recording on eight-track for a low-budget independent label, you could ignore the technical inadequacies and zero in on the music. Now, toiling for a major label with something approaching a real production budget, they've still made a defiantly crummy-sounding record. It's inexcusable, even as a deliberate artistic decision. It's a bohemian affectation, and a damned annoying one.

The music in "Warehouse" is by and large terrific, however. I'm not suggesting that anyone ever will (or should) mistake this band for Duran Duran, but if they continue to pretend that they're recording on a mono Wollensak tape machine in 1964, no one's ever going to mistake them for the world-class act they clearly are. S.S.

JEFFERSON AIRPLANE: 2400 Fulton Street. Jefferson Airplane (vocals and instrumentals); other musicians. *It's No Secret; Come Up the Years; My Best Friend; Somebody to Love; Comin' Back to Me; Embryonic Journey; She Has Funny Cars; Plastic Fantastic Lover;* and seventeen others (twenty-seven others on CD). RCA ◉ 5724-1 two discs \$12.98, © 5724-4 two cassettes \$12.98, © 5724-2 two CD's no list price.

Performance: *Mostly great*
Recording: *Belies its age*

Of all the major Sixties bands, Jefferson Airplane is the one whose posthumous reputation has tarnished most. The reason isn't hard to figure out: its two biggest hits, *White Rabbit* and *Somebody to Love*, are so indelibly associated with the whole Day-Glo Peace and Love foolishness of the era that in these more cynical, post-punk times they seem almost quaint, or at least comically dated.

But while that reaction may be understandable, it is also unfair. Underneath the hippie posturing, the Airplane was one of the most aurally overwhelming outfits of its (or any other) day. The band had a stupendous rhythm section, a splendidly unpredictable lead guitarist, and a vocal sound—three lead singers fighting simultaneously to be heard over an apocalyptic din—that bands like X are chasing even now. Fortunately, this new retrospective of Jefferson Airplane's most representative work has been put together well enough that it may occasion an overdue re-evaluation of the band's importance.

From the impassioned folk-rock of the Airplane's first album (*It's No Secret, Come Up the Years*) to the densely ominous psychedelic punk of its most creative period (*She Has Funny Cars,*



Jefferson Airplane: a powerful sound recalled

Plastic Fantastic Lover) to the late rabble-raising, Stonesish political hoo-hah (*Volunteers, We Can Be Together*), nearly all the band's good stuff is here. The two CD's even offer ten bonus tracks, and all three formats offer charming stylistic detours like Jorma Kaukonen's finger-picked Pete Seeger tribute, *Embryonic Journey*, and the first flowering of Paul Kantner's infatuation with science fiction, *Wooden Ships*. Best of all, RCA has done a splendid remastering job. These songs were well engineered for the period, but they have never before sounded so powerful. All told, an exemplary job for a band that deserves no less. S.S.

THE JUDDS: Heart Land. The Judds (vocals); vocal and instrumental accompaniment. *Don't Be Cruel; Turn It Loose; Old Pictures; Cow Cow Boogie; The Sweetest Gift;* and four others. CURB/RCA 5916-1 \$8.98, © 5916-4 \$8.98, © 5916-2 no list price.

Performance: *Adventurous*
Recording: *Very good*

Aside from George Strait, the Judds are probably the biggest stars in country music these days, and, so far, both fans and critics have treated them to a honeymoon of a career. Now, however, comes the all-important fourth album, where a performer reveals whether he's the real thing or a clever show-biz contrivance.

The Judds are certainly solid talents, scoring high marks for musical integrity as well as for choice and delivery of material, even if half their charm lies in their acoustic-based, country/jazz arrangements and their seemingly nonformulaic formula. In "Heart Land," however, they have started to veer toward dangerous waters, ripples of which appeared in their last album, "Rockin' with the Rhythm."

Part of the problem is a seeming arrogance that makes them think they can tackle anything. Here, for example, we have a remake of Elvis Presley's *Don't Be Cruel* and the jazzy Big Band swinger *Cow Cow Boogie*. It's easy to see how they came to record these tracks. Naomi Judd is one of the world's staunchest Presley fans (her boy friend even used to sing back-up for him), and in *Cow Cow Boogie* the mother-daughter duo gets to display a symbiotic vocal blend that recalls the sisters groups of old. But *Don't Be Cruel* is a song best left untried by anyone but the King, and this version of *Cow Cow Boogie* comes across as ersatz—little more than Redheads on a Lark.

On the other hand, there is some marvelous stuff in this set: the sentimental *Old Pictures*, the infectious, if restrained, *Turn It Loose*, and a gorgeous treatment of *The Sweetest Gift* with Emmylou Harris joining in. Even here, though, there is annoyance. Emotionally, the Judds can't touch the version of *The Sweetest Gift* Harris recorded with Linda Ronstadt a dozen years ago. And, in *Old Pictures*, Wynonna consistently pronounces "pictures" as "pitchers."

It is, in fact, Wynonna's enunciation that strikes the deepest blow at the duo's integrity factor. Spurred on, perhaps, by the example of pouty black jazz singers—or maybe just in imitation of Ricky Lee Jones—Wynonna fluffs off key words as if she had half her mouth packed with cotton and the other half with molasses, hiccupping as many syllables into the words "baby" and "true" as the law allows.

As usual, this album contains some of the surest vocal and instrumental work that anyone, anywhere, is laying down. But when the hipness quotient threatens to outweigh the honesty of the music, you know there's trouble in the "Heart Land." A.N.

THE BEATLES ON COMPACT DISC



Ringo Starr

IN a better world, the release of the first four Beatles albums on compact disc would occasion a sober, reasoned re-examination of the music they contain. Is this stuff something approaching art, a legacy as timeless and important as that of, say, Duke Ellington or Charlie Parker? Is the baby-boom generation's continued obsession with it a reflection of the music's intrinsic quality? Or is it merely a kind of kitsch/camp enthusiasm similar to an earlier generation's infatuation with Busby Berkeley musicals?

These are questions worth pondering, but here in the real world we are forced to take up more mundane considerations, such as: Is the appearance of these albums in mono grounds for a consumer class-action suit against EMI? A lot of people, and not just the lunatic fringe of Beatlemania, are miffed at EMI for what they're offering here. How it happened is open to dispute. Depending on which press report you read, either the Beatles' original producer, George Mar-



Paul McCartney

tin, wanted all four CD's to be released in mono, or he wanted "A Hard Day's Night" and "Beatles for Sale" in stereo but was brought into the project too late to do anything about it.

My own theory—which, admittedly, I cannot prove—is that EMI is going for the "New Coke" strategy. That is, knowing full well the hue and cry that mono reissues would provoke, they have already decided to rerelease the CD's in stereo a few months down the line—after everybody has already bought the mono discs. This particular scenario, of course, has the virtues of both rampant paranoia, something baby boomers are intimately acquainted with, and marketing genius, which younger yuppies can easily relate to as well.

Forgetting all that, how do the damn things sound? Well, to put it mildly, wonderful. Tape hiss is all but inaudible. The bass and drums have enormous punch. The guitars ring out with a clarity they've never had before. And the vocals are gorgeous. Mono or no, the sound is rich, deep, and right in your face. "Please Please Me" and "With the Beatles" have never sounded so good, and some of the rockers, *Money* in particular, have a raw power on CD that, to my ears, they never had before.

But—there's always a but—the fact is that while "Please Please Me" and "With the Beatles" were recorded on two tracks under relatively primitive conditions, "A Hard Day's Night" and "Beatles for Sale" were recorded on *four* tracks. I am willing to accept the first two albums in mono, since Martin was obviously thinking of AM radio when he did them, but the two later albums exist in true-stereo mixes on LP that are really quite lovely. It is my fervent hope that someday they will be available in stereo CD versions.

Of course, if my previously aired suspicions are correct, that will happen fairly soon anyway. Then maybe we can move on to a discussion of what this music means, rather than how well it's been adapted to a new technology.

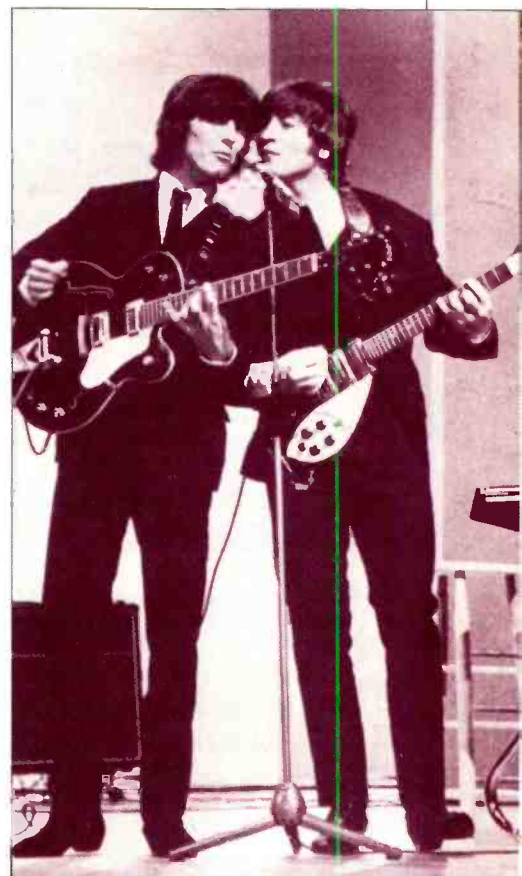
Steve Simels

THE BEATLES: *Please Please Me*. The Beatles (vocals and instrumentals). *I Saw Her Standing There; Misery; Anna (Go to Him); Chains; Boys; Ask Me Why; Please Please Me; Love Me Do; P.S. I Love You; Baby It's You; Do You Want to Know a Secret; A Taste of Honey; There's a Place; Twist and Shout.* PARLOPHONE/CAPITOL © CDP-46435 no list price.

THE BEATLES: *With the Beatles*. The Beatles (vocals and instrumentals). *It Won't Be Long; All I've Got to Do; All*

My Loving; Don't Bother Me; Little Child; Till There Was You; Please Mister Postman; Roll Over Beethoven; Hold Me Tight; You Really Got a Hold on Me; I Wanna Be Your Man; Devil in Her Heart; Not a Second Time; Money. PARLOPHONE/CAPITOL © CDP-46436 no list price.

THE BEATLES: *A Hard Day's Night*. The Beatles (vocals and instrumentals). *A Hard Day's Night; I Should Have Known Better; If I Fell; I'm Happy Just to Dance with You; And I Love Her; Tell Me Why; Can't Buy Me Love; Any Time at All; I'll Cry Instead; Things We Said Today; When I Get Home; You Can't*



George Harrison and John Lennon

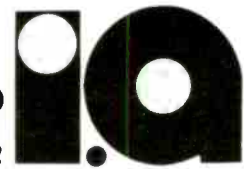
Do That; I'll Be Back. PARLOPHONE/CAPITOL © CDP-46437 no list price.

THE BEATLES: *Beatles for Sale*. The Beatles (vocals and instrumentals). *No Reply; I'm a Loser; Baby's in Black; Rock and Roll Music; I'll Follow the Sun; Mr. Moonlight; Kansas City/Hey, Hey, Hey, Hey; Eight Days a Week; Words of Love; Honey Don't; Every Little Thing; I Don't Want to Spoil the Party; What You're Doing; Everybody's Trying to Be My Baby.* PARLOPHONE/CAPITOL © CDP-46438 no list price.

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SIOUXSIE AND THE BANSHEES: *Through the Looking Glass*. Siouxsie (vocals); Steven Severin (bass); Budgie (drums, percussion); John Carruthers (guitar); instrumental accompaniment. *This Town Ain't Big Enough for the Both of Us*; *Hall of Mirrors*; *This Wheel's on Fire*; *Strange Fruit*; and six others. GEFEN GHS 24134 \$8.98, © M5G 24134 \$8.98, © 2-24134 no list price.

Performance: *Run for cover*
Recording: *Very good*

Siouxsie and the Banshees is one of those odd groups on the lunatic fringe of music whose main purpose seems to be to make us re-evaluate everything we take for granted about rock—and decide the status quo is probably right after all. “Through the Looking Glass” is unusual even for this band: it’s made up entirely of covers. Like David Bowie’s “Pin Ups,” “Through the Looking Glass” reprises songs that have interested or influenced Siouxsie and her pale, powdered colleagues, and, as you’d expect, it’s not Motown or surf music they’re interested in. In fact, Siouxsie’s influences are pretty much what you’d expect—John Cale, Iggy Pop, Jim Morrison, Bryan Ferry, Bob Dylan. The only guys missing are David Bowie and Lou Reed, the only real left-fielder Walt Disney (actually, the snake from *The Jungle Book*).

Unfortunately, the results aren’t as intriguing as one might hope for. The band seems to have given a lot more thought to how to open each song than to how to play the rest of it, so while a track may begin with an eerie violin or distorted psychedelic guitar, it always slips eventually into discordant drone music. Exception: the warped violins, playing a haunted-house gigue, that wooze along through Dylan’s *This Wheel’s on Fire*. M.P.

U2: *The Joshua Tree* (see Best of the Month, page 102)

BILLY VERA: *By Request—The Best of Billy & the Beaters*. Billy Vera (vocals, guitar); instrumental accompaniment. *At This Moment*; *Corner of the Night*; *Hopeless Romantic*; *Peanut Butter*; and five others. RHINO RNLP 70858 \$8.98, © RNC 70858 \$8.98, © RNC 70858 no list price.

Performance: *Super*
Recording: *Excellent*

Earlier this year, Billy Vera had a No. 1 hit single with *At This Moment*, released on a label that had never before issued a single. The recording was five years old, and it was Vera’s first major chart success in two decades.

A toiler in the vineyards since the later 1950’s, when he placed a song with Ricky Nelson, Vera’s other major writing credits are *Make Me Belong to You* (Barbara Lewis) and *I Really Got the Feeling* (Dolly Parton). As a singer and



Siouxsie and the Banshees: on the lunatic fringe

bandleader he has always been respected by his peers, but his recordings have been sporadic, especially during the 1970’s, when his gritty vocals and earthy lyrics were ignored in a period dominated by, in his words, “wimpy singer-songwriters whose names I won’t mention because I’m too much of a gentleman.”

In 1985 *At This Moment*, a song from a live album Vera made for the old Alfa label in the early Eighties, was used on the TV sitcom *Family Ties*, and the network switchboards lit up. But there was no recording available, so Vera went to Rhino and convinced it to issue this compilation. By the time the album appeared, though, the publicity value of the TV use had passed. But last year the song was used again, in a new episode, and both single and album zoomed.

Nearly all of “By Request” is taken from the Alfa album. The programming, probably done in a hurry, is simplistic—all the hot numbers are on side one, and all the mushy stuff is on side two. Among his many talents, Vera is a working actor who knows how to make an audience feel an emotion without plunging into bathos, but the second side is a bit overloaded on mood.

Vera is heard to much better advantage on side one. With a triple-A-bond rhythm section, four righteous saxes, and Jeff Baxter’s pedal-steel guitar, the band crashes into each number with wonderful exuberance. Vera’s basic singing style is white rhythm-and-blues—he sounds Southern even though he’s from suburban New York—and his battered romanticism is lightened here by a cosmopolitan and comic approach to matters carnal. This is superior music. Joel Vance

CHERYL WHEELER. Cheryl Wheeler (vocals, guitar); Jonathan Edwards (vocals, bass, percussion, harmonica); vocal and instrumental accompaniment. *Invisible Lady*; *Addicted*; *Lethal Detective*; *Behind the Barn*; *Paradise in Troubled Waters*; *Your Radio’s Up Too Loud*; *Gimme the Right Sign*; *Same Old Game*; and three others. NORTH STAR W0001 \$8.98.

Performance: *Impressive*
Recording: *Excellent*

Cheryl Wheeler is a New England-based singer-songwriter in the Dan Fogelberg vein. Loosely translated, that means she has a rich, compelling voice, a strong, warm, and somewhat theatrical delivery, and a tendency to be too sensitive for her own good (“save the whales, save the seals . . . and save each other”), which sometimes makes her come off a shade precious. When she has that stuff in check, however, Wheeler proves herself a contender in the folk/soft-rock category, writing affecting ballads—mostly on the downside of life—and sharply drawn vignettes of life’s more offbeat characters: a crazy lady in a pizza joint, a CIA assassin, and a street kid with a ghetto-blasters living up to its name. Some of her songs go on longer than they should, and some of them fail to deliver what they promise. But her melodies are frequently muscular, and there’s an odd quality to her voice that keeps you on your toes. As a bonus, the production, by Wheeler’s fellow troubadour Jonathan Edwards, is an audiophile’s dream. Definitely worth checking out. A.N.

PETER WOLF: *Come As You Are* (see Best of the Month, page 101)

GEFEN RECORDS

JAZZ

GARY BURTON: *Whiz Kids*. Gary Burton (vibraphone); Tommy Smith (saxophone); Makoto Ozone (piano); Steve Swallow (bass); Martin Richards (drums). *The Last Clown; Cool Train; Soulful Bill;* and three others. ECM/POLYGRAM ● 831 110-1 \$9.98. © 831 110-4 \$9.98, © 831 110-2 no list price.

Performance: *Excellent*
Recording: *Excellent*

When Gary Burton first began recording for ECM, the label's output was rarely anything that would set the body in motion or the fingers a-snapping. How times have changed. "Whiz Kids" preserves some of the well-known ECM frostiness, but it is, to say the least, a lilting set. Burton is a man of impeccable musical taste and is known to surround himself with fine musicians. He also has few equals when it comes to playing the vibraphone.

In this album, recorded last summer, his quintet is—with the exception of bassist Steve Swallow—made up of unknown players. Pianist Makoto Ozone is of the Chick Corea school, which makes him fit in rather nicely (his composition *Yellow Fever* might almost have been written by Corea), and although saxophonist Tommy Smith has no tone of his own, his sonorous flights seem tailor-made for the group. Drummer Martin Richards works well with Steve Swallow, and together they contribute to the cohesiveness that is a trademark of Gary Burton's work. *C.A.*

THE CHARLIE WATTS ORCHESTRA: *Live at Fulham Town Hall*. Charlie Watts (percussion); other musicians. *Stomping at the Savoy; Lester Leaps In; Moonglow; Robbins Nest; Scrapple from the Apple; Flying Home.* COLUMBIA FC 40570. © FCT 40570, © CK 40570, no list price.

Performance: *Rousing*
Recording: *Very good*

What a star does with his money can be as instructive as how he made it. Elvis wanted to be a king, so he built Graceland, a giant house trailer posing as a palace. Elton John was keen on showing he was one of the guys, so he bought a soccer franchise. That Charlie Watts bought a jazz band is both surprising—I wouldn't have guessed his fantasies involved music at all—and charming. Unlike most rock-star fantasies, this is one his fans can enjoy too.

Charlie Watts didn't just buy a band, he bought some of Britain's best jazz musicians. Thirty of them. To give you an idea of how big a big band that is: Benny Goodman recorded *Stompin' at the Savoy* with nineteen musicians, and you'd be hard pressed to say where one more piece was needed—but you'll hear where they put them when you cue up

Watts's rendition of *Stompin'*. Just keep all glass objects and household pets out of the line of fire.

"Live at Fulham Town Hall" is a raucous, free-swinging session of swing and bop standards, with a couple of slow numbers for variety and an emphasis on good, tight ensemble playing rather than extensive soloing. If you're a jazz

lover, you'll know every song here. If you're not, you'll still recognize most of the tunes. Either way, you won't be able to keep your feet still. As for Watts, he doesn't take the microphone, and you can't even be sure *what* he's doing since there are two other drummers in the band. But it doesn't matter. He bought a dream we can all share. *M.P.*

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FROM POLYGRAM—THE COMPANY THAT PUT JAZZ CDs ON THE MAP

THE KEYNOTE COLLECTION

WHEN jazz people talk about prolific record producers, certain names inevitably crop up, names like Norman Granz, John Hammond, Bob Thiele, and Creed Taylor. You may have seen these names on countless albums, some of which they actually did produce (few jazz record producers would ever admit that all they did was hold the stopwatch).

One name remains virtually unknown today, however, and that's Harry Lim, founder of the jazz wing of the Keynote label in the early Forties. To correct that situation, PolyGram recently released a box of twenty-one LP's and one 45-rpm single containing recordings produced, for the most part by Lim, between 1941 and 1947.

As the title "The Complete Keynote Collection" implies, all the material stems from that one label, but "complete" is misleading because Keynote's catalog reached beyond jazz. Indeed, some borderline sides have regrettably been included in this collection. We could, for example, have done without the bland 1946 sides by singer Marie Bryant and a pop-vocal group called the Midtowners, and there's no reason to include the cocktail-lounge ramblings of Bernie Leighton in a jazz collection. This is certainly an abundant box of fine jazz, but it might have been even better if Kiyoshi Koyama, the producer, had been more selective.

Most of the 115 "newly discovered

gems" here are, in fact, alternate takes. I wouldn't mind having several takes of the same number on CD, since it is easy to program out the ones you don't want to hear, but having three or four very similar performances of the same tune in a row on LP tends to dull the senses. (There is talk of releasing the collection on CD with, I am told, a more user-friendly sequence.)

So much for the negative aspects. On the positive side, this box contains a veritable treasure of jazz performances by some of the greatest artists in the field, and the sound quality is equally impressive.

Harry Lim, a native of Java who had developed a strong taste for jazz while attending grade school in Holland, persuaded the owner of Keynote in 1943 to add jazz to the label's catalog of classical and folk music. The first release was a George Hartman session that Lim had recorded in New Orleans in 1941. If that band's spirited but unimaginative treatment of such warhorses as *Muskrat Rumble* and *Jazz Me Blues* brings on a yawn or two, the stunning Lester Young Quartet sides that follow represent jazz expressions at their very best. The Young session, toward the end of 1943, was Lim's first for Keynote. Immediately afterward he recorded a nineteen-year-old Dinah Washington, with a Lionel Hampton sextet, and by the end of January 1944 Lim had added memorable work by Roy Eldridge and Coleman Hawkins groups. Keynote's new



Dinah Washington

jazz catalog was off to a great beginning.

Space won't allow me to mention *all* of the highlights in this collection, but among them are two 1944 sessions that were originally released on 78's. One is a Cozy Cole All Stars date with trumpeter Joe Thomas, trombonist Trummy Young, Coleman Hawkins, and Earl Hines featured prominently in a septet that also includes guitarist Teddy Walters and bassist Billy Taylor. I had two of these sides, *Father Co-Operates* and *Thru' for the Night*, on a Danish Tono release about forty years ago, and I had not heard them in at least thirty years, but every note came back to me sounding as fresh now as it did then. I can say the same for four ebullient Kansas City Seven selections with Buck Clayton, Dicky Wells, Lester Young, Count Basie, Freddie Green, bassist Rodney Richardson, and Jo Jones—pure perfection. Except *Lester Leaps In*, which omits Wells and Clayton, both sessions are presented here with one or more alternate takes of each selection.

Also high on the list of most memorable Keynote sides are the Lennie Tristano sessions of 1946 and 1947, performances that capped the label's jazz activity and pointed to the future. A far cry from the introductory New Orleans sounds of George Hartman's orchestra, these final entries in the Keystone catalog represent a more intellectual approach to jazz. Oddly enough, the Tristano sides were the only jazz recordings I ever found in the U.S. Information Service's Copenhagen library in the late Forties. Their once-dull surfaces had been played to a dull grey, but no



Saxophonist Lester Young was featured in the first recording Harry Lim produced for the Keynote jazz label.

amount of use could wear off the exciting interplay between Tristano and guitarist Billy Bauer. Additional examples of post-war modern jazz in this set are two sessions with Red Rodney's Be-Boppers, one featuring a sextet with Allen Eager, Serge Chaloff, and Al Haig, the other a Dave Lambert and Buddy Stewart date.

The Keynote collection thus covers several decades of jazz styles, but the best performances here are neither the ones that recall the past nor the ones that herald the future—although Tristano's work is clearly topnotch. No, the best comes from the Swing Era musicians, some of whom were in transition at the time.

Have I left out mention of other gems? Of course I have. There's more in this set than can be covered in any review. But apropos omissions, producer Koyama found one. After the twenty-one discs had been mastered, pressed, and packaged, he discovered an untitled, previously unreleased Lennie Tristano Trio side. I seriously doubt if anyone else would have noticed its absence, but Koyama wasn't taking any chances, so he prepared a single-sided, 45-rpm supplementary disc.

Let's face it, \$210 is more money than most people can afford to spend on a jazz record purchase at one time, and I hate to think that so many people are going to miss out on these great sides because a concept dictates that they should all be lumped together in a big box. PolyGram should consider issuing the best of this material in a more affordable form. In the meantime, even if this box were the only jazz item on your record shelves, and although it does not include such standard names as Armstrong, Ellington, Holiday, Beiderbecke, Parker, and Goodman, owning it gives you every right to boast that you have a superb jazz collection.

Chris Albertson

THE COMPLETE KEYNOTE COLLECTION. Lionel Hampton, Dinah Washington, Lester Young, Coleman Hawkins, Teddy Wilson, Cozy Cole, Bud Freeman, Red Norvo, Jonah Jones, Benny Morton, Charlie Shavers, Rex Stewart, Count Basie, Joe Thomas, Bill Harris, Barney Bigard, Chubby Jackson, Lennie Tristano, J. C. Heard, George Wettling, Red Rodney, Benny Carter, Dave Lambert, Gene Sedric, Milt Hinton, Shelly Manne, Don Byas, Harry Carney, Earl Hines, Buck Clayton, Roy Eldridge, Flip Phillips, Slam Stewart, Dicky Wells, Nat King Cole, Trummy Young, Horace Henderson, Howard McGhee, Pete Brown, Budd Johnson, Johnny Guarneri, Vic Dickenson, Sid Catlett, Tab Smith, John Kirby, and others. 334 selections on twenty-one LP's and one 7-inch 45-rpm single-sided disc. KEYNOTE/POLYGRAM 18PJ-1051-71 \$209.58.

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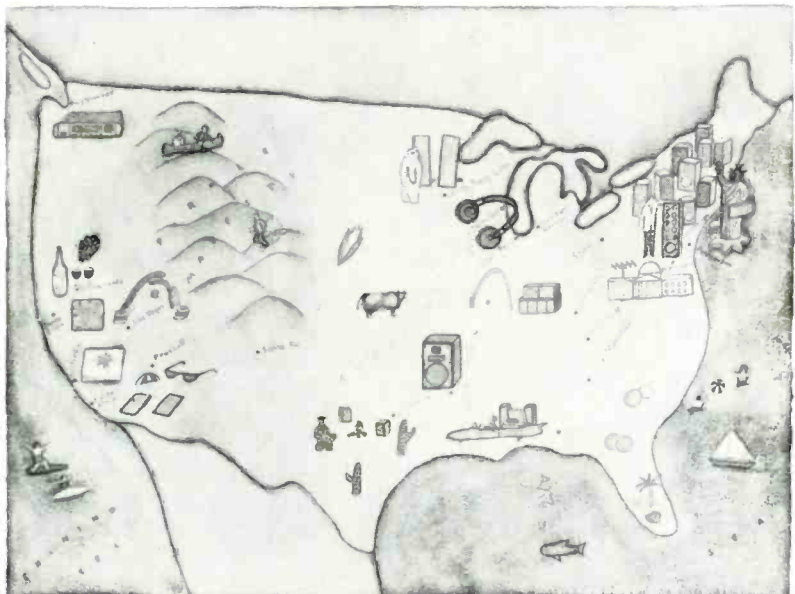
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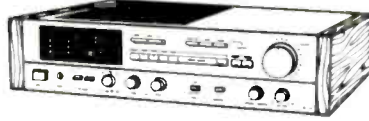
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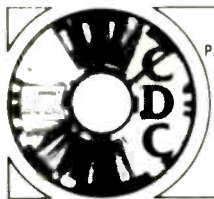
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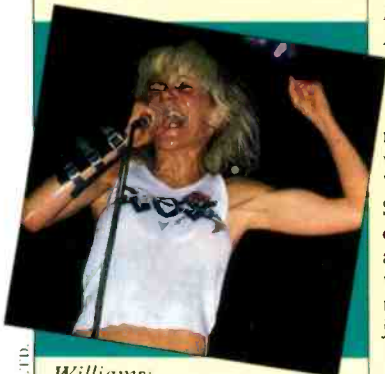
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JUNE



by *Christie Barter*
& *Steve Simels*

WHO says Wendy O. Williams, the lead singer of the Plasmatics and self-proclaimed Dominatrix of the Decibels, doesn't have a social conscience? Not the nice folks at F.A.R.M. (Farm



Williams: promoting health

Animal Reform Movement), including their national chairperson Doris Day. It seems the F.A.R.M. folks just gave Wendy their coveted New Yorker of the Year Award for promoting "the healthy, meat-free lifestyle." Williams, perhaps better known for chain-sawing Cadillac on stage than for her commitment to vegetarianism, was clearly tickled by the honor.

"To win an award for not eating meat is great," she said at the ceremony. "You feel better, the animals feel better, the planet feels better." And who knows?—she may be on the cutting edge. After all, other pop stars, including the Pretenders' Chrissie Hynde and the Smiths' Morrissey, have been making vegetarian noises of late.

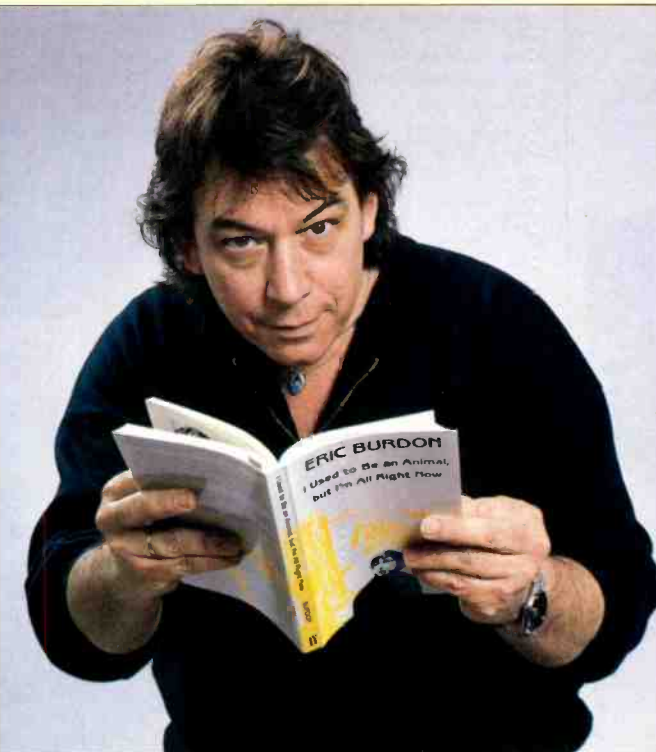
Speaking of noises, Wendy's latest is "Maggots: The Record" (GWR), a heavy-metal concept album that postulates New York City's being overrun by nonvegetarian fly larvae. □

WEVE always had a soft spot in our hearts for Eric Burdon, Glasgow-born lead singer for Sixties hit makers the Animals, so we're happy to report that the un-

predictable blues belter is making yet another comeback (the last being his 1983 tour with his former bandmates, from which a live album is still available on I.R.S./A&M). This time, however, the pugnacious Scot is making his debut as a social diarist. His combination autobiography and Sixties memoir, *I Used to Be an Animal, but I'm All Right Now*, has just been published by the prestigious British house of Faber and Faber, and in a pleasant irony, his editor on the project was none other than the Who's Pete Townshend. Since Burdon, a close friend of Bob Dylan, Jimi Hendrix, and other luminaries, knows where a lot of bodies are buried, this could be one of the juiciest reads of the year. □

GOOD CAREER MOVES DEPARTMENT: Mid-Seventies teen idol Peter Frampton has signed on as guitarist for the upcoming David Bowie world tour, perhaps recalling what a similar stint did for the commercial fortunes of Texas bluesman Stevie Ray Vaughan. Bowie and

Burdon: former Animal tells all—maybe



Bowie and Frampton: today the Cat Club, tomorrow the world

Frampton hyped the affair recently at Manhattan's notorious Cat Club, fielding hostile press questions and performing two numbers from Dave's new album, "Never Let Me Down" (EMI America). To our knowledge, it was the first rock-star press-conference/performance hybrid since the Rolling Stones serenaded New York City rock writers on the back of a flatbed truck to kick off their 1975 tour. □

IN the early years of this century, Enrico Caruso enjoyed a phenomenal career both on the stage of the Metropolitan Opera and in the studios of the American Victor Company. He signed an exclusive contract with Victor in 1903, for the then-magificent sum of \$4,000, and went on to cut over two hundred sides for the label, a generous sampling of which has just been released on compact disc by RCA, the Victor Company of today.

"The Legendary Enrico Caruso" is a kind of greatest-hits compilation, with seventy-two minutes of playing time, spanning the Italian-born tenor's golden years, from 1906 to 1920. He died in 1921 at forty-eight.

And, as luck would have it, RCA's marketing and promotion team got an unintended assist from the U.S. Postal Service, which issued a twenty-two-cent Caruso stamp. The tenth in the Postal Service's Performing Arts Series, it is the work of Jim Sharpe, who designed all the earlier issues as well. The previous two stamps in the series honored Jerome Kern and Duke Ellington. □

WELL, IT WORKED FOR ALICE COOPER! Why are obese rappers the Fat Boys huddling with a boa constrictor? Funny that you should ask. It seems the Boys have a new album called "Crushin'" (Tin Pan Apple/Polydor), and nobody could

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think of a better way to dramatize it—which is odd when you consider that the record's most notable track, *Protect Yourself*, is an ode to safe sex featuring the first known rhyming of the words "condom" and "mom." Hmm.

In related Fat Boys news, look for the group's forthcoming Warner Bros. film, *Disorderlies*, a Three Stooges-styled romp co-starring soap star **Anthony Geary** and the ageless **Ralph Bellamy**. Also look for a *Disorderlies* soundtrack featuring—get this!—a collaboration with another well-known Boys group: the **Beach Boys**. The unlikely pairing takes place on a rap remake of *Wipeout*, the all-time-classic surf-music instrumental. □

the Andrew Lloyd Webber–Richard Stilgoe–Trevor Nunn spectacle that is *Starlight Express*. Capitalized at \$8 million, the show has been called the most expensive ever produced on Broadway, and the mammoth Erector Set designed for it by John Napier at the Gershwin Theatre is said to have eaten up nearly a third of the budget just to build and install. The show's technical marvels are subjects of a PBS telecast, *Setting the Stage*, in the network's *Innovation* series, on June 6.

As for the tunes, which you're also expected to exit humming, the British original-cast recording is available on two Polydor CD's, and in mid-May a "concept album"



Starlight Express: a set to hum about

two albums devoted to works rooted in the twentieth-century repertoire: concertos by Bartók and Berg, with **Seiji Ozawa** conducting, and the Stravinsky concerto, with **Paul Sacher** conducting. Accompanying the Stravinsky will be a couple of concerted works by the contemporary Polish composer **Witold Lutoslawski**, one of which he wrote especially for Mutter and both of which he will conduct. □

by the legendary and highly influential blues guitarist **Lonnie Mack**. . . . The last two of the London-era **Rolling Stones** albums, "More Hot Rocks" and "Got Live If You Want It," have just emerged on CD, courtesy of Abkco. Anti-mono purists should know that the CD of the presumed-lost "Got Live" is in the pristine, glorious mono that the original producers intended. . . . The CD version of the new R.E.M. album, "Dead Letter Office," will also include all of "Chronic Town," the band's critically acclaimed debut EP. . . . **Iron Butterfly**, *It's a Beautiful Day*, and the original **Moby Grape**, three of the more psychedelic outfits of the Sixties, will be touring together this summer, so get those Nehru jackets out of your closet. □

GRACENOTES. Good news for blues and r-&-b fans: Rounder Records has just released a posthumous **Professor Longhair** album, "House Party New Orleans Style," featuring so-called "lost sessions" from 1971-1972, and Alligator has reissued "The Wham! of That Memphis Man," an early Sixties classic

Mutter: world-class violinist on the move

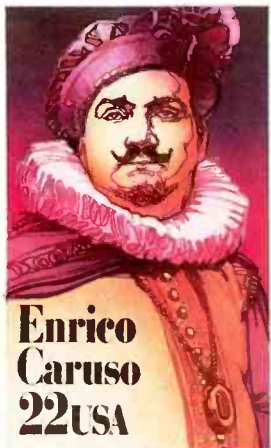


The Fat Boys weighing in with "Crushin'" friend

IF ever there was a musical that sent you out of the theater humming the sets and costumes, it would have to be

by MCA in which songs from the show are performed not by cast members but by such popular artists as **Stephanie Mills**, **Richie Havens**, and **El DeBarge**. □

Caruso commemorative



THE German violinist **Anne-Sophie Mutter**, an acknowledged world-class artist though still in her mid-twenties, has returned to Deutsche Grammophon, the label on which she made her very first recording, at the age of fifteen, with **Herbert von Karajan**. She will also be returning to the U.S. for concert tours on an annual basis beginning in February 1988.

Mutter's new long-term agreement with DG calls for recordings of the Tchaikovsky and Sibelius violin concertos with Karajan as well as

EBET ROBERTS

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by Ralph Hodges



Who Tests?

LAST March in this column I discussed the views of those who believe that objective (by the numbers) testing is futile because so many ears seem either to dispute the findings or to qualify them enough to put their meaning in serious doubt. Most letters I received in response expressed appropriate frustration at this state of affairs, but a few suggested the human ear itself might be at fault and raised some points worth discussing.

The first such letter enclosed a clipping from last December's *Science News* that discussed experiments by Diana Deutsch, a psychologist at the University of California in San Diego. Dr. Deutsch had reported to the Acoustical Society of America that test subjects exposed to identical sequences of pure tones spaced one-half octave apart disagreed as to whether the tones ascended or descended in pitch.

I haven't tried to ask Dr. Deutsch herself about her findings—first, because I encountered the phenomenon years ago at Columbia University's music department, and second, because it makes no logical difference for the purposes of high fidelity. Dr. Deutsch is quoted as

saying, “. . . it's certainly possible that people listening to certain orchestral pieces are going to hear them in ways that are different from each other and be unaware of that.” I agree. The business of high fidelity, however, is to put *that* orchestra in *that* room. If you hear/experience it differently than I do, that's *your* business, and you're welcome to it.

Another letter brought up the truly disagreeable subject of the possibility of defective hearing among reviewers.

Hearing acuity, especially at the higher frequencies, ages along with the rest of the body, and a modern man is doing well if he has any consistent perception at 10,000 Hz or so at age sixty-five. The possibility of cataclysmic hearing damage, usually indicated by “notches” in perception at about 6,000 Hz, and in worse cases at 3,000 Hz, also increases with age, if only because an older man has had that many more occasions to be exposed to intolerably loud sounds than a younger one.

Many esteemed audio reviewers are attaining the age at which a civil-service employee would be fishing full time in Florida. How do they do it—or, rather, how can they pretend to do it?

The answer may be a complex one, but it doesn't involve pretense. We'll skip the usual anecdotes about how Arturo Toscanini and Bruno Walter were able to balance and adjust an orchestra far better than conductors half their age and just consider whether hearing acuity up to 10,000 Hz might be enough.

The traditional way of testing for nonlinearities in an audio system has been by measurements of harmonic and intermodulation distortion. Audiophiles often read that these tests are inadequate, but what is usually meant is that the test *equipment* is inadequate: that it cannot respond fast enough, or analyze signals complex enough, to satisfy the requirements of the ear. This is probably true, but it doesn't mean that these distortions are not the most significant ones for the human hearing mechanism. And who is capable of hearing these distortions? Almost anyone.

The first harmonic-distortion

product to be stimulated by information at 10,000 Hz will appear at 20,000 Hz—a bit too high to be bothersome to most, even if it were not severely attenuated by all but the most ambitious tweeters. Intermodulation-distortion products appear at both the sum and *difference* of the frequencies giving rise to them, and that difference frequency is bound to come through even on a hearing aid.

It can be argued that harmonic-distortion products generated by, say, a 6,000-Hz fundamental, manifesting themselves first at 12,000 Hz, will escape the scrutiny of the ear whose top limit is 10,000 Hz. This is a reasonable assumption. Also, as I've learned from bitter experience, near-ultrasonic noise invading a delightfully linear recording system can ruin a tape for any but the most feeble-eared. Nonetheless, the former example supposes that the distortion is purely harmonic and erupts at only 6,000 Hz, which is rarely the case. In the latter instance, the fault is less likely to be in the equipment than in the way it's hooked up.

About ten years ago Julian Hirsch and I were invited to participate in a Technics/Panasonic speaker evaluation in which five loudspeakers, hidden behind veils, were to be rank-ordered for quality. This is an impossibly demanding test of acoustic memory, which Julian believes in not at all and I only provisionally. But they bought lunch, so . . .

Although Julian was writing about hi-fi before I had broken in my second teething ring, we were right down the line on our second, third, and fourth choices, for reasons we could cite and discuss with complete understanding. But the speaker that Julian liked most was the one I liked least. The engineer who oversaw the test—a very competent one—called this a preference inversion and said it was common in his experience. It wasn't in ours.

Yet, for the most part, older and younger ears heard alike under very critical conditions and with very high-quality reproducers. Can the discrepancy be related back to the points made in letter No. 1? All comments cheerfully welcomed. □

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