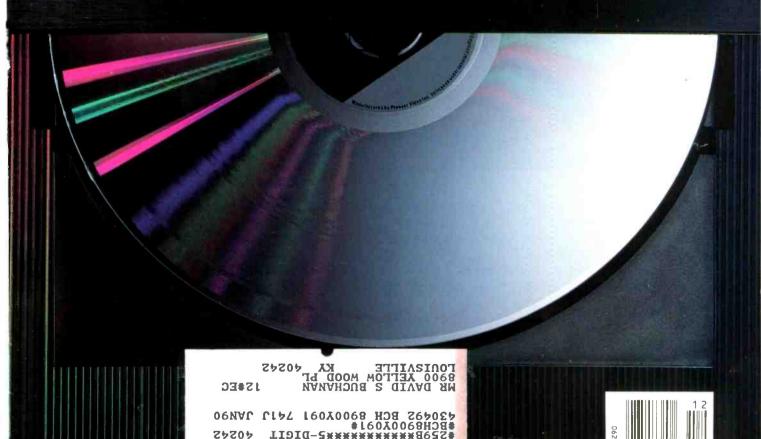


3 TOP COMBI-PLAYERS: AUDIO AND VIDEO LAB TESTS

DESIGN FOR LISTENING

TEST REPORTS: ONKYO RECEIVER, CONRAD-JOHNSON CD PLAYER, DESIGN ACOUSTICS SPEAKER SYSTEM, MORE...

HI-FI HOLIDAY GIFTS





If you've vowed not to compromise this time around, consider the rich rewards of owning Carver. Each component includes unique innovations designed to confront and solve real-world sonic problems.

Power unleashed: Simultaneous high current/high voltage output. The TFM-25 is capable of delivering more simultaneous current, power and voltage into a wider range of speaker loads than any other competitively priced design: 225 watts per channel into 8 ohms 20-20kHz with no more than 0.5% THD. Its patented Magnetic Field Power Supply can draw up to 200% more line current, store more joules of energy in its unique distributed capacitance system, and then deliver up to 500% more current during musical peaks. With the right speakers, this kind of serious power can achieve a full restoration of the robust percussive attacks and lightning transients so

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J a m

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"Do you like art;"

he asked.

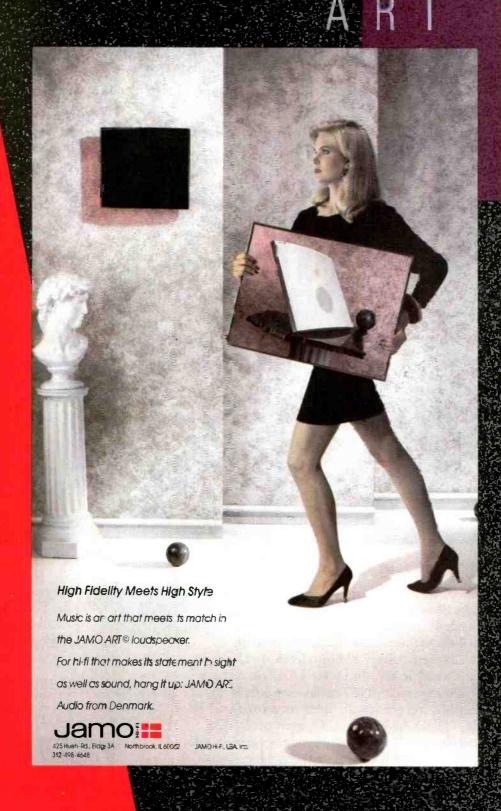
"or do you find

the competition

too tough?"

Her fingernails danced

on the marble bust.



Stereo Review

Incorporating High Fidelity®

| BULLETIN5 | TECHNICAL TALK |
|---|--|
| LETTERS8 | POPULAR MUSIC 129 |
| NEW PRODUCTS | CLASSICAL MUSIC |
| Signals | 1989 Editorial Index 164 |
| Audio Q&A24 | The High End 172 |
| EQUIPM | |
| THE BASICS Magnets and music | by Ian G. Masters |
| HIRSCH-HOUCK LABS EQUIPMENT | |
| Onkyo TX-890 AM/FM Receiver, pa Hafler IRIS Preamplifier, page 65 Design Acoustics PS-3 Micro-Monito Conrad-Johnson DF1 Compact Disc Pioneer SP-91D Digital Sound Proce | or Speaker System, page 69 Player, page 72 |
| THREE TOP COMBI-PLAYERS How leading players measure up in a performance | audio and video by Ed Foster |
| DESIGN FOR LISTENING | 102 |
| When great looks and great sound go | by Warren Berger |
| SIGNAL PROCESSORS | 107 |
| Should you add one to your system? | by David Simon 107 |
| HOLIDAY GIFTS | 113 |
| Suggestions for audiophiles and mus | ic lovers |
| | by William Livingstone |
| MUS | SIC |
| TOM TOM CLUB "Whatever we do always has a strong | g beat" by Ron Givens 100 |
| BEST RECORDINGS OF THE MONT Linda Ronstadt, Strauss's <i>Le Bourge</i> Ray Vaughan, and Martinu's piano i | ois Gentilhomme, Stevie 123 |
| RECORD MAKERS The latest from David Byrne, Liza M Chung, Jefferson Airplane, Tears for | |
| | = |











Cover: The Pioneer PLD-3070 combi-player (see page 94). Design by Sue Llewellyn, photo by Roberto Brosan.

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H A Harman International Company

by Christie Barter and Rebecca Day

BETTER AM SOUND

The Electronic Industries Association and the National Association of Broadcasters have agreed to join in promoting high-quality AM sound by developing a certification mark or logo to be used on the faceplates of high-performance am receivers and tuners. Under the plan, receiver manufacturers who have designed their products in accordance with National Radio Systems Committee (NRSC) guidelines may use the trademark. The program relies on new NRSC standards that 1) limit the bandwidth of AM broadcasts to 10 kHz, enabling manufacturers to extend the AM response of their receivers up to 10 kHz without suffering interference, and 2) specify the amount of highfrequency boost that broadcasters should add to audio signals. Complementary equalization in the receiver restores flat response and reduces noise.

FLASH FROM TOKYO

Digital audio tape (DAT) recorders were shown prominently at this fall's Japan Audio Fair, some with the circuits that are said to make possible direct digital copies from co's or DAT's (but not copies of those copies). Despite the international agreement on DAT announced last July, there is still record-company opposition to the format in some countries, and the time of worldwide introduction of DAT decks is still uncertain. U.S. introduction by the end of 1990, however, seems quite possible.

ON THE AIRWAVES

Newport Jazz '89, featuring performances by Herbie Mann, Wynton Marsalis, George Shearing, and Spyro Gyra, is being aired by the PBS television network on November 22.... On November 25. National Public Radio will broadcast the opera Holy Blood and Crescent Moon by Stewart Copeland, one of the founding members of the Police,

in a performance by Cleveland Opera, which gave the work its world première earlier this fall.

PRODUCT NOTES

Thomson Consumer Electronics has announced plans to resuscitate the RCA audio brand name in 1990 with a line of midprice to high-end components. . . . Denon America has reduced the prices of its high-bias audio cassettes by 4 to 12 percent. . . . BASF has added the 100-minute length to its Chrome Extra II and Ferro Extra audio cassette lines.

... Pioneer's two new digital sound-field processors—the SP-91D (\$1,000) and the SP-700D (\$700)—employ the company's digital signal processing (DSP) circuit. Pioneer has also introduced a new audio/video receiver line, led by the VSX-9500S (\$1,050) with Dolby Pro Logic. . . Standard on the new 1990 Nissan 300ZX (\$28,000) are a five-enclosure Bose speaker system and a Clarion cassette receiver modified with Bose audio circuitry. . . . Infinity is using Monster Cable only for the internal wiring of its new RS series of loudspeakers (\$85 to \$529 each).

FIVE-FORMAT RELEASES

PolyGram is the first record company to release albums simultaneously in all five popular formats—LP, audio cassette, CD, VHS videotape, and videodisc. These initial entries in the new Jazz Visions series include such titles as "The Many Faces of Bird," with Bobby McFerrin, Lee Konitz, and Bud Shank; "Rio Revisited" with Antonio Carlos Jobim and Gal Costa; and "Jump the Blues Away," with Etta James, Joe Walsh, and Albert Collins. No plans have been announced for release in the DAT format.

MUSIC NOTES

The summer's superhit film, Batman, from which Prince derived (in part) his superhit "soundtrack" album, has just been released on videotape by Warner Home Video. The videodisc version is due soon after the first

of the year. . . . Italian conductor Claudio Abbado is the new music director of the Berlin Philharmonic, succeeding the late Herbert von Karajan... Finnish conductor Esa-Pekka Salonen, an exclusive Sony Classics/CBS Masterworks artist, becomes music director of the Los Angeles Philharmonic as of the 1991-1992 season. . . . The composer William Schuman is scheduled to receive Kennedy Center Honors in Washington on December 3.... The National Academy of Recording Arts and Sciences has fixed February 21 for its next Grammy Awards presentation and telecast (on CBS).

HI-FI PHONE CALLS

A new digital coding method developed by Bellcore, a research and engineering consortium of regional telephone companies, may pave the way for high-fidelity phone calls. The technology can transmit stereo audio signals with a 7-kHz bandwidth over a single Integrated Services Digital Network channel, more than doubling the bandwidth (3 kHz) now used for telephone sound.

Stereo speakerphones were demonstrated at a recent Bellcore technical forum, along with hi-fi telephone news reports by reporters on location. Also demonstrated was a device that would enable consumers to call up a music store to audition a recording through their home hi-fi systems.







"Polk's RTA Tower Loudspeakers Combine Legendary Polk Performance with Contemporary Style."

Big speaker performance with an efficient use of space.

RTA 11t

The RTA 11t is the finest conventional (non-SDA) speaker that Polk Audio manufacturers. Its extremely high power handling (250 watts) and high efficiency (90dB) provide remarkable dynamic range from both large and small amplifiers. The RTA 11t utilizes the same technologically advanced fluid-coupled subwoofer design found in Polk's flagship model. Dual 8" sub-bass radiators are coupled to two 6½" mid/bass drivers, resulting in a fast, powerful, deep, and ultra-accurate bass response, without the boomy, undetailed sound of large woofer systems.

RTA 8t

In a slightly smaller package, the RTA 8t offers the same driver complement as the larger, more expensive RTA 11t, and thus shares its benefits of superior imaging, musicality, and detail.

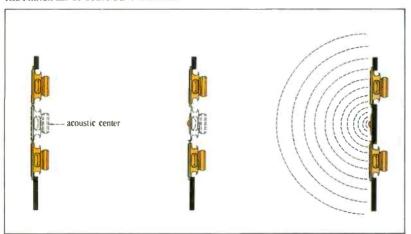
Both Polk RTA series loudspeakers achieve the extremely rare combination of good looks and state-of-the-art performance. The tall, elegantly slender and deep "tower" design cabinets allow for substantial internal volume for high efficiency and powerful bass, but only require less than one square foot of floor space! The small baffle surface area around each driver minimizes diffraction (sonic reflections), thereby insuring outstanding imaging and low coloration.

Positioning the 1" silver-coil dome tweeter between the two 6½" trilaminate polymer bass/midrange drivers achieves what is called "coincident radiation." This means that both the mid- and high-frequencies appear to radiate from the same place on the baffle resulting in perfect blending at the critical crossover point. (See illustration, below).

Polk RTA speakers have an uncanny ability to perfectly reproduce the human voice, pianos, guitars, and every other instrument whose faithful reproduction demands superlative midrange and high-frequency performance. Bass and percussion instruments are accurately reproduced with full visceral power and realism, without the heaviness, boominess, or lack of detail that plague lesser designs.

The discriminating listener who seeks stateof-the-art performance and design will find the quintessential combination of both in Polk's RTA series loudspeakers.

THE PRINCIPLES OF COINCIDENT RADIATION



The perceived source of sound of two identical drivers is centered in the area between them.

In the Polk RIA loudspeaker, the tweeter is positioned at the acoustic center of the drivers.

Drivers and tweeter appear to operate together as an ideal point source resulting in precise imaging, uniform dispersion and startling midrange accuracy.



Polk Audio's RTA 8t and RTA 11t High Performance Tower Speakers

Stereo Review

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LETTERS

Digital Differences

In his September "High End" column, Ralph Hodges concludes that the days when digital reproduction was described as "perfect" and having "no audible differences" are behind us. People who have selected CD players on the basis of features rather than sound quality don't realize what they could be missing

Four years ago I purchased what was then a state-of-the-art (according to STEREO REVIEW tests) CD player. Two and a half years ago I purchased a newer model that exhibited significantly better sound. Recently, on the basis of STEREO REVIEW's December 1988 study by Ken Pohlmann, I purchased another top CD player, and I was astounded by the improvement in sound. It was like changing from LP's to CD's. Both the bass and treble seem to have an extended range, the bass more voluminous and better defined, the treble sweeter and more open. The increased definition has enabled me to hear many instruments that were previously muffled, and discs I rarely listened to because of their harshness now sound great.

ARTHUR M. WELLS Gainesville, FL

Gershwin and Sullivan

Eric Salzman incorrectly stated, in his October review of the latest recording of Gershwin's Porgy and Bess, that this opera established a record for continuous performances of a new opera. The present world's record is held by Sir Arthur Sullivan's Ivanhoe, which had more than 155 performances in its initial run in 1891. Ivanhoe's second full recording will soon be released by Pearl Records.

> BRUCE GREENGART Brooklyn, NY

Recording Rock

Ken Pohlmann states in October "Signals" that "a professional rock monitor must provide very high soundpressure levels." That's totally untrue. Way back in the dark ages of the Seventies, rock engineers thought that extreme volume was good. Today the thinking engineer knows that because of the Fletcher-Munson curve, a recording will sound terrible at low volume if it is mixed at high volume. Moreover, in the studio the ear will quickly become very fatigued, and thus useless, under such circumstances.

> CRAIG PATTERSON Evergreen, CO

Ken Pohlmann replies: My office adjoins a professional recording studio, and I travel to dozens of studios a year. In my experience, most rock engineers continue to monitor at levels 20 to 40 dB higher than home listening levels. I certainly cannot condone these high levels, which do fatigue the ear and can cause permanent hearing damage. Incidentally, the Fletcher-Munson curves, reflecting work done in the 1930's, are no longer used, having been replaced by newer data from Robinson and Dadson.

The Basics

I am a charter subscriber to STEREO REVIEW. I built my first hi-fi system in the late Forties from individual parts I bought from an Allied Radio catalog. using a diagram a fellow engineering student at Cornell drew for me. Many systems later, I find that although various responsibilities and activities have prevented me from keeping up with the technical aspects of hi-fi, I am enjoying my system more than ever because of technical advances, especially CD's.

The point of all this is to commend you on the series "The Basics" by Ian Masters that started in October. This will bring me up to date at long last.

PHILIP F. SEARLE Naples, FL

Loudspeaker Sound

"How to Buy Speakers" by Ian G. Masters (September) left out a vital consideration: Speaker buyers need to consider whether they want units that create or re-create music. In most recordings of pop and rock and electronic instruments, the speakers are part and parcel of the creative process. "Loudspeaker sound" may make an affirmative contribution, and may even be counted upon by musicians and producers to supply a coloristic touch and panache. To realize what the musicians and producers intended, then, you must use loudspeakers (and acoustics, if possible) similar to the ones they used for studio sound checks.

But a re-creative loudspeaker is not part of the creative process. It has a tougher job to do. The music and sound it may be called upon to reproduce is not disciplined by the speaker's own characteristics and limitations. In a re-creative loudspeaker, "loudspeaker sound" is anathema. Such a loudspeaker may seem bland playing pop, rock, and electronic material, but it may be just the thing for re-creation of the delicacy and balance of a Baroque chamber orchestra.

You can't select good re-creative loudspeakers by comparing them with one another to hear which sounds "bet-You've got to compare them with fresh aural memory of the real thing.

LEAVING A
SYMPHONY
UNFINISHED
SHOULD BE UP TO THE
COMPOSER,
NOT YOUR TAPE.



Schubert had a pretty good reason for not completing music. He died.

But abrupt endings while taping CDs are not so excusable. Which is why Maxell now offers 100-minute cassettes designed specifically for digital sources. With superior frequency response and noise reduction, they actually rival CDs in sound

quality. And with an extra ten minutes of

recording time, they do the same in sound quantity. Instead of being frustrated by the shortcomings of other tapes, try our new XLII 100 and XLII-S 100. And you may never have to settle for Vivaldi's "Three-And-A-Half Seasons" again.

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Sony's invention of the world's first compact disc player set the world on its ear by bringing unheard-of clarity and accuracy to recorded music. Then, on the theory that you can't get too much of a great thing, Sony developed the world's first 5-disc carousel CD changer and multiplied the stunning advantages of digital sound fivefold.

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LETTERS

You have to be a frequent concert, recital, opera, or folk-festival attender, or become one.

> JOHN WITHEY Wimberley, TX

"Elektra"

Robert Ackart's August review of the new recording of Strauss's Elektra has me utterly mystified. Mr. Ackart says that conductor Seiji Ozawa's previous readings have sometimes struck him as "polite, correct, perhaps a bit too 'civilized." I abandoned Boston Symphony performances and recordings a few years ago, sated with strings that climb in pitch whenever they get louder and with coarse, swamping brass.

Having seen or heard bits of Hildegard Behrens elsewhere, I was reluctant to give in to Mr. Ackart's advice to hear her "precise delination of the complex character" of Elektra. I found that it was the same as always with Behrens: The role of a courageous, determined woman is sung with a dramatic bellow each time an emotion is to be shown by either a high or a low note. And Mr. Ackart says not a word about the cuts, in particular the enormous slab hacked from-what else?-the difficult long solo from Elektra to Klytämnestra.

> RICHARD SEBOLT Springfield, MA

Analog Deficiencies

Ken Pohlmann's claim, in the August "Signals," that analog tape cassettes are even remotely close to digital recordings in terms of sonic clarity is outright wrong! Any music with dynamic changes (loud to soft) will immediately show the flaws in analog tapes. Though I must admit that Dolby SR improves the usual sound quality of analog tapes, let us not forget that the system was designed to cover up deficiencies in analog sound reproduction.

Digital audio tape cassettes are too expensive for consumers today, but audio professionals know that DAT is a major technological breakthrough.

> **DELFEAYO MARSALIS** New Orleans, LA

Ken Pohlmann replies: While music with a wide dynamic range reveals the analog noise floor, most recordings have a very narrow range, and for these analog technology works quite well. Digital audio will eventually triumph, but for now, analog isn't bad.

CD Changers

The article on CD changers by lan Masters in July barely scratched the surface of features that make changers the

Holy Grail of listening enjoyment. True, a changer involves added expense, but consider the advantages of storing your music permanently in changer cartridges. Besides a major saving in space, you never have to touch your recordings to play them; that alone justifies the expense, for repeated handling is the curse of every other recorded-music format.

To anyone who listens to popular music, having a hundred selections by millions of dollars of musical talent at your fingertips from the comfort of an easy chair is as good as it gets.

JOHN NAGY Sequim, WA

How can you tout the power, accessibility, and utility of a CD changer in this day and age when each record manufacturer's CD's are so intensely different? I recently went to a single-play machine for my upgrade player because of the time I spent adjusting my system between discs. I had to get up anyway, so why use a changer?

THOMAS L. FARNEY Hermiston, OR

Finding Videodiscs

The laser videodisc is a very exciting medium, but I have been very frustrated in trying to obtain discs. Local dealers will not order classical-music discs or claim they are unavailable. The Voyager Co. has videodiscs of movies only. The only places I have been able to buy classical videodiscs are Tower Records stores in Boston and New York City. Do other readers have as much of a problem in locating discs as I do?

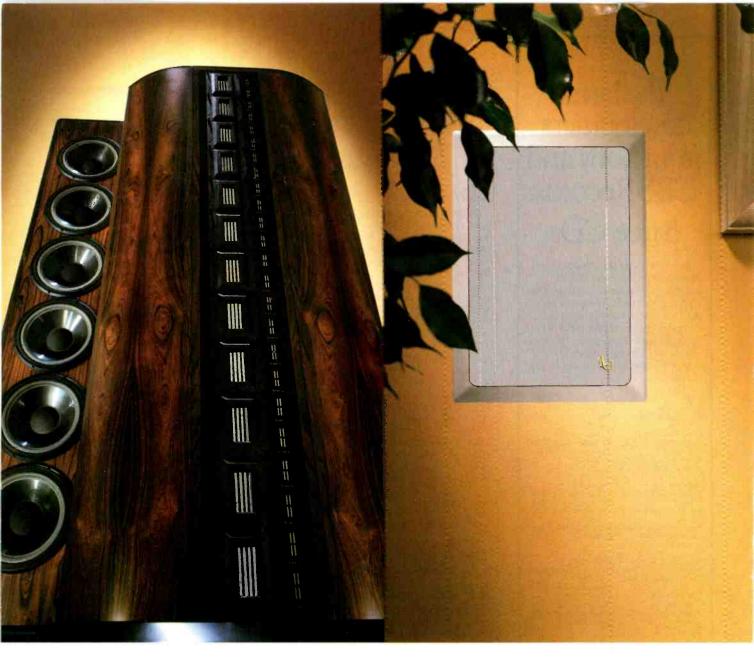
> DONALD W. RICHMAN Martinsville, VA

You are not alone. The medium is relatively new, and there are not as many retail outlets as there surely will be as more and more people are converted. Meanwhile, try these two mail-order sources: LaserDisc Fan Club, 1-800-322-2285, and U.S. Video Source, 1-800-USA-DISC (1-800-872-3472).

Corrections

A last-minute addition to the "Systems" ensemble featured in October was an Audio Control Phase Coupled Activator. It appears in the photo on pages 100-101 but was not mentioned in the text.

The review of Leonard Bernstein's Deutsche Grammophon recording of the Mahler Symphony No. 1 on page 145 in September gave the wrong catalog numbers. The LP, cassette, and CD versions are 427 303-1, 427 303-4, and 427 303-2, respectively. \Box



For music purists with an unlimited budget.

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NEW PRODUCTS

DISCWASHER

The FG 1620 is the top model in Discwasher's SpikeMaster line of surge suppressors. Approved by Underwriters Laboratories and carrying a lifetime warranty, it was designed to protect all types of electronic equipment from excess voltage, noise interference, spikes, and other power-line irregularities that can cause equipment problems such as loss of data and shortened useful life. It has an illuminated power indicator and four outlets. Price: \$114.95. Discwasher, Dept. SR, 4310 Transworld Rd., Schiller Park, IL 60176.

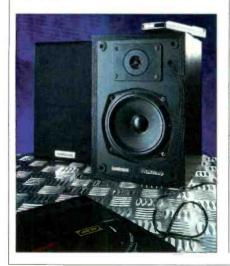
Circle 120 on reader service card



GOODMANS

The Maxamp Remote powered minispeaker from Goodmans of England was designed to provide a secondary music system when used with a portable CD or cassette player. A remote sensor is built into one of the speaker cabinets so that a user can control muting, balance, and tone from an infrared handset. The amplifier is rated at 25 watts per channel. Dimensions are 101/4 x 63/4 x 8 inches. Price: \$425 a pair. Goodmans of England, Dept. SR, 1225 17th St., Suite 1430, Denver, CO 80202.

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CARVER

The CT-17 preamplifier/tuner incorporates Dolby Pro Logic surroundsound processing as well as Carver's proprietary Sonic Holography Generator and Asymmetrical Charge-Coupled FM Detector circuits. Other features include "stadium" and "hall" synthesized rear-channel surround modes, twenty station presets for AM or FM, seven

audio inputs, three-way tone controls, a high-cut filter, separate input selectors for listening and recording, and a second volume control for multiroom and room-to-room applications. The CT-17 comes with a full-function wireless remote control. Price: \$799. Carver Corporation, Dept. SR, P.O. Box 1237, Lynnwood, WA 98036.

INFINITY

Infinity's Reference Standard 5 Kappa loudspeaker is a two-way system that's said to incorporate many of the technological features of the more expensive Kappa models. Its 61/2-inch, injection-molded woofer cone uses polypropylene for low coloration and graphite fibers for rigidity and superior transient response. The EMIT K tweeter is an improved version of Infinity's planar-magnetic tweeter, which is said to extend frequency response to 45,000 Hz. The crossover uses Solen polypropylene-film capacitors and high-quality inductors. The cabinet measures 17 x 101/2 x 9 inches. Price: \$399 each. Infinity Systems, Dept. SR, 9409 Owensmouth Ave., Chatsworth, CA 91311. Circle 122 on reader service card





IVC

The JVC RX-701V surround-sound receiver features JVC's Compu Link Source Related Preset for one-touch operation of a stereo system. Users can program the volume, equalization, surround-sound mode, balance, and loudness contour for each source into memory; whenever a source is selected the parameters are adjusted automatically.

The AM/FM tuner section has forty presets. The front-channel amplifier section is rated for 80 watts per channel into 8 ohms in stereo mode, 70 watts in surround mode; the rear channels are rated at 12 watts. Price: \$540. JVC, Dept. SR, 41 Slater Dr., Elmwood Park, NJ 07407

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A video receiver designed for audiophiles.



Until now, video receivers have overlooked a distinct segment of the Nielsen population.







Those people who listen to TV as well as watch it. Which is why Mitsubishi engineers developed the M-AV1. A video receiver

inspired from the philosophy that a soap opera should sound every bit as good as an Italian opera. At the heart of the system is a powerful amplifier with Dolby Surround sound. It boasts 125-watts per channel.* With a generous dose of 25-watts per channel in the rear for surround sound. A time delay of 20 milliseconds has also been encoded into the rear channels to increase depth perception and maintain separation from the front speakers. And with our Dynamic Delay Line, we've expanded the dynamic range of our rear channels by as much as 40 dB over other conventional designs. It also offers four video inputs (two of which are Super-VHS compatible). And comes complete with an award-winning remote that's easy-to-use and capable of controlling all functions via on-screen displays. So you never have to get up from your recliner on our account. But now that you've got a great video receiver, as an audiophile, you might be in the market for an audio receiver. In which case read the other side of the page.

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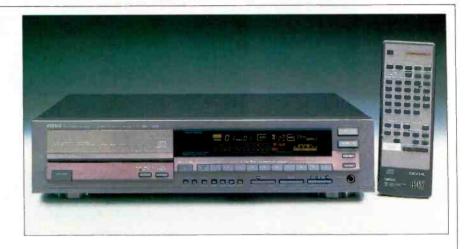
loudspeakers from potentially damaging DC signal components. And there's also a remote-operated motorized volume control that provides smooth attenuation while avoiding distortion. Of course, if you decide you're still a hard-core videophile and only care about obtaining a great video receiver, we have a small suggestion. Buy the receiver on the other side of the page. *125-watts per channel minimum RMS, both channels driven into 8 ohms from 20Hz-20kHz with no more than 0.05% total harmonic distortion. For the name of your authorized Mitsubishi dealer, call (800) 527-8888 ext. 145. © 1989 Mitsubishi Electric Sales America, Inc. Dolby Surround is a trademark of Dolby Laboratories Licensing Corp.



NEW PRODUCTS

VAMAHA

The Yamaha CDX-920 compact disc player uses the company's Super Hi-bit technology, in which series-loaded 18bit digital-to-analog converters with four "floating" bits are said to achieve the effective linearity of a 22-bit system. The CDX-920 also has eight-timesoversampling digital filters and a digital de-emphasis circuit. Convenience features include twenty-four-track random-access programming, five-way repeat, direct track access, and an infrared remote control. It is available in black or titanium finish. Price: \$699. Yamaha Electronics, Dept. SR, 6722 Orangethorpe Ave., Buena Park, CA 90620. Circle 124 on reader service card



SOUNDCRAFTSMEN

The Soundcraftsmen Pro-PT Two "Pre-ceiver," a preamplifier/tuner, incorporates complementary metal-oxide semiconductor (CMOS) switching. The source inputs include CD/DAT, phono, two tape decks, and one audio/video source. There are tape-dubbing facilities and an extra pair of line outputs for surround-sound applications or a subwoof-

er/satellite system. The digital-synthesis quartz-PLL AM/FM tuner section has automatic scanning and thirty-two station presets. The rear panel has three AC convenience outlets, one unswitched and two switched. Price: \$449. Soundcraftsmen, Dept. SR, 2200 S. Ritchey, Santa Ana. CA 92705.

Circle 125 on reader service card



TRACK TRACK TREACH STATE AND THE STATE AND

TRACKMATE

The patented brush system in Trackmate's TM 451 record cleaner does not require that the user put pressure on a spinning record, which the company says can harm a turntable's bearings, belt, and motor. Instead, the cleaning brush is mounted onto the platter's center spindle and rotated by hand around a stationary record. The brush has different types of fibers to lift surface dust, to break up and absorb debris in the grooves, and to reduce static charge. The record brush, a stylus brush, and a supply of cleaning solution in an applicator are housed in a clamshell storage box. Price: \$19.95. Trackmate, Dept. SR, I.D.A., East Wall Rd., Dublin 3, Ireland.

Circle 126 on reader service card

RAINBOW RAX

Rainbow Rax modular rack units can be set up in a wide variety of configurations and sizes. Maximum width and depth for a single bay are 30 inches, and each tempered-steel shelf is designed to hold as much as 200 pounds of equipment. The racks are sold by the piece directly by the company and come with the necessary wrenches and a rubber mallet for assembly. Users can expand the racks later as needed. Price: between \$250 and \$275 for a four-shelf unit, depending on shelf size. Rainbox Rax, Dept. SR, 2704 Manhattan Ave., Suite A, Manhattan Beach, CA 90266. Circle 127 on reader service card





Vivaldi, Concerto "L'Amoroso;" 5 more The English Concert/Pinnock. "Lusclous [sound]."—<u>Billboard</u> Archiv 25187*

Periman: Mozart. Sinfonia Concertante 25032

Clercland Onthonia CHRISTOPH VON DORNANYI

Heifetz: The Decca Masters, Vol. 1 Humoreske, Clair de lune, Golliwog's Cakewalk, many more. MCA 00604

Respighl: The Pines Of Rome; The Fountains Of Rome; Roman Festivals • The Philadelphia Orch./Muti. Angel 34443

Rachmaninov, Symphony No. 1 • Concertgebouw Orchestra/Ashkenazy, "Full of churning, driving energy."—Fantare tondon

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Beethoven, Symphonies Nos. 2 & 8 * London Classical Players/Norrington. "Brilliantly executed."—Opus Angel 00466

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Emanuel Ax: Beethoven, Plano Conc. Nos. 1 & 2 · Previn, cond. RCA

Beethoven, Symphony No. 6 (Pastorale); more • Royal Phil./ Previn. RCA 43612

D. Scarlatti, 7 Sonatas; Larghetto: more · Nar-Yepes, guitar. 15497

Tchalkovsky, Symphony No. 4 Chicago Symphony Orchestra / Solti. London 25038*

Holst, The Planets · Montreal Symphony Orchestra/Dutoit, London 15448

Dvořák, Sym. No. 8; more · Dohnány Cleveland Orch, London Rossini, Overtures • Barber Of Seville, more. Orpheus Chamber Orch. DG 15527

Mahler, Symphony No. 4 • Concertgebouw Orchestra/Bernstein. DG 15526*

Vivaldi, 9 Concerti a Quattro · I Musici, must."—Fanfare Philips 15:

Saint-Saëns, Symphony No. 3 (Organ) Montreal Symphony/Dutolt. London 15529

Bach, Brandenburg Concertos Nos. 4-6 The English Concert/Pinnock. Archiv 25417*

Berlioz, Symphonie Fantastique • The Philadelphia Orchestra/Muti. Angel 54244

Accardo: Bach, Violin Conc. - Chamb. Orch. of Europe. Philips 25162

Vivaldi, 4 Seasons - Simon Standage; English Concert/Pinnock. Archiv 15356 Periman: Brahms, Sonatas for Violin & Piano; more • Angel 33760

Mozart, Piano Concertos Nos. 20 & 21 Malcolm Bilson, fortepiano. Archiv 25208 Tomita's Greatest Hits • The Planets, Bolero, Pachelbel Canon, more. RCA 53955

Suppe, Overtures • Light Cavalry, more. Montreal Sym./Dutolt. London 25219

Ashkenazy: Mozart, Piano Concertos Nos. 8 (Lützow) & 9 (Jeunehomme)

Beethoven, Triple Concerto • Mutter, Ma, Zeltser. Karajan conducts. DG 05319*

Newman: Bach, Organ Works • Prelude & Fugue in C, more. Newport Classic 34604

IPS/6550 E. 30th St./Indianapolis, IN 46219

Barry Douglas: Brahms, Piano Concerto No. 1 • London Symphony Orchestra/ Skrowaczewski. RCA 00732

Andres Segovia Plays Bach · Chaconne, Siciliano, 3 Pieces For Lute, Gavotte en Ron-deau, more. MCA 63600

Salerno-Sonnenberg: Mendelssohn, Violin Concerto; Salnt-Saens, Rondo capriccioso

Krystlan Zimerman: Chopin, The 4 Ballades • Plus Barcarolle & Fantasie In F Minor. "Dramatic."—<u>Gramophone</u> DG 15332

Ravel, Bolèro; La Valse; Rapsodie Espagnole; Alborada del Gracioso • Montreal Symphony Orch./Dutoit. London 15199

Jascha Heifetz: Bruch, Violin Concerto No. 1 & Scottish Fantasy; Vieuxtemps, Concerto No. 5 • RCA 44363*

Ravel, Plano Concerto; Concerto For The Left Hand • Argerich & Béroff, planos. London Symphony/Abbado. DG 15468

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Prokofiev, Peter And The Wolf; Tchaikovsky, Nutcracker Suite · Dudley Moore, narrator. Boston Pops/Williams. Philips 15137

Handel, Music For The Royal Fireworks; Concerti a Due Cori Nos 2 & 3 English Concert/Pinnock, Archiv 25375

Classic Marches . St. Louis Sym./Slatkin. Rakóczy March, Turkish March, Wedding March, Radetzky March, more. RCA 00996 Adams The Chairman Dances • Plus Chris-

tlan Zeal And Activity, more. San Franci Symphony/deWaart. Nonesuch

Beethoven, Symphony No. 6 (Pastorale); 2 Overtures - Academy of Ancient Music/Hog-wood, L'Oiseau-Lyre 25397

Mozart, Clar. Conc.; Horn Conc. 1 & 4 Neidich, Jolley. Orpheus Chamber Orchestra.

Van Cilburn: Rachmaninoff, Piano Sonata No. 2; Prokoflev, Piano Sonata No. more · RCA 006

Stravinsky, Petrouchka; Song Of The Nightingale; 4 Studies • Montreal Symphony Orchestra/Dutoit. London 15331

Into The Woods · Bernadette Peters & Title song, No One Is Alone,

original cast. Titl many more. RCA



Liszt & Grieg Piano Concerto 006064

Strauss, Don Quixote; Burleske - Janigro, cello; Janls, piano. Chlcago Symphony Orchestra/Relner. RCA 63643*

Ashkenazy: Rachmanlnov, Piano Concerto No. 3 · Concertgebouw Orchestra/Haitink. "Fabulous."—<u>HI-Fi News</u> London 25157

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Copeland, Appalachian Spring (Complete); Cortege macabre (from Grohg); more • St. Louis Sym./Slatkin. Angel 54176

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Ravel, Mother Goose (Complete); Le Tom-beau de Couperin; Pavane; more · Montreal Symphony Orch./Dutoit. London 25197

The Pearl Fishers - Golden Age performances by Jussi Bjoerling with Robert Merrill, Licia Albanese, others. RCA 00992

Canadian Brass: More Greatest Hits Barber, Adagio; Bach, Wachet Auf; more by Gershwin, Bizet, others. RCA 64348

Ashkenazy: Rachmaninov, Piano Concerto No. 1; Rhapsody On A Theme Of Paganini Haltink conducts. London 25153

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Michael Feinstein: Pure Gershwin · S'Wonderful, Embraceable You, Liza, more

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itzhak Periman: French Violin Showpieces • N.Y. Phil./Mehta. Carmen-Fan-tasy, Tzigane, Havanaise, more. DG 15457

Anything Goes • Broadway revival cast. Title song, I Get A Kick Out Of You. Friendship, many more. RCA 43950

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NEW PRODUCTS



SHERWOOD

The Sherwood CD-1182R is the company's top-of-the-line single-disc CD player. It has an eight-times-oversampling digital filter and dual digital-toanalog converters. Features include a headphone jack with volume control, repeat of a track, disc, programmed sequence, or random sequence, auto

space, and sixteen-track programming. The CD-1182R comes with a ten-key remote control and can be controlled by a Sherwood DigiLink receiver or amplifier. Price: \$269.95. Sherwood, Dept. SR. 13845 Artesia Blvd., Cerritos, CA

Circle 128 on reader service card



WRIGHT AUDIO

All of the components in Wright Audio's P-75 vacuum-tube power amplifier sit on top of its 11/2-inch-thick redoak base. No circuit boards are used, and all the parts are hand-wired. Sensitivity is rated as 1.3 volts input for 35 watts per channel output. The solidstate power supply has a 1,000-microfarad capacitor bank that is said to insure tight bass response. The P-75 comes with a one-year warranty. Price: \$850. Wright Audio, Dept. SR, 308 N. New St., Staunton, VA 24401.

Circle 129 on reader service card

VELODYNE

The VA-1012 subwoofer, Velodyne's least-expensive model, has a rated frequency response of 23 to 48 Hz. It utilizes "anti-brucking" circuitry, which is said to reduce output slightly at the onset of significant harmonic distortion. Its Class A/B amplifier, rated to deliver 60 watts of continuous power. drives a 10-inch polyurethane, forwardfiring active driver and a 12-inch, downward-firing passive radiator. Finished in black-ash woodgrain vinyl, the



cabinet measures 161/4 x 181/4 x 181/4 inches and weighs 40 pounds. Price: \$645. Velodyne Acoustics, Dept. SR, 1746 Junction Ave., San Jose, CA 95112

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DISCONCEPTS

Disconcepts' CD-40 hardwood compact disc holder has an adjustable divider to accommodate from one to forty discs. The stackable unit can hold both single discs and multiple-disc sets. It is made of solid walnut and measures 171/2 inches wide, 6 inches high, and 5 inches deep. Price: \$36. Disconcepts, Dept. SR. 7536 Parkdale, No. 6, St. Louis, MO 63105.

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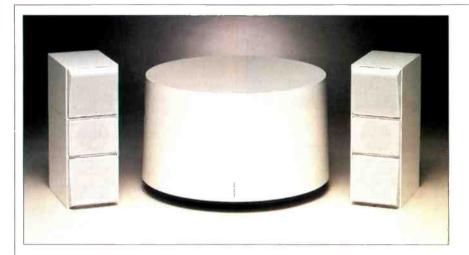
TATUNG

The Tatung VRH-185U is a frontloading VHS Hi-Fi VCR with HO circuitry, automatic rewind, repeat playback, three speeds (SP, EP, and LP), and an indicator light to show when a tape is

loaded. An infrared remote control is included. Price: \$299. Tatung Company of America. Dept. SR. 2850 El Presidio St., Long Beach, CA 90810.

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NEW PRODUCTS



BANG & OLUFSEN

The Bang & Olufsen Cona subwoofer. shown here with B&O's CX100 compact speakers, uses a single 8-inch driver with two voice coils in its bass-reflex cabinet. This design is said to enable the subwoofer to reproduce low frequencies from both channels without interference or phasing problems. Rated frequency response is 40 to 195 Hz, power handling is 60 watts, and nominal impedance is 6 ohms. The Cona is available in white, black, and gray and comes with matching speaker cables. Dimensions are 10½ inches high and 17 inches in diameter. Price: \$395. Bang & Olufsen, Dept. SR, 1150 Feehanville Dr., Mt. Prospect, IL 60056.

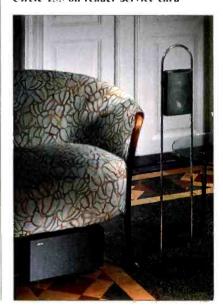
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IAMO

The satellite speakers in the Jamo SW2 subwoofer/satellite speaker system are designed either for free-standing placement or for wall mounting in a custom installation. The subwoofer module, which has two 61/2-inch woofers, can be hidden from view. Each satellite speaker has a 4-inch midrange and a 2-inch tweeter. System frequency response is rated as 35 to 20,000 Hz, nominal impedance as 8 ohms, sensitivity as 90 dB, and power handling as 80 watts continuous, 140 watts peak. Dimensions are 19 x 131/3 x 8 inches for the subwoofer and 61/2 x 4 x 62/3 inches for the satellites. Prices: \$499 for the threepiece speaker system, \$149 a pair for the optional chrome-plated, cast-iron satellite stands shown.

Circle 135 on reader service card



GOLDMUND

Dubbed the "heaviest amplifier ever built" by its manufacturer, the 220pound Goldmund Mimesis 9 has a case made of 1/4-inch steel, damped with shock-absorbing material and decoupled from the electronics and the unit's three conical feet by Teflon isolators. The power transformer and output stages are mounted rigidly to the feet to minimize vibration. Rated to deliver 200 watts per channel, the Mimesis 9 was designed for use with low-efficiency speakers. Price: \$8,990. Goldmund SA, Dept. SR, 5 Rue Du Cardinal-Journet. 1217, Meyrin-Genève, Switzerland, Circle 136 on reader service card

All product information is provided by the manufacturers and does not represent the results of tests or evaluations by STEREO REVIEW. Suggested retail prices were current as of press time but are subject to change without notice.

A TLANTIC TECHNOLOGY

The Pattern three-piece speaker system is the debut product from Atlantic Technology, a part of Lincolnwood, Ltd., the parent company of NAD. The Pattern is a powered satellite/subwoofer system with three separate channels of amplification. The subwoofer's amplifier uses a recently patented contouring circuit that continuously monitors the level and frequency of the incoming signal and adjusts the equalization for optimum performance. The dual-mode system can be driven by virtually any line-level source, including a portable CD or tape player or a stereo television set, and it can also be driven conventionally by a receiver or an external amplifier

Frequency response is rated as 38 to 20,000 Hz ± 3 dB, with a maximum sound-pressure level of 110 dB. The subwoofer's cabinet measures 1934 x 121/4 x 83/4 inches, and the satellites are 4 x 8 x 3¾ inches. Price: \$499. Atlantic Technology, Dept. SR, 575 University Ave., P.O. Box 9124, Norwood, MA 02062.

Circle 134 on reader service card

THE 200 SERIES



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MODEL 202

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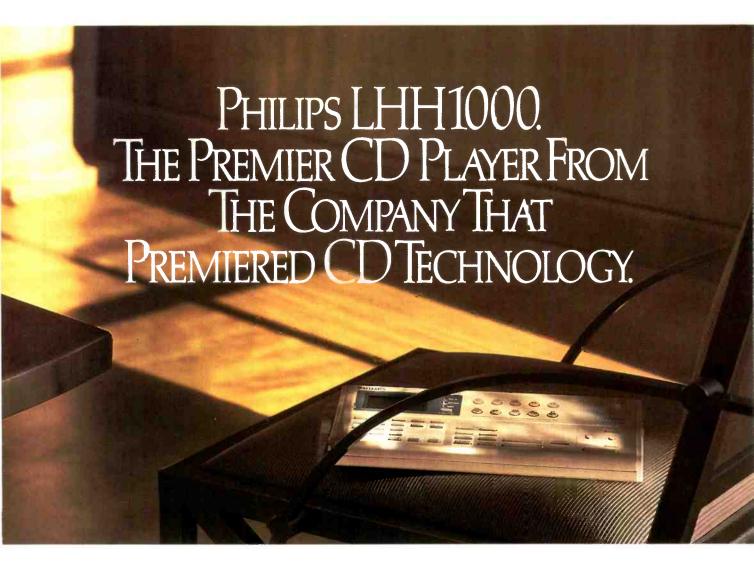
Four separate port tubes allow you to select just the right sensitivity to compliment almost any small speaker, and thus, realize a remarkable listening experience.











This limited edition Reference Series LHH 1000 is a direct descendant of Philips' broadcast-standard CD recording and mastering equipment. In fact, it's the first consumer model with the professional LHH designation.

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PHILIPS

"JUST THE FACTS, PLEASE"

by Ken C. Pohlmann

WOULD like to describe an innovative audio reproduction technique that I have recently developed. It is admittedly unorthodox, but I have worked out the math, and I have testimony from listeners who support my theories. With all due modesty, I think you'll agree that the improvement in signal clarity is astonishing.

Although much too complex to detail here, the basis of my technique is the interaction between the earth's magnetic field and the electrical signals in conductors. The strength of the earth's magnetic field (easily strong enough to move a compass needle) can influence the flow of electrons in a wire and hence the nature of the audio signal represented by that flow. I have carefully analyzed the effect and devised practical steps that you can take to minimize the problem in your audio system.

First, orient all the electrical wires in your system so that they are parallel to magnetic north (use a compass, but make sure that no audio signal is running through a wire when you are aligning it). Second, wrap the wires with thin copper sheets, making sure that all seams are electrically connected. Third, join all the copper sheets together at the power amplifier and connect them to a ground—ideally, a cold-water pipe.

Through these modifications, your audio signals will no longer be affected by the earth's magnetic field. The electrons will be free to move linearly through the conductor without interference from extraneous magnetic flux. As a result, I believe, you will hear new clarity and transparency.

That was fun. Now let's return to reality. Let me make clear that I have absolutely no idea whether the earth's magnetic field affects audio signals. Intuitively, I would say that it almost certainly does not. At any rate, the suggested modification

confuses the issues of electrical shielding and grounding with that of magnetic flux. The two are not related

Or are they? Who's to say that good magnetic shielding might not somehow alter the electron flow, or that very weak magnetic fields might not cause interference? When is a new idea nonsense, and when is it a fact that has yet to be recognized? One test might be its relation to existing facts. If it doesn't fit with the rest of our knowledge, surely it would be suspect. But knowledge is ever changing, particularly in a technology-driven field like audio.

What we take for fact changes all the time, often dramatically. For example, every audio engineer is acquainted with the Fourier series; it has ramifications in almost all aspects of audio theory. It's a fact that a periodic function, such as an acoustical waveform, can be represented as a series of harmonically related sines and cosines. But when the idea was first proposed, in 1811, it met with great skepticism.

Perhaps the biggest problem, quite frankly, was Jean Baptiste Joseph Fourier himself. He was a strange guy, even as mathematicians go. His passion was the mathematics of heat, and he pursued his studies so enthusiastically that he kept the temperature in his rooms unbelievably high, and even then he always kept himself bundled in a heavy overcoat. Anyway, while studying the conduction of heat, he casually tossed off this new idea about representing periodic functions as a harmonic series. Acousticians, scientists, and even fellow mathematicians thought the idea was absolutely goofy. Eighteen years elapsed before another mathematician, Peter Dirichlet, succeeded in proving the theorem. The theorem became a fact and completely overturned scientific convention.

Clearly, scientists have a nasty habit of discovering that what they had believed to be true is actually completely wrong. And it doesn't take a scientific revolution to puzzle people. In many cases, established facts simply aren't understood very well. Stanley Lipshitz, a contemporary professor of mathematics and an audio researcher at the Universi-

ty of Waterloo, Ontario, is fond of pointing out that "simple" stereo reproduction isn't so simple after all. Stereo sound comes from two loudspeakers, reaching our two ears. You would expect that level differences between the speakers would manifest themselves as level differences between the ears and that phase differences between the speakers would result in phase differences between the ears. That's how we localize sounds in the stereo plane, right?

Well, actually, at low frequencies it's pretty much the opposite: Loudspeaker level differences produce time differences between the ears. and that's how we localize sounds. Time differences between the loudspeakers produce very unnatural polarity differences at the ears that just confuse things. The heart of the matter is this: In natural hearing, each ear hears sounds from the source to be localized. But in stereo reproduction, a completely artificial kind of listening, each ear hears sounds from both loudspeakers. If you think about that, and draw a diagram or two, you'll see that stereo listening is, in fact, quite complex. But sometimes even the facts aren't interpreted correctly.

What can we make of this? When someone suggests a strange idea about audio, should we believe it or not? Is the idea ahead of its time, or is it just crazy? If other facts imply otherwise, can you really trust those facts? Is the idea valid but its implications so negligible that it can safely be ignored?

Unfortunately, there's really no absolute way to answer any of those questions. It's been estimated that at its current rate of growth, human knowledge doubles every twenty months. I don't know at what temperature modern audio researchers keep their thermostats, or exactly what effect that has on their thought, but at any time one of them could notice something, like Fourier's theorem, that redefines audio as we know it.

On the other hand, some things are certain. If you set your thermostat too high, your heating bill will be astronomical. No one has yet managed to perfect a perpetualmotion engine.

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AUDIO Q&A

by Ian G. Masters



Tracking Force for Dubbing

When I am making a tape copy of a treasured LP that is in good condition but starting to show signs of wear, is it better to increase or decrease the stylus tracking force or to use the normal setting?

JOHN McCarthy Carbondale, PA

Decreasing tracking force is usually unwise because it can lead to mistracking, which not only sounds terrible but will almost certainly damage your records. Increasing it, on the other hand, is unlikely to improve the sound unless your normal setting is so light that mistracking is already occurring, in which case you should increase the force for all playing. Check the range specified by your cartridge manufacturer and set the force toward the top end of the range.

Ultrasonic Response

I often see audio equipment frequency-response specifications that reach 40 or 50 kttz. Why would they need to go this high when humans can only hear up to 20 kttz?

GURPREET DHALIWAL Racine, WI

A Not only can we not hear such high frequencies—or even as high as 20 kHz in most cases—but there's nothing up there for the equipment to reproduce. Both tape and vinyl strain to

reach 20 kHz; CD players intentionally filter out signals above that frequency, and FM tuners cut off above 15 kHz. Nevertheless, there are a couple of reasons why hi-fi manufacturers design extended high-frequency response into their equipment.

One is the belief—disputed by some engineers—that this extra margin improves transient performance. Also, most equipment's response tends to taper off slightly as it reaches its upper limit; by placing this limit well above the audible range, the designers are able to maintain flat response in the part of the spectrum we can hear.

Listening and Taping

With my present A/V receiver I can watch the program from one VCR while recording on another, but I can't do the same with the audio sources. I would like to be able to feed any input to any recorder while listening to a different source. Is this possible?

TARIQ NAZIR Owings Mills, MD

Probably not with your present equipment. A number of manufacturers do configure their preamplifiers and receivers so that any input can be fed to the tape-recording circuits independently of what is playing through the system, but this is a facility that must be designed into the system; it would be difficult to add it on after the fact. There are, however, several external audio/video switchers on the market that might allow you to do what you want by routing the signals before they even reach your receiver, which then becomes primarily an amplifier.

Bulk Erasure

I have a bulk eraser that works beautifully on open-reel tapes, but with cassettes it always leaves some signal. Am I doing something wrong?

JOHN KELLNER East Walpole, MA

No, the tape makers have been doing something "right." Tapes vary quite widely in the amount of energy it takes to record them, and this applies to erasing them as well. As higher and higher levels of performance have been squeezed out of the cassette, one of the tradeoffs has been coercivity—the amount of energy required to reduce the magnetic flux on the tape to zero. Chrome tape, or its equivalent, is harder to erase than "normal" (Type 1) ferric-oxide; metal tape is harder still. The same advances in magnetic technology have not generally been applied (Continued on page 28)

THE METAL AGE IS HERE

Serious recording enthusiasts know that in today's world of digital audio, conventional cassettes just won't do. Their formulations don't meet higher recording requirements.

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Sony introduces Metal Master, the preeminent tape in the Sony Metal line. Based upon years of Sony advanced research into high density metal materials, it combines ultrafine Extralloy magnetic particles with a new high polymer binding, to achieve superb linearity and the highest rated output ever. Plus its unique one-piece ceramic shell and tape guide are designed to dampen vibration and reduce modulation noise.

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For more information write: Sony Metal, Sony Magnetic Products Company, Sony Drive, Park Ridge, NJ 07656.



SONY





Before you buy a CD changer, there are two things you should consider. Your home. And your car.

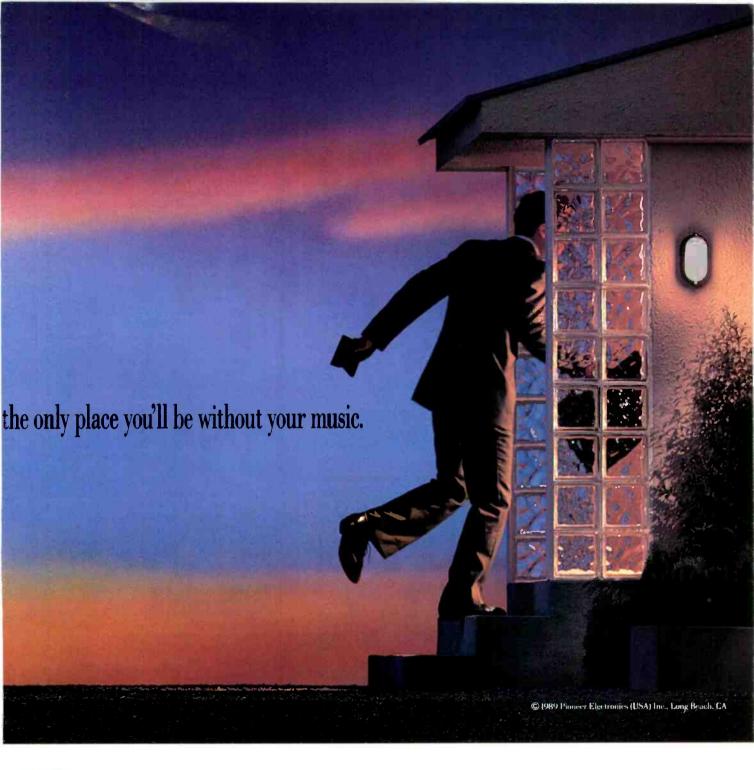
Because Pioneer makes a compatible 6-disc CD changer system for both, now you can enjoy your favorite music wherever you go.

The key to home and car compatibility



is Pioneer's ingenious 6-disc magazine, which works in all Pioneer home and car CD changers. It's the most convenient way to load, store and catalog your CDs.

All of Pioneer's home CD changers feature the latest innovations in digital





technology, as well as multiple programming capability and

random play.

As for versatility, you simply won't find a better car CD changer system. A Pioneer car CD changer can either replace or be added on to your current car

stereo, using one of four advanced CD controller units.

Of course, there are still some places where you won't be able to enjoy Pioneer's 6-disc CD Changer system.

But we're working on it.



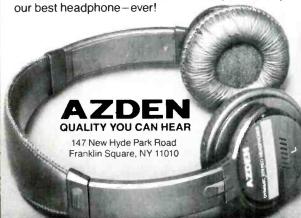


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AUDIO O&A

to open-reel tapes, however, because it has not been needed; open-reel tapes perform well even with the old-style. low-coercivity formulations. So while your bulk eraser may be strong enough to clear the open-reel tapes (and probably Type I cassettes as well), it hasn't enough power to erase the more advanced-formula cassettes.

Multiple Crossovers

My system consists of a pair of subwoofers and a pair of satellite speakers powered by two stereo amplifiers through four separate crossover networks. For each side, one set of amplifier outputs is connected to one of the crossovers, which is in turn connected to the high and midrange drivers in the satellite speaker, the woofer output being unconnected. The other amplifier is connected to another crossover, the low-frequency output of which drives the subwoofer. Is this a practical way to set things up, or will leaving the various crossover outputs unconnected degrade the sound quality in some fashion?

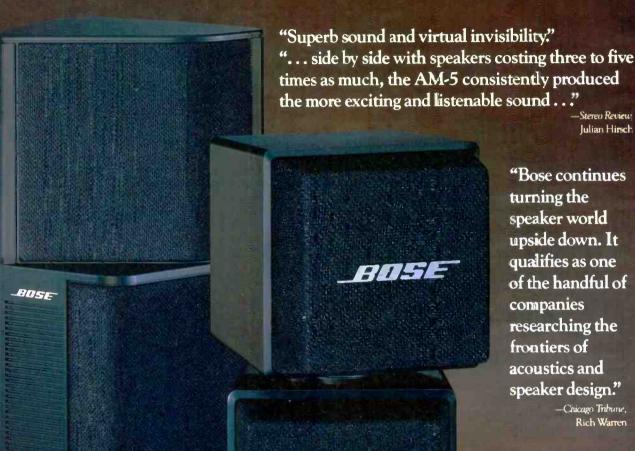
> RANDOLPH TELLERIA ORTEGA La Paz, Bolivia

What you have accomplished is a sort of passive biamplification. Normally, using separate amplifiers to power different parts of the audio spectrum requires the use of an active electronic crossover network inserted in the system before the amplifier stage; in your case, you have separated the signals after amplification.

But one of the main reasons for biamplifying is to maximize amplifier power by making available to each part of the audio spectrum the total power capability of the amplifier driving it. An electronic crossover will insure that the amplifier driving, say, the satellite speakers will not have to deal with the power-hungry bass signals and so will be able to deliver its whole output to the higher frequencies. In your setup, on the other hand, all the amplifiers are handling the full audio spectrum, so they are not able to provide much more power to the speakers than they would if a single amplifier were used. Certainly, since the high-frequency amplifier will not actually be driving a woofer, it will produce less heat, but the voltage swings will be the same, as will the amplifier's clipping level.

In addition, a crossover network with only some of the intended speakers connected to it may represent a fairly strange load that your amplifiers may have difficulty driving. That depends largely on the amps themselves and the design of the crossovers, but in some circumstances you could damage the output stages of your amplifiers.

READ WHAT THE EXPERTS HAVE WRITTEN ... THEN YOU DECIDE.



Rich Warren

"...a sonic standout."

> -The New York Times. Hans Fantel

TAKING A "BUILDING
BLOCK" APPROACH TO A
HOME ENTERTAINMENT
SYSTEM LETS YOU BUILD
YOUR SYSTEM GRADUALLY
OR ALL AT ONCE, AND
ENJOY IT AT EVERY
STAGE!

THE MOST EXCITING PART OF YOUR VIDEO COULD BE THE AUDIO!

by Tim Holl

he videotape movie you rent this weekend may offer more entertainment than you thought possible. If it is recent, it probably has a hi-fi soundtrack rivaling the sound of compact discs. From the thundering bass of jet aircraft in Top Gun to the emotional impact of Amadeus, home video soundtracks have come a long way. Watching them on a normal television with its built-in sound system is rather like listening to modern albums on a wind-up phonograph.

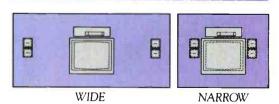
Enjoying this new dimension of sound and motion can be accomplished in different ways and at different levels. By just combining your current audio system with your television you can begin to unleash the excitement built into today's videos and broadcasts. And don't forget that many video soundtracks are also "surround" encoded. By making a modest upgrade to your current system, you can be on a path toward a full surround sound system with as many as six speakers that will rival the sound heard in some of the best cinemas, and exceed that heard in most others. But if you find the thought of six speakers in a room daunting, forget the bulky multi-channel systems of the past-today such a system can be virtually invisible. The path you take to achieve the full performance locked in today's software and off-air program material is up to you. Regardless of approach, the key to really recreating the cinema experience in your home and building a true home entertainment system is understanding the performance requirements and potential pitfalls of such a system, and knowing what's available to build it.

Does "audio for video" impose additional requirements?

High-quality audio soundtracks on laser disc and videotape are a relative newcomer in the field of high

fidelity. I remember the excitement I felt several years ago when I took home an early model laser disc player, hooked it up to my sound system, placed my television midway between the speakers and settled back to watch "Raiders of the Lost Ark". That excitement was fully justified, and I soon became totally absorbed in the entertainment ... until I was jarred out of the world of Indiana Jones by the sound of his voice somewhere off-screen, even though I saw him obviously speaking on-screen. Audio for video was apparently not as simple as the "audio only" material to which I had been accustomed. In the world of audio for video, spatial cues our eyes receive must match the associated audio cues our ears receive, and that was the missing element.

The area of high fidelity audio for home video is so new that misconceptions about what is appropriate abound. While much work has been done over the years on high quality audio associated with video, this work has almost exclusively been in the realm of cinema sound—a situation that is very different from your home. In the cinema, the listening space is



(Wide) Speakers too far to either side of the TV screen may produce an unnatural sounding phantom center image. Speech will not be localized on-screen as the eye and ear expect to hear.

(Narrow) By moving the speakers closer to the TV screen, a more pleasant and natural on-screen speech effect is created. Be sure the speakers you use are magnetically shielded to prevent picture interference.



The cinema sound stage is much larger and wider than even the largest home TV screen, with loudspeakers behind the full width of the screen, exactly matching the size of the sound stage. By building toward the ultimate home sound system, you get closer to a cinema experience with each "building block" step taken.

obviously much larger than that in the home. But more importantly, the screen is also much larger and matches exactly the size of the sound stage (the loudspeakers are behind the screen). In the home, even large rear-projection televisions provide small-screen viewing by comparison. The TV screen is much smaller than the size of the audio image delivered by a normal stereo system with 6 to 8 feet of separation between the loudspeakers.

Taking all this into account, let's take a "building block" approach to a home entertainment system. Starting from the simplest utilization of a current stereo system, to a full multi-channel system, let's examine the benefits and drawbacks of each approach.

A first step.

The first step is to connect your video sound to your stereo system and place your TV screen midway between the speakers. Make sure to use the stereo audio outputs of your VCR or laser disc player. (The most common mistake is connecting the signal from the RF output [Antenna Out] of a hi-fi VCR or laser disc player to the TV, then connecting the audio outputs from the TV to the hi-fi system. This kind of RF output connection does not transmit stereo sound to the television, and you will end up with monophonic playback of stereo sources!)

Properly connected, this setup will provide an immediate improvement in the tonal balance compared with just about any television's built-in speaker. In addition, the audio image will be wide, extending to at least the width of the space between the speakers. (Vocal localization will not be as strongly on screen as you are used to with your television, but this compromise may be acceptable to you—if not, I will show you how to improve matters later.) The improvement will definitely be considered worthwhile, particularly on video material with a musical

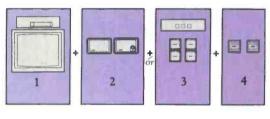
soundtrack. In addition, if the speakers can produce deep bass, you will hear another benefit. In movies, deep bass is often used to provide essential clues to the overall atmosphere of a scene. A deep, continuous bass note is often used to impart unease or danger, such as when "enemy" space ships come into view. A loudspeaker without good bass performance will liter-

ally not produce such notes, and the effect will be totally lost. If your speakers lack adequate bass response, you may wish to consider upgrading them. Here, knowing what's new can help a great deal. If space is at a premium, or

if you simply object to the negative cosmetic impact larger speakers might impose on your decor, Bose[®] Acoustimass[®] speaker systems could provide an excellent solution. In these systems, the stereo image is provided by enclosures that are so small, they virtually disappear into the room. A patented Bose design allows you to conceal a third piece, the Acoustimass bass module, anywhere in the room, where it produces full, deep bass without giving any audible hint as to its location.

All hooked up, where else to go?

With your current stereo system properly connected, the benefits are better sound, wider image and deep bass. However, there is also a localization problem to overcome. Unlike typical audio software, much of the sound on a television is speech, most of it coupled to an image on the screen of the person talking. We expect that speech to be strongly localized on the TV screen. However, the phantom center image produced by the pair of wide-spaced speakers just does not provide enough on-screen localization. Thus, if such a system is used, a sense of dissatisfaction



The "Building Block" Approach

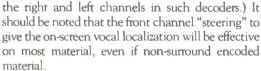
Start with your TV and hi-fi VCR (block 1). Add powered speakers or a Pro-Logic® receiver and a pair of hi-fi speakers (blocks 2 & 3). Put blocks 2 and 3 together and add rear speakers (block 4) and you've built the "ultimate" surround system while enjoying it one piece at a time.

with the result frequently appears with time, even if the viewer cannot quite put his finger on what actually is wrong. A degree of on-screen localization can frequently be retrieved by slightly turning up the volume on the television speaker, but a better answer is to move the speakers adjacent to either side of the screen. This will give a narrower sound stage, but will retain all the higher quality sound with excellent on-screen localization. To do this requires that the speakers be magnetically shielded so that the television picture is not adversely affected. (Once again, the Bose® Acoustimass® speaker systems are ideal for discreet placement adjacent to the TV. They are exceptionally small, and are magnetically shielded.)

Moving onward toward the home cinema.

Looking at slightly more complex audio-video systems, it becomes possible to enjoy on-screen vocal localization with a wide stereo image. To do this, a steering logic surround decoder is included in the system. However, the important part of what this decoder does is in the *front* of the room, not in the rear as might be expected. It assures that speech is directed to a speaker close to

the screen. In most video material. speech is recorded monophonically to assure that good onscreen localization can be obtained. A steering logic surround decoder has right, left and center outputs for the front of the room. Its logic will direct the monophonic content of the program, including speech, to the center channel only. and not to the right or left channels. (Simpler surround decoders without steering logic will not provide the same benefit, even if they have a center channel, since monophonic signals will be fed equally to



With full bandwidth stereo speakers widely spaced to either side of the television screen for a normal wide stereo image, the center channel speaker(s) should be placed on top of or adjacent to the television. You now, of course, need those center channel loudspeakers, but they do not have to produce deep bass, as their real purpose is to localize speech. Once again, they must be magnetically shielded since they are close to the TV screen, and amplification must be provided for them. Steering logic decoders can be purchased as separate pieces of equipment or as features incorporated into a receiver. Such equipment may well provide power amplification for any rear surround channel speakers, but can fail to provide amplification for the center channel. This requires a separate amplifier or, more conveniently, the use of magnetically shielded self-powered speakers such as the Bose Video RoomMate[®] speaker system.



Adding a pair of quality high fidelity loudspeakers adds to the excitement and enjoyment of watching television and videotape movies.

Rear channel . . . the final frontier.

So far, I have only covered what the surround system can achieve in the *front* of the room. Indeed, this is probably the most important function of it. However, a complete audio-video system should also include rear channel speakers as well.

It is normally desirable to select inconspicuous speakers, since there now will be many of them in the room. It is also desirable to place them such that furniture is not positioned directly between them and the viewer (such as the back of the favorite armchair being used). Such placement is most easily achieved if they are positioned relatively high on the rear wall. If deep bass were not needed, this would allow the use of any number of models of small speakers. However, investigation has shown that in about 50% of surround encoded movies, bass is deliberately included in the surround channel. To get the full impact of such movies, it is desirable to reproduce that bass. Once again, Bose Acoustimass systems are an excellent solution, providing deep bass, and very small stereo speakers that can be easily wall-mounted.

If a full surround system is used as described, the desired effects in the rear will only be heard on surround encoded material (which includes almost all modern movies). However, the left-right-center steering produced by the decoder will, as stated earlier, be effective on most material, surround encoded or not. It is therefore a good idea, if possible, to only switch the rear speakers on or off for encoded or non-encoded material respectively, leaving the decoder itself active at all times.

Now playing . . . The total cinema experience.

The ultimate system described is an audio system that can be used as a "home theater" and will rival sound heard in some of the best cinemas. However, it is not necessary to take an "all or nothing" approach. Remember that I built up to this system, showing just what each addition added. In just the same way, you can build a system all at once, or one step at a time. The addition of just a pair of quality speakers and suitable amplification can be a tremendous improvement, and the start of your dream audio-video system. Addition of a steering logic surround decoder for a full-width sound image together with on-screen vocals brings you closer to a true cinema experience. Finally, if you add rear channel speakers to the system, surround encoded material fills your room with sound. There is no question that at each stage the improvement is very noticeable, but the most noticeable improvement will be when you take that first step. You may wonder how you ever put up with ordinary TV sound, and find yourself renting those old favorites again to hear what you missed the first time. To find out where to audition a system like the one described in the article, call 1-800-444-BOSE.

About the author:

Tim Holl has spent 24 years in the audio business as a Senior Engineer and VP/Technical Director. Tim is currently Manager of Research in Acoustics at Bose Corporation, USA.

A MORE LIFELIKE EXPERIENCE IS JUST WAITING TO BE UNLEASHED, BUT ONLY IF YOU KNOW HOW, AND ONLY IF YOU PLAN TODAY FOR YOUR NEEDS TOMORROW.

CHOOSING THE RIGHT COMPONENTS.

f you haven't yet read the article on the last three pages you could be cheating yourself, because the information it contains could literally change the way you enjoy your music system forever. Some new-found excitement may be available in your home today, hidden in the hi-fi tracks of your video software, or in the television airways. A more lifelike home entertainment experience is just waiting to be unleashed, but only if you know how, and plan today for your needs tomorrow. With the information contained in this article you can greatly enhance the investment you have already made or are about to make. Planning your audio system should not be limited to just music, rather you should view your

components in terms of total *Home Entertainment*. Even if your current video activities are simply watching sporting events or standard network broadcasts on your TV, you will be amazed at how much more lifelike the experience of your entertainment selection will be when delivered in real high fidelity sound. With the purchase of the right components, particularly speakers, you can enhance your enjoyment today and protect your investment from becoming obsolete. In the following pages we will introduce you to Bose® speaker systems that use unique patented technologies to achieve a standard of design and performance that until recently was not possible.

Just starting your entertainment adventure?

If you have nothing more than a television set the best way to begin the development of your home entertainment system is with the Bose Video Room-Mate® speaker system. The Video Room-Mate system will provide full-range, high fidelity sound with crisp, clear stereo separation that will enhance your viewing and listening enjoyment.

The Bose Video RoomMate system is a fullyintegrated system. This eliminates the need to purchase or connect separate amplifiers or electronics. In addition to high performance stereo amplification, the system incorporates magnetically shielded patented Helical Voice Coil drivers which increase the performance, efficiency and durability of the system, while protecting against video interference. The Video RoomMate system also includes active equalization circuitry which balances the tone automatically and is optimized for video broadcasts. Additional limiting circuitry virtually eliminates distortion even when played at maximum volume. As your system grows, the Video RoomMate system can be utilized as an ideal center channel speaker in a multi-channel system, allowing you to add the Video RoomMate system now with confidence that it will not become obsolete as you continue to build your home entertainment system.



The Bos? Video RoomMate speaker system's integrated design includes shielded stereo speakers, stereo amplifier, limiting circuits and active equalizer, all in one package.

"SUPERB SOUND AND VIRTUAL INVISIBILITY." "... SIDE BY SIDE WITH SPEAKERS COSTING THREE TO FIVE TIMES AS MUCH, THE AM-5 CONSISTENTLY PRODUCED THE MORE EXCITING AND LISTENABLE SOUND . . ." —STEREO REVIEW

INTRODUCING BOSE® "VIRTUALLY INVISIBLE" SPEAKER SYSTEMS.

One of two stereo imaging cube speaker arrays included in

Acoustimass-5 system.

ose[®] Acoustimass[®]-5 Direct/Reflecting[®] speaker system

Julian Hirsch

8056

: 1115

The magnetically shielded Acoustimass-5 speaker system is the result of years of research dedicated to providing room-filling, high-quality sound reproduction. A pair of tiny stereo imaging cube speaker arrays and single compact Acoustimass bass

module are "virtually invisi-

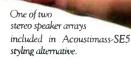
ble" in a room, yet capable of powerful bass and exceptional spatial qualities. The performance of the Acoustimass-5 surpasses even that of much larger, more expensive speakers. This level of performance is the result of patented Bose Acoustimass technology. Unlike conventional speakers, Acoustimass speakers launch sound into the room by two masses of air, rather than by a vibrating surface. This results in purer bass response with virtually no distor-

s m a l l size and distortionfree performance allow the module to be hidden anywhere in a room without any audible hint of

tion. Its

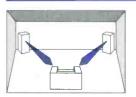
timass module is complemented by a pair of stereo imaging cube speaker arrays-each measuring only slightly over 7in./17 cm high. A product of the Bose heritage of Direct/ Reflecting® speaker technology, their design is based on over 20 years of research dedicated to recreating sound that approaches the experience of a live performance. Additionally this unique Bose design also delivers the benefit of Stereo Everywhere®

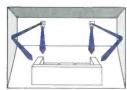
its location. The Acous-



sound regardless of where you sit in the listening room (see diagram).

Each cube array can be conveniently mounted on a wall, ceiling, or shelf with available Bose mounting accessories, which can provide for a "virtually invisible" installation in your room.





Conventional speakers (left) reproduce mainly direct sound. They miss much of music's realism and impact—and let you hear full stereo only in a narrow spot. Bose Direct/Reflecting® speakers (right) accurately reproduce the balance of direct and reflected sound, providing greater realism in full stereo throughout the listening room, wherever you sit.

WHATEVER YOUR
BUDGET, DECOR OR
LISTENING REQUIREMENTS
BOSE SPEAKER SYSTEMS
COMBINE SURPRISINGLY
SMALL SIZE WITH
HIGH PERFORMANCE.

PURER SOUND AND "VIRTUAL INVISIBILITY" FROM BOSE" TECHNOLOGY.

Offering much of the performance of the Acoustimass[©]-5 speaker system but at lower cost, is the new

ose Acoustimass®-3

tem but at lower cost, is the new Acoustimass-3 speaker system, the world's smallest speaker system offering purer sound and virtual invisibility.

Unique wedge-shaped, magnetically shielded cubes, each about the size of a softball, are coupled with a patented Acoustimass bass module only slightly larger than a shoe box. As with all Bose Acoustimass systems, the bass module can be hidden anywhere in your room yet all the bass still seems to come from the imaging cubes.

The system produces lifelike stereo sound with all the bass, power handling and dynamic range you would expect only from a much larger and more expensive system.

The extremely small size of the Acoustimass-3 system allows placement anywhere in your room . . . next to a TV, or any out-of-the-way location. Available mounting accessories allow additional flexibility of installation.

Compare Acoustimass-3

speakers to larger and more expensive systems. We

submit no system in its price class will offer the same level of performance

and flexibility.

Bose[©] Freestvle™ speaker system

Although not an Acoustimass system, patented Bose technology in the Freestyle system provides maximum performance in a small, inexpensive bookshelf speaker. Surprisingly small size combined with high performance qualify the Freestyle system as a Bose "virtually invisible" speaker system.

At the heart of the Freestyle speaker system is the Bose Helical Voice Coil driver. After 11 years of continued Bose research in the performance areas of accuracy, power output, efficiency and reliability, we believe this driver is the most highly developed in the world. Used for the first time in the Bose Freestyle, this is the latest and most enhanced Bose HVC driver to date. It provides exceptional power handling, and extended high frequency performance. A patented curved and flared porting system, optimized just for this new driver, allows the Freestyle speaker to produce low frequencies previously only thought possible from a much larger enclosure.

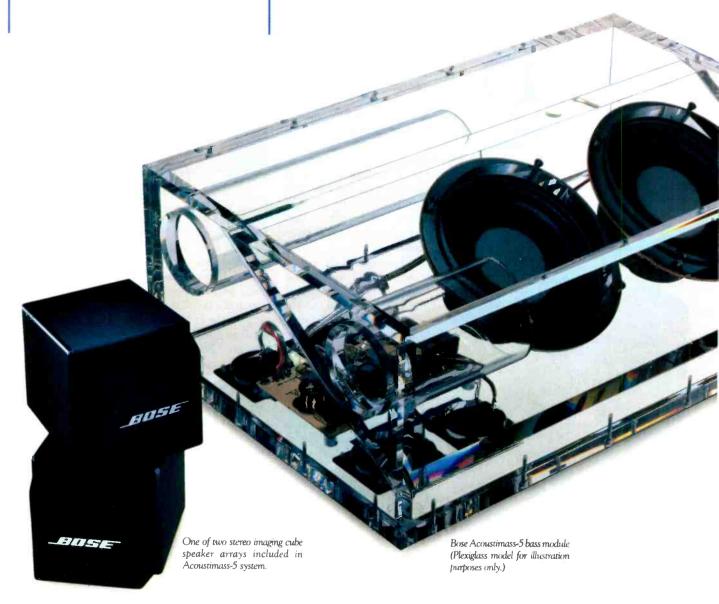
The Freestyle offers performance that will impress the most discriminating listener, particularly for its size. As with the other "virtually invisible" Bose speaker systems, mounting accessories provide placement flexibility for the Freestyle.

One of two stereo imaging cubes included in Acoustimass-3 system.

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WHAT MAKES AN
ACOUSTIMASS SPEAKER
DIFFERENT FROM
ANY OTHER?
AN ACOUSTIMASS
SPEAKER LAUNCHES
SOUND INTO THE ROOM
BY TWO AIR MASSES,
RATHER THAN BY
A VIBRATING SURFACE.

ACOUSTIMASS° TECHNOLOGY. A BENEFIT YOU CAN HEAR BUT NOT SEE.



(Top left) Bose Acoustimass-SE5 speaker system.

(Top right) Bose Acoustimass-5 white wall-ceiling mount accessory (WC-6) in typical "surround sound" rear channel application allows "virtually invisible" installation.

(Bottom left) The Bose Video Roommate® speaker system can be used to add high fidelity to simple TV viewing.

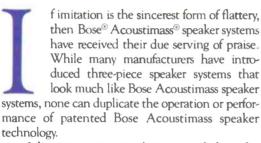
(Bottom right) Acoustimass bass modules conceal easily virtually anywhere.











Like many, you may have marveled at the extremely small size of the Bose Acoustimass speakers, which can literally fit in the palm of your hand. But the real secret is hidden from view, in the Acoustimass module which allows the imaging speakers to be so small. Only Acoustimass speaker technology can allow such speakers to be so small. Only Bose patented Acoustimass systems achieve it all. Purer sound, virtual invisibility, high power handling, improved efficiency and wider dynamic range.



Bose Acoustimass-3 bass module and one of two stereo imaging cubes included with Acoustimass-3 system. (Plexiglass model shown for illustration purposes only.)

The Important Benefits Of Bose Acoustimass Speaker Systems.

· Purer sound

Sound is launched into the room by two air masses, rather than from a vibrating surface. Acoustic filtering of distortion within the Acoustimass module means that the air masses are purer sound generators than mechanically vibrating cone surfaces.

· Virtual invisibility

The acoustic filtering of distortion means that the compact Acoustimass module can reproduce the lower musical spectrum, yet without the audible localization of the source of the sound. The remaining upper octaves of music are reproduced by extremely small and unobtrusive stereo imaging speakers.

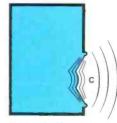
· Wider dynamic range

The reduced distortion, high efficiency and power handling design of the Acoustimass system means that you can reliably take full advantage of the wide dynamic range of digital compact discs and hi-fi videocassettes.

How An Acoustimass Module Works:

Improving speaker performance means first reducing distortion. The design of an Acoustimass system produces no discernible distortion. (See diagrams.) This means a better sound. It is the distortion in the reproduction of bass frequencies which allows the listener to pinpoint the location of their source. This is why a conventional subwoofer must be placed close to its satellite speakers for optimum performance. Unlike conventional systems, however, the reduction in distortion from a patented Acoustimass speaker system also gives the listener an additional benefit—the ability to hear all the sound seemingly originate solely from the small imaging speakers. The result is a system with better performance which can be easily concealed anywhere in your listening room. The ultimate benefits of this patented Bose speaker technology? Purer sound and virtual invisibility.





Acoustimass Speaker

Conventional Speaker

Left: An Acoustimass speaker launches sound into the room using two masses of air working like pistons (A&B, darker blue), rather than by a surface vibrating directly into the room. The sound launched into the room by the Acoustimass speaker's air pistons is the purest sound that can be produced by present technology.

Right: A vibrating cone radiating directly into the room (C) produces more distorted sound.

AT BOSE THE PRIMARY
OBJECTIVE IS
TO PRODUCE AUDIO
PRODUCTS WITH
PERFORMANCE
ADVANTAGES WITH CLEAR
BENEFITS TO LISTENERS
EVERYWHERE.

BOSE® CORPORATION:



Dr. Amar G. Bose, founder and Chairman of Bose Corporation.

he Bose story began in the research laboratories of MIT.

Dr. Amar G. Bose, professor of electrical engineering at the Massachusetts Institute of Technology (MIT), began wondering in the 1950's why loudspeakers with impressive published technical specifications failed to reproduce the full, rich subtleties of a live musical performance.

For 12 years, Dr. Bose studied speaker design and psychoacoustics, the science of the human perception of sound. His findings resulted in design concepts for radically different kinds of speaker systems.

The company behind the products. Bose is the world leader in acoustics and innovative audio products for home and industry.

Bose Corporation was formed in 1964. In 1968, together with a team of engineers including many of his former students, Dr. Bose entered the high fidelity music field by introducing the Bose 901° Direct/Reflecting° loudspeaker system. With the 901 system, Dr. Bose and his research team achieved international acclaim by setting a new standard in music reproduction.

Bose Corporation designs, manufactures and markets some of the finest audio products in the world. In fact, Bose has been chosen by many of the world's leading automobile, computer and television manufacturers to provide quality sound for their products. At Bose, the primary objective is to produce audio products with performance advantages that provide clear benefits to listeners everywhere.

Bose engineers have worked to assure that the product reaching the consumer is thoroughly tested for quality and durability, and will perform reliably for years. By creating and employing the Syncom[®] computer quality assurance program, Bose speaker components receive demanding and comprehensive

acoustical testing, which assures that they meet critical performance and reliability requirements.

In applications ranging from private home listening to automobiles, televisions, computers or large-scale concert hall reinforcement, Bose products deliver sound to some of the most demanding listeners in the world.

Performance, innovation and quality combine to make Bose products the choice of both professionals and consumers alike, which is why we believe: "If music is important in your life, sooner or later you will own a Bose system."

For a free Bose product brochure, or the name of the Bose dealer nearest you, call 1-800-444-BOSE.



We have produced some of our most popular models in black finish to complement today's high-technology audio/video equipment.



How the sound gets from there to here third in a series on the basics of audio.

BY IAN G. MASTERS

HE task of any audio system, however simple or complex it may be, is to reproduce in our listening rooms sounds that occurred at a different place and time. Over the years, some of the most ingenious technological thought in any field has gone into developing the means to get high-quality signals to the inputs of our hi-fi systems. Some knowledge of how this process works is basic to an understanding of audio as a whole: Before we can begin to consider specific components, we must know what it is they're supposed to do and what sort of information they have to work with.

The First Step

Practically everything we listen to starts out as live sound, from a radio announcer's dulcet tones to a multitrack rock extravaganza. The signal may have been manipulated and processed along the way, and it may even have some totally artificial elements added to it, such as synthesized instruments or digital delay, but its core is usually real



sound. To get this sound into the audio chain requires a microphone.

The resistive device used as a microphone in early telephones did its job well enough, and it was adapted for early radio and recording. But it was only with the coming of the electrodynamic microphone that the full audio range could be captured reliably. A "dynamic" microphone is one that uses the durable moving-coil design, in which a round, more-or-less flat diaphragm is attached to a very light coil of wire surrounded by a specially shaped magnet. As the diaphragm moves in and out in response to the sound waves hitting it, the coil moves with respect to the magnetic field and thereby generates a corresponding voltage. Dynamic microphones can be small, light, and inexpensive, and yet they can offer true high-fidelity performance.

At the other end of the cost spectrum is the electrostatic or condenser microphone, which is used for the majority of professional applications. A very light, flexible diaphragm, with a thin metallic coating deposited on its rear surface, is positioned near a fixed metal plate so that the sound reaching the diaphragm varies its distance from the plate. These two elements act as a capacitor in an electrical circuit, varying the characteristics of the circuit in step with the sound. Such microphones are capable of the finest performance, but they require that an external voltage be applied to charge the fixed plate. A variation on this theme, which is much simpler to use and less expensive to produce, is the electret microphone, which uses a permanently charged plate requiring no external power source. The majority of microphones for home use are now elec-

However they go about it, microphones create the varying audio signals that other components require to do their work. Such a signal may be sent directly to the listener, as in a live broadcast. Far more often, however, it is recorded, and that usually involves magnetic tape.

Pure Magnetics

It would be difficult to overstate the importance of tape recording. Practically every record, tape, or compact disc we buy was mastered on magnetic tape (with the sole exception of a few direct-to-disc audiophile recordings). Almost everything we listen to on the radio is also recorded, and for the past few years

THEBASICS

the overwhelmingly favorite medium for music buyers has been the cassette.

Tape recording may be the purest application of electromagnetic principles in audio. A signal fed to a coil of wire encircling a bar of iron will create a strong magnetic field that varies with the signal. Normally, the lines of magnetic force will run from one pole to the other lengthwise along the metal, but if the bar is curved so that the ends just about meet, the field in the gap between them will be stronger because of the shorter distance from pole to pole.

Placing an object that has the ability to accept and retain magnetization in contact with this gap will vary its magnetism in step with the energy it receives. A thin strip of plastic coated with iron oxide (rust) drawn past such a magnetically active gap—as in a tape deck's recording head—will cause its particles to be magnetized in response to the varying signal. This magnetic analog of the original signal is recorded across the tape as a continuously varying series of parallel magnetic "waves." Drawing the now-recorded tape past the gap in the head once again, this time with no current in the coil, will re-create the magnetic field within the gap, which will produce an electrical signal in the coil that is—in theory—identical to the original.

Unfortunately, it's not so simple. For one thing, no magnetic medium is linear: Tape responds differently at different signal levels, and response variations are usually most pronounced at the lowest levels, where most of the music is. To overcome this, a high-frequency bias current is added to raise the signal level overall into a region where the tape is closer to linearity. In effect, the positive/negative polarity of a normal audio signal, which passes through the zero point, is converted to a maximum/minimum variation, with the minimum point still well above the troublesome response range. Bias is also fed at a considerably higher level to a deck's erase head, where it scrambles the magnetic information on a tape, leaving a clean medium ready to accept a new recording.

Boosting the overall signal level brings its own problems. The

amount of magnetism a particular tape can hold is limited; beyond a certain level, distortion rises to an unacceptable amount. And yet recording at too low a level, even though that may still be within the linear range, makes only too obvious the fact that tape is a noisy medium, for pianissimo passages are easily lost in the hiss. Noise performance depends partly on the width of the track being recorded, so professionals tend to use wider tapes, or wider tracks on ordinary tapes, to minimize noise. Profes-



sional tape recorders tend to improve high-frequency reproduction by the use of faster tape speeds, as performance in this area depends largely on the number of magnetic particles passing the recording head in a given period of time.

To gain even more advantage, several electronic noise-reduction processes, notably Dolby and dbx, were developed. Both operate during recording by reducing the ratio between a signal's highest and lowest levels—its dynamic range—to something the tape can handle, a process called compression, and then increasing it again during playback (called expansion). As the quieter material is reduced to its proper level, the noise is reduced with it. The details of the various Dolby systems and the dbx system are different, but the basic principle is the same.

While conventional analog re-

cording is still the most common method, several specialized types of audio storage have been developed that take advantage of the widebandwidth capability of video recorders, which have upper frequency limits more than a hundred times greater than that of an ordinary audio tape recorder. The three main video formats now provide hi-fi sound by using a frequency-modulated carrier for the audio signal. Like the picture information, the FM carrier is recorded across the tape diagonally, effectively bypassing most of the inherent limitations of the tape-recording process and offering quality that rivals that of digital recordings. Beta and 8mm VCR's include the hi-fi audio signal with the video information, but VHS machines use a separate head that takes advantage of the fact that higher-frequency signals (the video) are recorded on the surface of the tape while lower-frequency ones (the audio) penetrate deeper into the oxide layer. Video's bandwidth also allows the recording of pure digital audio signals using a normal VCR together with a digital adaptor. And the new digital audio tape (DAT) recorders have a similarly wide bandwidth.

Physical Storage

Until very recently, the audiophile medium was the vinyl record, in which the signal is engraved as an undulating spiral groove directly analogous to the original audio signal. The recording device is the cutter head, which contains an electrodynamic element rather like a dynamic microphone. In this case, however, the moving component is connected to a sort of chisel-the stylus-rather than a diaphragm, and an audio signal is fed to the head rather than being produced by it. The cutter head is mounted on an assembly that gradually moves the stylus across the soft surface of a master disc, cutting a spiral groove from the edge to the center of the disc. The shape this groove takes as the stylus moves back and forth from the center line is an analog of the audio signal: the higher the frequency, the more tightly spaced the undulations; the louder the signal, the farther afield the stylus travels. The master disc itself could be

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For more information and the name of your nearest dealer, call toll free: 1-800-USA-KOSS. Or write: Koss Stereophones, 4129 North Port Washington Road, Milwaukee, WI 53212.

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played, but it would soon be destroyed; we buy harder copies made from a mold of the master.

The RIAA equalization used in making every vinyl record was born of the recognition that low-frequency material takes up most of the groove space. By reducing the bass by a specific amount in mastering the record and then boosting it by the same amount on playback, the grooves can be made closer together and the playing time longer. At the same time, boosting the treble on recording and reducing it by the same amount on playback significantly reduces surface noise.

The stylus that is used to record the two channels of stereo in a single groove has two driving devices that are mounted at right angles to each other and at 45 degrees with respect to the disc surface. Each of the elements is fed with one channel and translates this to an in-and-out movement; as both channels are feeding the cutter head at the same time and the two dynamic elements are attached to the same stylus, the stylus moves with a vertical component as well as a lateral one. Each wall of the groove corresponds to the movement of the opposite dynamic element.

The playback device, the phono cartridge, is constructed similarly to the cutter head. In playback, the record groove imparts motion to the stylus, which is converted by the cartridge's dynamic elements to a two-channel electrical signal. For each channel, the opposite wall of the groove imparts an in-and-out motion that the cartridge element's coil can turn into electricity. The groove wall on the same side as the element, however, only causes a pivoting motion within that coil, which is ignored.

Long Distance Audio

Radio takes advantage of another electromagnetic phenomenon: If a varying electrical signal is high enough in frequency, it radiates in much the same way as light. Feeding such a signal—called a carrier to an appropriate antenna allows it to induce a voltage in a wire that may be miles away. By using an audio signal as a control to modify the carrier in some way—to modulate it—music and other information can be broadcast over great distances.

Any alternating signal has two components, amplitude and frequency, and either can be varied to carry information. The original type of radio was amplitude modulation, or AM, in which the level of the carrier varies in step with an audio signal. The carrier radiates outward from the broadcasting antenna, inducing a voltage in any receiving antenna it encounters. The receiver itself contains a tuned circuit that responds only to one carrier frequency at a time and then detects what's happening to that carrier. Any level variations it turns into sound. The AM system suffers in that the various forms of interference a broadcast signal encounters along the way are indistinguishable from desired amplitude differences. so static and other noises are a problem. Also, AM operates in a frequency range that lets it bounce off one level of the atmosphere, the ionosphere, particularly at night. This does increase the listening range, but it also increases the chance that different AM stations will interfere with each other.

The alternative is to modulate the other characteristic of the carrier, its frequency. This form of radio—frequency modulation, or FM-has the potential for much quieter operation, as it is relatively impervious to most interference. In addition, the FM band was set up from the beginning with a wider audio bandwidth than AM, making true high-fidelity broadcasting possible (while AM could approach this level of fidelity, it rarely does so). The main problem with FM is a product of its much higher carrier frequencies (about a hundred times those of AM). Because FM carriers tend to travel only in straight lines, like light, reception is subject to distortion caused by multiple reflections from objects in the way, such as buildings, an effect called multipath.

One very distinct advantage, however, is that an FM carrier is capable of containing much more information than just the audio spectrum. Subcarriers can be added without disturbing the audio. This is chiefly done to provide stereo reception. For the sake of compatibility with mono receivers, the main

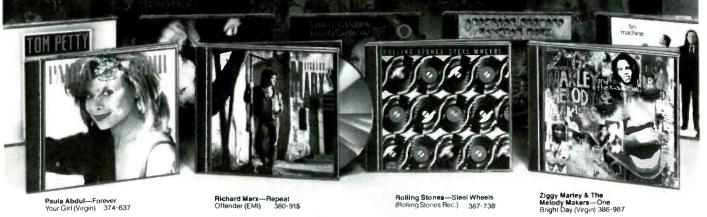
signal received by an FM tuner is a mixture of the left and right channels (L + R), but there is also a suppressed subcarrier at 38 kHz-much higher than anything we could hear—that is amplitude-modulated with a stereo difference signal (L -R). In a stereo receiver, one channel is derived by adding the difference signal to the main signal and the other by subtracting it, canceling out the unwanted channel in each case. To enable your tuner to perform this operation, every stereo station broadcasts a stereo beacon. or pilot, at 19 kHz. The beacon signal must be filtered out of the audio. which is one reason the upper frequency limit of FM broadcasting is 15 kHz rather than 20 kHz.

Bv the Numbers

An analog signal continuously varies over time. There is, however, only one signal level at any moment, and this level can be measured. If a succession of such measurements were taken, the original signal could be reconstructed, as long as the instantaneous measurements were taken often enough. This is the principle of digital audio: An analog waveform is sampled at regular intervals, and the voltages are noted and recorded. The sampling rate need be only twice the highest frequency we wish to record for us to be able to reconstruct the waveform perfectly; in audio, that means roughly 40 kHz. The sampling rate that was chosen for the compact disc is 44.1 kHz.

The individual sampling measurements are recorded in binary notation, where all numbers are expressed as a series of 0's and 1's. called binary digits, or bits. Any single bit can indicate only whether a signal is present (1) or not (0), but if bits are organized in digital "words," they can represent degrees of "presence"-signal levels, in other words. The more bits in each word, the greater the number of level variations it can express, hence the greater the dynamic range of the encoded signal. A 16-bit word—the standard for the CD-can express 65,536 separate signal levels, which corresponds to a dynamic range of approximately 96 dB. To obtain this dynamic range, each of the 40,000odd samples per second for each

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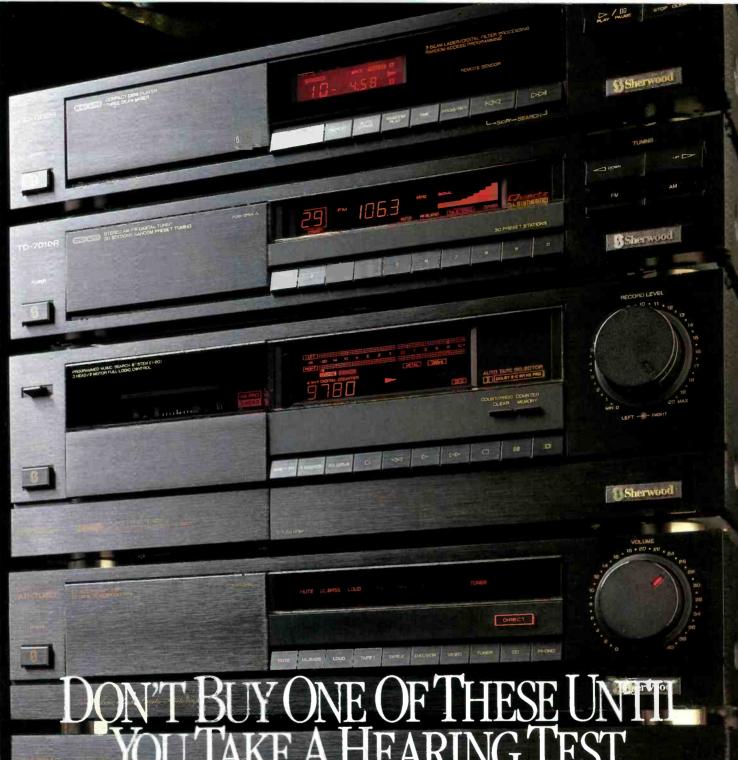
channel must be represented by 16 bits.

To record a stereo digital signal, therefore, we need a medium with an upper frequency limit of at least 1.5 MHz. Once that requirement is satisfied, however, the method of storing the signal becomes relatively unimportant. All that the playback mechanism need detect at any moment is the presence or absence of a signal (a 1 or a 0); distortion and noise become irrelevant unless they obscure the signal totally. Even speed irregularities-wow and flutter-don't matter, as the bit stream can be stored briefly in the playback device and then released at precisely the right sampling rate (known in this context as the clock frequency). The bits so retrieved can then be reorganized into 16-bit words, and the voltages they correspond to can be regenerated.

Some things can disrupt even digital recording and playback, however: Tape dropouts, for instance, or flaws in a CD's surface can interrupt the data flow and cause some terrible noises. For this reason, digital recordings are encoded according to a sophisticated scheme of error correction that allows the playback device to detect when information is missing or incorrect and then either reconstruct or simulate it.

The main medium for digital sound is the compact disc, which borrows from earlier videodisc technology. The string of 0's and 1's in the binary signal code is converted to a series of elongated pits arranged in a spiral on the disc (but without grooves; the playback device finds the proper spot on the disc electronically). In the player, a low-level laser beam is bounced off the disc's surface to a photosensitive device; the pits passing through the beam alternately interrupt or reflect it, thus reproducing the binary code. The resulting digital signal from the photocell, after error detection and correction, passes through a digitalto-analog converter, or DAC, where the original analog signal is restored. From this stage on the signal is treated in a conventional (nondigital) fashion.

NEXT: Inputs—devices that turn recordings or broadcasts into signals the rest of your system can use.



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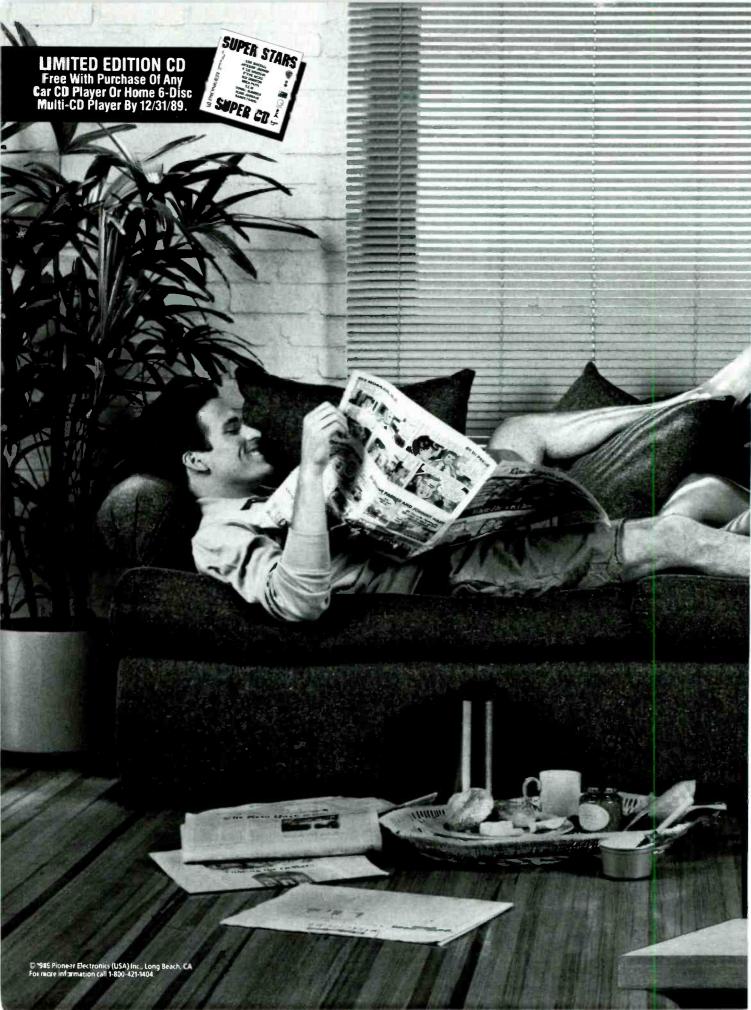
Why? Well, it won't be the fact that our current line of home components is the finest we've ever built. Or because our engineers didn't cut corners to assure excellent, long lasting performance. Or because you'll have enough jacks to handle an entire home entertainment center.

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TECHNICAL TALK

by Julian Hirsch



DOES IT MAKE A DIFFERENCE?

HE people who buy and own high-fidelity systems come in as many shapes and design variations as their cherished audio components. None of us came into this world as discerning, golden-eared audiophiles. Like so many of life's pleasures, hi-fi is an acquired taste that can be developed to almost any degree, from a casual awareness to an intensity that can dominate a person's life.

Fortunately, our hobby (for those who consider it as such) can be enjoyed on many levels. Being totally subjective in its goals, hi-fi has few, if any, absolutes. One man's meat is another's poison in terms of preferences for program material and the hardware that brings it into the home. Your preferences in both areas may be very different from mine, but that is no reason for either of us to criticize or look down upon the other. Listening to music is supposed to be fun, right?

Nevertheless, some people become so involved in the minutiae of sonic "differences" or subtle quali-

ties of performance that they seem to have lost the capacity for enjoyment. This preoccupation is often expressed as a condescending attitude toward those rank-and-file audiophiles who may be so misguided as to fail to perceive the "truth" as expounded by the cognoscenti.

Things were not always like that. In my early days as an audio hobbyist, some forty years ago, most of us had a considerable amount of ignorance, an imperfect understanding of the phenomenon of sound recording and reproduction. but we had many of the same feelings as today's audiophiles have about the distinctions between mass-market products and so-called high-fidelity components.

Despite the generous sprinklings of nonsense in the claims made for some of those early products, I don't recall any appreciable acceptance of the bizarre ideas promulgated by people who were either (1) far ahead of their time, (2) more ignorant than we were, (3) mentally disturbed, or (4) outright charlatans. I think that the test of time has separated these categories quite effectively, with the individuals in the first category being the rarest and the majority of people with strange ideas falling in the other three.

A somewhat similar situation exists today, with some fundamental differences. Over those four decades, there have been enormous technological advances. The world is quite literally a different place than it was then. A great deal has been discovered by researchers in such fields as mathematics, physics,

Tested This Month

Onkyo TX-890 AM/FM Receiver Hafler IRIS Preamplifier Design Acoustics PS-3 Micro-Monitor Speaker System Conrad-Johnson DF1 Compact Disc Player Pioneer SP-91D Digital Sound Processor

acoustics, and psychoacoustics. Concurrent with this advance in knowledge, we have seen an unending series of bizarre claims concerning the great-never merely subtle-audible effects of such factors as the design of connecting wiring in a system, the crystalline structure of various exotic materials, the dielectric material used in capacitors, and the specific construction of the semiconductors used in a product (not necessarily in the signal path power supplies too have received

Some people become so involved in the minutiae of sonic "differences" or subtle qualities of performance that they seem to have lost the capacity for enjoyment.

their share of attention from these quarters).

I could go on and on, but these are examples of a trend in the audio world that I would find hilarious, except that it too often diminishes the credibility (to me, at least) of its proponents. The fact that many of them are talented engineers, designers, or musicians makes their utterances more sad than funny. It is like finding an esteemed geographer or astronomer supporting the flatearth theory.

One thing seems to be common to all such ideas: The claims are never supported by hard evidence in the form of carefully conducted doubleblind tests. The adherents to each such belief support it with a true religious fervor. Since their support is, without doubt, a matter of faith, any test that does not confirm the idea's validity is (to them) faulty by definition.

Well, faith can be a good thing, although I would prefer to see it applied in a more spiritual context than the supposed effect of a piece of wire on reproduced sound. Unfortunately, it is difficult—impossible, in fact, unless you are facing a potential apostate—to counter faith with logic or scientific evidence. I may as well admit that in matters of

(Continued on page 53)



Seven years ago, Sony made your turntable obsolete.

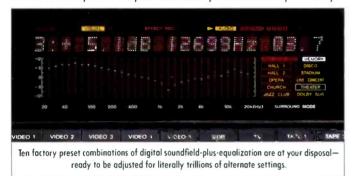
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Sony proudly presents the TA-E1000ESD Preamplifier, incorporating the most advanced Digital Signal Processing in high fidelity.

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Sony's new TA-E1000ESD Preamplifier incorporates Digital Signal Processing (DSP) to maintain the integrity of Compact Disc sound from input to output. This incomparable circuitry not only



handles digital sources in the digital domain, it even converts analog sources to digital. So all your music can receive the full DSP treatment, including digital expansion, digital compression, digital parametric equalization, digital reverberation, digital delay, and digital surround sound encompassing ten digital soundfield parameters. Now you can heighten sonic performance digitally, obtaining optimum ambience and brilliance without enduring the veil of conventional signal processing.

Unprecedented technology from the company with a precedent for introducing it.

To create the TA-E1000ESD, Sony overcame formidable obstacles in high-speed conversion and computation. Our research produced two landmark integrated circuits. One Sony IC undertakes equalization, compression, and expansion while the other provides the most extensive reverberation, delay, and surround sound processing ever.

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The numerical prowess of DSP puts you in full digital control of dynamic range, with nine discrete steps of compression or



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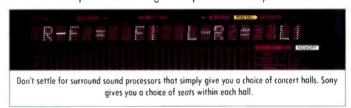
recordings for your car by raising soft passages above the road noise. And DSP expansion brings your analog sources closer to digital standards.

Bass and treble controls were never like this.

Conventional tone controls tend to be inaccurate and inconsistent. That's why Sony developed digital parametric equalization. It's simple, effective, and free from the distortion, phase shift, and noise of analog equalization. With any of 31 center frequencies and four slope settings, you have a choice of over three trillion EQ curves. Which is more than enough boosting, peaking, shelving and tweaking to overcome acoustical deficiencies.

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Because listening rooms were never designed to contain the Vienna Philharmonic, Sony's digital surround sound places you in your choice of symphony hall, movie theater, stadium, studio or small club. Unprecedented digital adjustments let you choose



room depth, width, wall absorbancy, reflection times—even the row and number of your seat! You get acoustic environments so detailed, so authentic, they have a palpable presence. And for Dolby Stereo™ movies, our six-channel Dolby Pro Logic™ Surround Sound projects a more vivid soundstage than most sound stages.



Oh yes, it is a preamplifier.

With all these digital attainments, you might forget that the TA-E1000ESD is a preamplifier. But we didn't. We included five low-noise audio inputs, three digital inputs, seven audio/video inputs and a programmable remote control to let you run your entire A/V system from a comfortable distance.

All of which leads to an inevitable conclusion. The company that wrote the book on digital audio has just inaugurated a whole new chapter.

Sony ES. Reinventing high fidelity one component at a time.



As singular an achievement as the new Digital Signal Processing Preamplifier undoubtedly is, it has a natural place among the singular components of Sony's ES Series. Since the inception of ES, every model has challenged long-accepted compromises, defying the status quo.

Today's ES Series components are proud inheritors of this tradition of rebellion. Take, for example, the CDP-C8ESD Compact Disc Changer. It embodies the Sony carousel mechanism that is now the object of fevered imitation. Incorporating generous helpings of technology from Sony's reference standard CDP-R1, the changer is admirably fit for audiophiles.

Consider the TA-N55ES Power Amplifier, which produces

output power in casual disregard of speaker loads that would cause a lesser amplifier distress. Then there's the ST-S730ES Tuner, whose Wave Optimized Digital Stereo Detector extracts the full benefit from today's improved FM broadcasts. And the TC-K730ES Cassette Deck emphatically disproves the notion that analog recording is immune to substantial improvement.

Finally, contemplate the ES three-year limited parts and labor warranty. (See your authorized ES dealer for details.) It's a ringing confirmation of the outstanding quality that brings perceptive audiophiles to their nearest ES dealer. To locate that dealer and to receive a free White Paper on Sony DSP technology, call 201-930-7156 during East Coast business hours.



SONY

THE LEADER IN DIGITAL AUDIO™

TECHNICAL TALK

audio, I am a devout agnostic. Born and raised in New York, I can still lay claim to coming from Missouri, the Show Me State, when it comes to accepting statements from others about what I am hearing (not about what they are hearing—everyone hears what he hears).

Let me make it perfectly clear that I do not question the sincerity of most advocates of ideas with which I disagree, even if I consider them to

Okay—components A and B sound different. That's only half of the decision process. The next question to ask is, "Is the difference meaningful to me?" Or, "Does the difference make a difference?"

be nonsense. I think that is being more than fair, since I suspect that some of these advocates fall into Categories 3 and 4 of my earlier classification. But I'll concede that some of them unquestionably hear the sonic differences they claim to hear. I freely admit that I don't hear sonic differences ascribable to polarity, cables, types of semiconductors, etc., and I rather suspect that the vast majority of the human popsuffers from the same ulation "flaw."

I have often stated in equipment reports that I couldn't hear any differences between two amplifiers or two CD players. Such statements are not entirely true, I must admit. Although there are some cases where the items being compared measure alike in every test that I can perform on them, when there is a real frequency-response difference or, just as important, a gain difference, I can generally hear it. And yet I do not comment on the difference; it is simply too trivial.

Which brings me to the point of these comments. Let me start by saying that since no two people hear alike, it is ridiculous for any one person, regardless of what he hears from a music system, to claim that this is the sound of the system. It is the sound he hears, no more and no

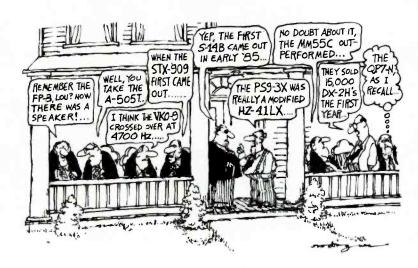
So the controversy really less. comes down to a question of whether a listener can hear a difference between two components. Obviously, if he hears no difference, the two are identical so far as he is concerned. And except in the case of loudspeakers, the differences anyone hears between hi-fi components today are likely to be very subtle.

But suppose there is a distinct, if slight, difference between two components, which is not unusual. If the volume level does not change during the comparison, they are obviously not identical (if the volume changes, even by a small fraction of a decibel, the comparison is invalid). Moreover, the two items being compared must be alike except for the one single factor whose influence is being studied. That could be the speaker cables, or the type of capacitors used in the amplifier's signal path, or the entire amplifier. But there can be no more than one variable in such a comparison or the issue becomes confused.

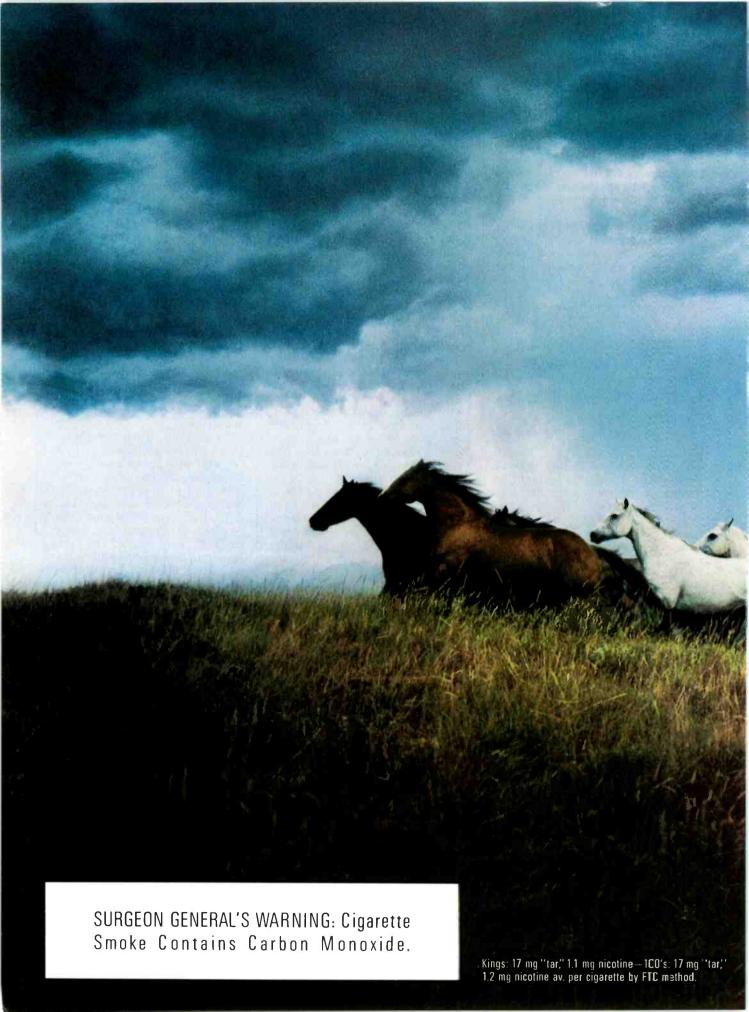
Okay—components A and B sound different. That is only half of the decision process. The next question to ask is, "Is the difference meaningful to me?" Or, as I prefer to put it, "Does the difference make a difference?" Would it be enough to induce me to choose one over the other for my listening, or would I be equally satisfied with either one?

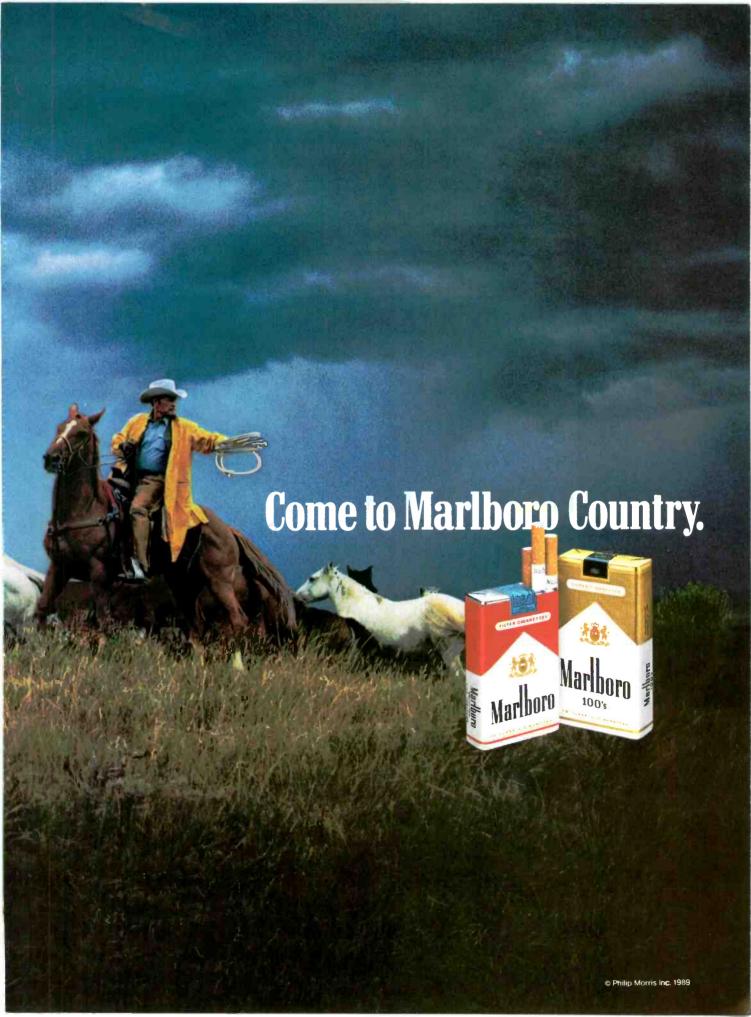
Here I speak for myself, although I suspect that quite a few people might feel the same. On the other hand, a lot of readers may have much stronger preferences. But if you had tested about 3,300 different products, as I have, you might have a tougher time making such a decision. Anyway, for me most of the reasonably competent products I test would be perfectly welcome in my music system. I am more likely to react negatively than positively, however, to one that is confusing to operate, or aesthetically unsuitable, or unreasonably expensive even if its sound quality is at least as good as that of any other. Since my criteria are very different from those of people to whom the finest nuances are of great importance, I try not to make dogmatic pronouncements about which is the product for anyone to buy.

To sum up, listen for yourself. Don't let yourself be swayed by the "expert" who points out very audible sound qualities (unless you agree with him, of course). If you don't hear a difference that someone is trying to convince you exists, don't be afraid to say so. Remember, the emperor may indeed be going around in his birthday suit! And ask yourself these two key questions when auditioning a component or a system: Can I hear a difference? If I do, does it make a difference?



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ONKYO TX-890 AM/FM RECEIVER

Julian Hirsch, Hirsch-Houck Laboratories

HE TX-890, part of Onkyo's Grand Integra series of deluxe hi-fi components, is a full-featured AM/FM stereo receiver that includes inputs, outputs, and switching for two video sources (such as two VCR's or a VCR and a videodisc player). Lacking an internal RF modulator, the TX-890 cannot supply signals directly to the antenna terminals of a standard TV set, but it has a composite-video output jack for connection to a monitor. Its amplifier section has a continuous power rating of 125 watts per channel into 8 ohms from 20 to 20,000 Hz with no more than 0.02 percent total harmonic distortion (THD).

The TX-890 has audio inputs for a moving-magnet (MM) or movingcoil (MC) phono cartridge, a CD player, and two tape decks. Any source can be recorded while you listen to any other. Most of the front-panel controls are pushbuttons, but there are knobs for tone, volume, and balance adjustment and horizontal sliders for the Dynamic Bass Expander and the Selective Tone/Loudness control. According to the instruction manual, the Dynamic Bass Expander adds an "extra feeling of power and realism" to the low-frequency range, but there is no further explanation of this feature. The Selective Tone/ Loudness control provides a wide range of loudness-contour characteristics independent of the volumecontrol setting.

Large, square buttons select the input source. The CD DIRECT button bypasses all signal-modifying circuits and connects the CD input directly to the volume control and amplifier stages. The REC SELECTOR button connects the desired source to the recording-output jack. Ten buttons, switched in two banks, store up to twenty preset FM and AM frequencies. In addition to the tuning buttons, there is a button that disables the interstation mutingsimultaneously changing the normal 50-kHz FM tuning interval to 25 kHz for fine tuning-and another button that switches the muting threshold between values of 17 and 27 dBf. Two 75-ohm FM antennas can be connected to the receiver (one can be the input from a cable

system), with front-panel pushbutton selection.

An interesting feature of the Onkyo TX-890 is its Automatic Precision Reception (APR) system for stereo FM. Depending on reception conditions, the system automatically switches the tuner's RF gain between the local and distant settings, turns a noise-reduction circuit on or off, turns the high-frequency blend on or off, or, in the worst case, switches the tuner to mono. Illuminated words in the display window show the tuner's full operating status at all times. Although the APR system can be defeated by a button, there is no individual control of its various operating parameters other than mono/stereo mode selection. For mono sources, there is a switchable simulated-stereo circuit that uses phase-shift techniques to add a sense of breadth and spaciousness.

The display window shows the selected source for listening and for recording, the frequency, the preset channel number, and the signal strength of a tuned station, and the settings of virtually every pushbutton control on the panel. A headphone jack, selector buttons for two pairs of speakers, the cartridge (MM or MC) selector button, the main power button, and a SYSTEM POWER button are also on the front panel. As long as the main power button is on, the receiver is in a standby mode and can be switched to full

TEST REPORTS

operation with the SYSTEM POWER button or the remote control.

The rear apron of the TX-890 has all the audio and video input and output jacks as well as separate preamplifier outputs and main-amplifier inputs, which are normally joined by jumpers. Remote-control connectors enable certain Onkyo turntables, CD players, and tape decks to be operated through the receiver. The speaker outputs are insulated binding posts that accept stripped wire ends or single or dual

banana plugs. Two of the three AC outlets are switched.

The TX-890 is supplied with an infrared remote control that duplicates its key functions: power switching, input selection, tuner preset selection, and volume adjustment (the receiver's volume knob is turned by a motor in remote operation). The remote unit also has a "muting" button, not present on the receiver panel, that lowers the volume 20 dB, but most of its buttons are dedicated to operating other Onkyo components that may be plugged into the receiver's remotecontrol sockets. The receiver is also available as the TX-890M with a universal remote control that can learn and mimic the commands of other remote controls.

The Onkyo TX-890 is a large, heavy receiver, measuring 18¹/₄ inches wide (including its decorative wood-grain side panels), 17 inches deep, and 6¹/₄ inches high. It weighs just under 33 pounds. Price: \$820 (TX-890M, \$880). Onkyo U.S.A. Corp., 200 Williams Dr., Ramsey, NJ 07446.

Lab Tests

The FM tuner section of the Onkyo TX-890 surpassed its sensitivity specifications handily, with usable-sensitivity measurements 10.7 and 13.5 dBf in mono and stereo, respectively, and corresponding 50-dB quieting readings of 11 and 34 dBf-all excellent figures. It is one of the very few tuners we have tested that allows stereo reception with good separation down to extremely low signal levels (5 dBf, or 0.5 microvolt into its 75-ohm antenna input), even though the noise under such conditions is so great that listening becomes impractical. When the APR system is activated, however, the tuner will gradually blend the two channels as signal strength decreases and eventually switch to mono.

The tuner's noise levels at a 65-dBf input were -79 and -75 dB in mono and stereo, respectively, with corresponding distortion readings of 0.15 and 0.28 percent. As with some other tuners, there was a slight additional reduction in noise and distortion at higher signal levels, 85 dB or greater, which are rarely avail-

FEATURES

- ☐ Digital frequency-synthesis AM/FM tuner with twenty station presets
- ☐ Defeatable Automatic Precision Reception (APR) system to select optimum tuner modes for FM reception
- ☐ Interstation muting level switchable between 17 and 27 dBf
- ☐ Tuning steps for FM switchable between 50 and 25 kHz
- ☐ Inputs for two FM antennas,
 switchable from front panel
- ☐ Detachable wire-loop AM antenna
- Logic-controlled selector buttons for five audio and two video input sources
- ☐ CD DIRECT switch to bypass tone and balance controls
- Phono input switchable for MM or MC cartridge
- ☐ Bass and treble tone controls

- ☐ Independent selection of program sources for listening and recording
- □ Selective Tone/Loudness Control
- ☐ Dynamic Bass Expander☐ Video dubbing facilities☐
- ☐ Composite-video output to monitor
- ☐ Simulated-stereo processing for mono sources
- Discrete transistors with high current capability in output stage
- Pre-out/main-in jacks (joined by removable jumper)
- Connections for two pairs of speakers with independent front-panel selection
- ☐ Front-panel headphone jack ☐ Infrared remote control, can operate compatible Onkyo source components through receiver

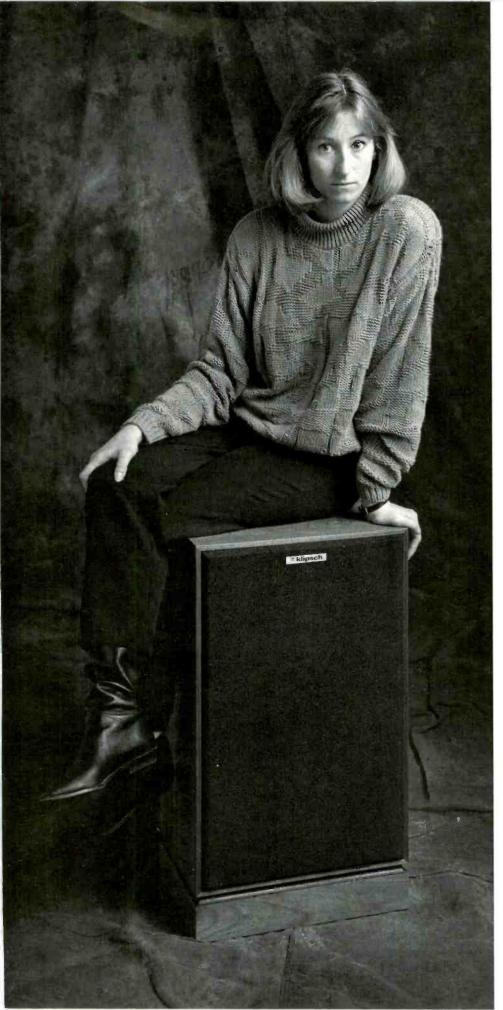
LABORATORY MEASUREMENTS

- □ Tuner Section (all figures for FM only except frequency response; measurements in microvolts, or µV, referred to 75-ohm input)
- Usable sensitivity: mono, 10.7 dBf (0.95 μ V); stereo, 13.5 dBf (1.3 μ V)
- 50-dB quieting sensitivity: mono, 11 dBf (1 µV); stereo, 34 dBf (13.8 µV)
- Signal-to-noise ratio at 65 dBf: mono, 79 dB; stereo, 75 dB
- Harmonic distortion (THD + noise) at 65 dBf: mono, 0.15%; stereo, 0.28%
- Capture ratio at 65 dBf: 2.3 dB AM rejection: 75 dB
- Selectivity: alternate-channel, 80 dB; adjacent-channel, 8.5 dB
- Stereo threshold: not measurable (see text)
- Pilot and subcarrier leakage: 19 kHz, -74 dB; 38 kHz, -72 dB Hum: -74 dB
- Stereo channel separation at 100, 1,000, and 10,000 Hz: 54, 62.5, 41.5 dB
- Frequency response: FM, +0.4, -0.75 dB from 30 to 15,000 Hz; AM, -6 dB at 55 and 2,200 Hz

- ☐ Amplifier Section
- 1,000-Hz output power at clipping: 158 watts into 8 ohms, 250 watts into 4 ohms, 425 watts into 2 ohms (one channel driven)
- Clipping headroom (relative to rated output): 1 dB
- Dynamic power output: 265 watts into 8 ohms, 340 watts into 4 ohms, 485 watts into 2 ohms
- Dynamic headroom: 3.26 d8

 Maximum distortion (20 to 20,000

 Hz into 8 ohms): 0.0155% at
 20,000 Hz and 125 watts output
- Sensitivity (for a 1-watt output into 8 ohms): CD, 2.15 mv; phono, 0.217 mv (MM), 0.0125 mv (MC)
- A-weighted noise (referred to a 1-watt output): CD, -75.8 dB; phono, -73.7 dB (MM), -71.5 dB (MC)
- Phono-input overload: MM input, 168 to 175 mV from 20 to 20,000 Hz; MC input, 12.6 mV to 16 mV from 20 to 20,000 Hz
- Phono-input impedance: 47,000 ohms in parallel with 180 pr Tone-control range: 100 Hz, +10,
- -9 dB; 10,000 Hz, +7.5, -9 dB Selective Tone/Loudness range: 50 Hz, +15 dB; 16,000 Hz, +8 dB



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able in most locations. Stereo channel separation was exceptionalbetween 54 and 63 dB from 30 to 3.500 Hz and a still impressive 39 dB at 15,000 Hz. The capture ratio was 2.3 dB, and image rejection was marginal at 48 dB, but the 75-dB AM rejection and 80-dB alternate-channel selectivity were very good. The AM tuner section had the usual restricted frequency response, down 6 dB from its midrange (400-Hz) level at 55 and 2.200 Hz.

The TX-890's power-amplifier section was awesome and possibly unique among receivers for its tremendous power capabilities. Onkyo notes that the output stages use discrete devices, instead of the power IC's often used in receivers, in order to deliver their full rated power consistently into low-impedance loads. Our clipping-power readings of 158 watts into 8 ohms, 250 watts into 4 ohms, and 425 watts into 2 ohms would seem to confirm that claim. The first two measurements were made with both channels driven. but we drove only one channel into 2 ohms to minimize the likelihood of blowing out a line fuse (an internal component that is not ordinarily user-replaceable).

As with most receivers, the Onkyo TX-890's FTC power ratings are limited to 8-ohm operation. Unlike most, it also carries a dynamic power rating of 380 watts per channel into 2 ohms. Our dynamic power measurements gave readings of 265 watts into 8 ohms, 340 watts into 4 ohms, and a staggering 485 watts into 2 ohms.

The distortion (including noise) was between 0.0042 and 0.0049 percent from 20 to 10,000 Hz at the rated 125 watts output into 8 ohms. rising to 0.0155 percent at 20,000 Hz because of the added noise in the 80-kHz measurement bandwidth necessary to include the harmonics of a 20-kHz signal. The distortion was almost entirely third-harmonic. At 1,000 Hz, the distortion into 8 ohms was between 0.0042 and 0.027 percent from 1 to 150 watts. Readings into 4 ohms were slightly higher, 0.005 to 0.036 percent between 1 and 200 watts. Even into 2 ohms (driving only one channel), the 1,000-Hz distortion was between 0.0078 and 0.03 percent from 1 watt

to more than 400 watts. The slew factor of the amplifier was 4.5, with increased third-harmonic distortion appearing at about 90 kHz.

The amplifier input sensitivity for a 1-watt reference output was 2.15 millivolts (mv) for a high-level input, 0.217 mV (MM) and 0.0125 mV (MC) for the phono input. The corresponding A-weighted noise levels were -75.8, -73.7, and -71.5 dB. The phono preamplifier overloaded at 168 to 175 mV in its MM setting and at 12.6 to 16 mV when set for MC cartridges. When it was overloaded at 20,000 Hz-a condition very unlikely to occur when actually playing records—the output waveform either collapsed or "motorboated" (oscillated at a very low frequency). The phono-input impedance was 47,000 ohms in parallel with 180 pF, and the RIAA phono equalization was accurate within a remarkable ±0.1 dB from 20 to 20,000 Hz.

The tone-control characteristics were conventional, with a variable turnover frequency in the bass and high-frequency curves hinged at about 2,000 Hz. The Selective Tone/ Loudness control provided a wide range of curves, some of which were more suitable for certain forms of tone-control equalization than for loudness compensation. At its lower settings, only the bass was boosted, by as much as 6 dB at 20 Hz, with less than 1 dB change at 200 Hz and higher frequencies. Near the upper part of the control range, the bass boost was centered at 40 to 50 Hz, with a maximum amplitude of 15 dB, and the highs were increased by as much as 8 dB at 16,000 Hz.

The simulated-stereo mode, usable only with a mono signal, introduced a smoothly varying phase shift between the outputs of the two channels. The phase shift was 90 degrees at 20 and 20,000 Hz and 0 degrees at 600 Hz; frequency response was not affected. Subjectively, the circuit did a good job of expanding the width of a mono program, which no longer sounded monophonic (it might be described as sounding like somewhat "phasey" stereo, with larger apparent dimensions than the mono program).

We were unable to find any signif-

icant audible or measurable effect from using the Dynamic Bass Expander. Once or twice it seemed to add a minute amount of warmth to the sound, but if this was the intended action, it hardly seems worth the inclusion of a button and slide control, let alone the circuitry associated with them.

Comments

The Onkyo TX-890 is a distinctively "different" stereo receiver in the fine points of what it does and how it does it. Superficially, the TX-890 may not look much different from some other high-power receivers, but the amount of good, clean audio power it can deliver places it pretty much in a class by itself. This is one receiver that should be able to drive almost any speaker (or combination of speakers) to the highest levels that the speakers—or listeners-can tolerate, without even working up a sweat.

Moreover, the TX-890 is an obviously flexible control center, even with source components from different manufacturers. With compatible Onkyo components it can function as a true system control, with remote operation of all units from a single hand-held controller.

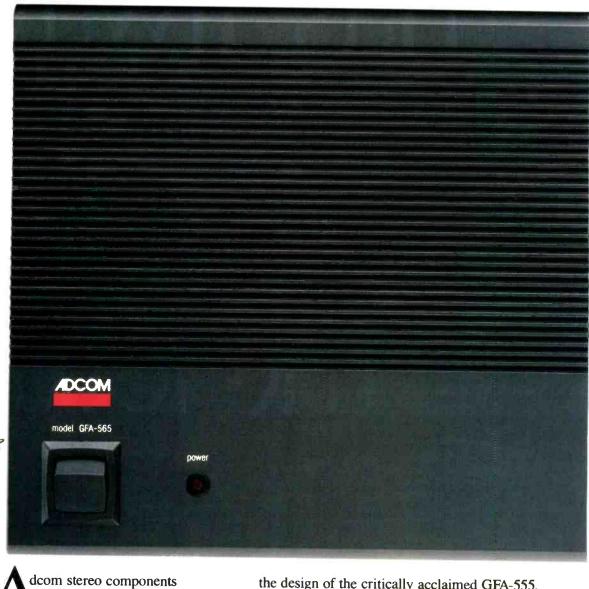
Most of the many features that we were able to use did their jobs effectively. It was not easy to judge the APR tuner system with our available broadcast signals, since almost all receivable stations activated the same options, and without external control over them we could not judge their effectiveness. The Selective Tone/Loudness control, to our surprise, was an excellent means of boosting low-bass response without boominessland seemed to have little in common with typical loudnesscompensation controls, which hopelessly muddy and unbalance the system frequency response.

Perhaps the best thing about the TX-890 was just that it sounded so good! There was a distinctive ease and smoothness to its sound, especially while it was playing FM broadcasts, which probably reflected the excellent qualities of its tuner section. Whatever the reasons, we found the Onkyo TX-890's combination of features, performance, and sound thoroughly satisfying.

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*Continuous power output, 20 Hz - 20 kHz < 0.02% THD, measured in accordance with FTC specifications.

(over please)

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High-Current Output Stage

More and more of today's high performance loudspeakers exhibit very low impedances and particularly difficult loads. Many so-called esoteric amplifiers are incapable of delivering large amounts of undistorted power continuously into these complex loads thereby defeating the objectives of the loudspeaker's design.

The GFA-565's highly advanced, triple Darlington output stage featuring 20 rugged, discrete output transistors is designed to deliver extremely high-current at low impedances and reactive loads. No protection circuitry or current limiting devices



Adcom components are also available with white front panels. Shown: GFA-545 with GFP-555 preamplifier and GFT-555 AM/FM stereo tuner.

are incorporated which would restrict the delivery of full power output. Protection against short term overloads, short circuits or long term, excessive output is achieved by non-interfering power supply fuses and thermal circuit breakers.

Well Regulated, High-Current Power Supply

Advancements in CD technology and the introduction of digital audio tape have created opportunities to reproduce the full dynamics and psychoacoustic experience of a live musical performance. To realize the full potential of this technology, amplifiers and loudspeakers must be capable of delivering tremendous energy continuously, not just for tiny fractions of a second.

The massive power supply of Adcom's GFA-565, featuring 70,000 microfarads of filter capacitance and a huge 1.25kVA toroidal power transformer, has enormous reserve power capability. This is a no compromise power supply that eliminates all audible

limitations. Hum, vibration and noise, the byproducts of lesser power supplies, have also been reduced to an absolute minimum. For most home applications. the optional variable speed cooling fan is unnecessary. making the GFA-565 a silent performer despite its formidable power.

Instantaneous Distortion Alert

A highly accurate LED on the front panel is activated by a unique monitor circuit if any form of distortion—THD, IM, TIM, SID, etc.-exceeds 1 percent. This will provide ample warning that the music system is being operated beyond its design parameters.

Ask for a Demonstration

No amount of words or technical specifications will adequately describe the experience of listening to a music system featuring a pair of Adcom GFA-565 amplifiers. If you are one of those few who are seeking real power and sonic perfection, please contact your authorized Adcom dealer for a demonstration of this most remarkable audio component.

Specifications

Power output, watts/channel, continuous, 20 Hz - 20 kHz, <0.02% THD: 8 ohms/300 4 ohms/450

2 ohms/850

Signal-to-noise ratio, A-weighted, full output: >106 dB

Input impedance: 50-700 ohms Input sensitivity:

For rated output: 2.15 V For 1 watt: 130 mV

Damping factor (20 Hz - 20 kHz): >1000 @ 8 ohms

Dynamic headroom (at 4 ohms): 1.6 dB

Voltage: 120 V/60 Hz (available in 220 V/50 Hz on special order)

Dimensions: 17" × 814" × 111/2" D (432 mm × 210 mm × 292 mm D)

Shipping weight: 45 lbs (20.50 kg) Available options:

565 FAN: Top mounted, automatically variable, ventilating fan.

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HAFLER IRIS PREAMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories

HE Hafler Infrared Remote Integrated System, or IRIS, consists of two audio components, a preamplifier and an FM tuner, that take some unusual, perhaps even unique, approaches to circuit design and system interconnection, particularly in their remote-control facilities. The IRIS preamplifier can be used with any tuner and power amplifier, and it also has inputs for a turntable, a CD player, two audio tape decks, the audio from a video source, and two auxiliary sources.

preamplifier's dark-blue The front panel contrasts with its black cabinet. White markings above the eight input selectors identify the options; the one for the selected input is illuminated in bright yellowgreen. Two similar buttons, MUTE and NORM, activate or disable a 20dB audio level reduction. These ten buttons have a short, positive travel and operate through electronic switching circuits.

To the right of the input selectors and mute buttons are six round buttons that engage mechanically when

depressed and are released by a second push. These controls are used to connect one or two tape decks for recording the selected source, to monitor the playback from either deck, to insert an external signalprocessing accessory in the signal path through the EPL (external-processing-loop) jacks in the rear of the preamplifier, and to parallel the two stereo channels for mono operation. A button at the far right of the panel switches the power on and off. The remaining front-panel controls are the volume and balance knobs.

The rear apron of the Hafler IRIS preamplifier contains the signal input and output jacks (the phono jacks are gold-plated) and three AC outlets, two of them switched. A small pushbutton next to the phono inputs increases the phono-preamplifier gain by 20 dB and reduces its terminating resistance from a nominal 47,000 ohms to 100 ohms for a moving-coil (MC) cartridge.

One of the distinguishing characteristics of the IRIS preamplifier is its remote-control unit. About the same length and width as most

infrared controls but 11/2 inches thick, the IRIS controller has only twelve buttons and two knobs (volume and balance). The remote control radiates its infrared pulses from two clear LED's arranged in a Vshape and protruding from the panel of the remote. The signal is much more powerful than from conventional remote controls, enabling the IRIS controller to operate the system over a considerable distance without necessarily being aimed directly at the preamplifier.

When the preamplifier is turned on, its volume and balance knobs appear to operate conventionally. They actually supply a variable DC control voltage to Hafler-developed Cyber-Optic solid-state potentiometers employing cadmium-sulfide photoresistors. If either of the corresponding knobs on the remote control is touched, a green light on the preamplifier's panel flashes rapidly to show that control has been passed to the remote unit. Volume and balance adjustments are then performed from the remote position. Touching one of the front-panel knobs restores their control.

The remote control senses the positions of its knobs eight times per second and transmits the information to the preamplifier as 32-bit digital words, amplitude and fre-

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David Clark-Audio Magazine Sept. '89

Cambridge SoundWorks has created Ensemble, a speaker system that can provide the sound once reserved for the best speakers under laboratory conditions. It virtually disappears in your room. And because we market it directly, Ensemble costs hundreds less than it would in stores.



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Ensemble consists of four speaker units. Two compact low-frequency speakers reproduce the deep bass, while two small satellite units reproduce the rest of the music, making it possible to reproduce just the right amount of energy in each part of the musical range without turning your listening room into a stereo showroom.

No matter how well a speaker performs, at home the listening room takes over. Room acoustics emphasize and deemphasize various parts of the musical range, depending on where the speaker is placed in the room. If you put a conventional speaker where the room can help the low bass, it may hinder the upper ranges, or vice-versa.

Your listening room works with Ensemble, not against it.

Ensemble, on the other hand, takes advantage of your room's acoustics. The ear can't tell where bass comes from, which is why Ensemble's bass units can be tucked out of the way—on the floor,

atop bookshelves, or under furniture. The satellites can be hung directly on the wall, or placed on windowsills or shelves. No bulky speaker boxes dominate your living space, yet Ensemble reproduces the deep bass that *no* mini speakers can.

Unlike seemingly similar satellite systems which use a single large subwoofer, Ensemble uses two separate, compact bass units. They fit more gracefully into your living environment, and help minimize the effects of the listening room's standing waves.

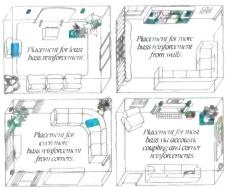
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StereoReview

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quency modulated on the infrared carrier at frequencies of 25,000 to 35,000 Hz. This system can transmit as many as 65,000 possible combinations of volume and balance from the remote to the preamplifier. After digital-to-analog conversion of the remote signal in the preamplifier, the corresponding Cyber-Optic control is electronically adjusted (in steps of about 0.25 dB) to match the remote knob setting.

Eight of the remote-control buttons correspond to the front-panel input selectors. The others operate and clear the mute function and redefine the remote's input-selector buttons to perform different functions for other IRIS components (currently, only the tuner). In the tuner mode, the input selectors become preset station selectors and up/down scan controls.

The Hafler engineers concluded that they could obtain better audio quality from junction field-effect transistors (J-FET's) than from conventional bipolar transistors. Accordingly, only J-FET's (thirty-two in all) are used in the active signal paths of the IRIS preamplifier. Each phono-preamplifier channel uses six J-FET's, followed by a solid-state input source switch and a J-FET isolating buffer stage. Following the tape-recording, tape-monitor, and external-processor switching and the Cyber-Optic volume and balance controls, the signal is processed only by the line amplifier, using eight J-FET's per channel.

The Hafler IRIS preamplifier measures a compact 17 inches wide. 81/2 inches deep, and 3 inches high, and it weighs 81/2 pounds (the companion tuner is the same size and weight). The IRIS remote control is 73/8 x 23/4 x 11/2 inches (plus a 1/2-inch knob extension). Price: \$800 with remote control, \$650 without. David Hafler Co., Dept. SR, 613 S. Rockford Dr., Tempe, AZ 85281.

Lab Tests

The Hafler IRIS preamplifier has a high signal output capability, clipping at about 8.85 volts. Up to a 2volt output level, its 1,000-Hz total harmonic distortion (THD) was less than 0.0032 percent (it was unmeasurable, less than 0.001 percent, at 1 volt). Even at 8 volts, the rated maximum output, distortion was a negligible 0.06 percent.

The sensitivity, for a reference output of 0.5 volt, was 34 millivolts (mv) at a high-level input, 0.32 mv at the phono input in its standard, moving-magnet (MM) mode, and 38 microvolts (μV) at the phono input in its MC mode. The respective Aweighted signal-to-noise ratios were 83.5, 77.2, and 75.2 dB. The phonopreamplifier section overloaded at 65 mV in the MM mode and 6.5 mV in the MC mode. Unlike most phono preamplifiers, this one had an overload level (corrected for the RIAA

equalization characteristic) that was essentially uniform across the full audio range from 20 to 20,000 Hz. The phono-input termination was 44,000 ohms in parallel with a 200pF capacitance (the rating is 47,000 ohms and 220 pF). The user can change the MM shunt capacitance and the 100-ohm MC input resistance by plugging components of the desired values into the circuit board. The preamp does not come with resistors or capacitors for that purpose, however.

The preamplifier's frequency response varied less than 0.1 dB from 20 to 10,000 Hz, falling off to -0.28dB at 20,000 Hz and -3 dB at 80,000 Hz. The phono-equalization response error was +0.3, -0 dB from 20 to 20,000 Hz.

Comments

Not surprisingly, in view of our test results, the Hafler IRIS preamplifter performed very well. Its low noise, complete freedom from switching transients, and overall smoothness of operation were exemplary. Aside from the noise levels, the measurements that impressed us most were those for phono overload, which demonstrated ideal characteristics. We cannot think of another preamplifier we have tested whose phono overload level did not show some variation with frequency: Sometimes the figure at 20,000 Hz is less than 50 percent of the midrange value, and there is frequently erratic or unstable behavior at the point of overload. In contrast, the IRIS overloaded in an ideal fashion, with soft and symmetrical clipping, so that the only variable was the human error in estimating when the waveform began to clip.

We have no way of knowing whether this feature has any direct correlation with the sound of the preamplifier, which was as good as we have heard—that is, it had no "sound" of its own at all, as is proper for a component that should be totally neutral. But to us it signifies a degree of expertise that is not often seen in the design of consumer audio equipment. And the same skill went into the design of the preamplifier's control circuits and its remote-control system.

FEATURES

- ☐ Only J-FET components used in signal circuits
- Cyber-Optic solid-state level control
- ☐ Pushbutton input selection: phono, CD, tuner, video, tape 1 and 2, auxiliary 1 and 2
- ☐ Provision for tape monitoring, external-processor loop
- ☐ Phono preamp switchable for moving-coil cartridge

 Infrared remote-control unit
- duplicates all front-panel functions, has volume and balance knobs; can also control (through the preamp) Hafler IRIS FM tuner and possible future IRIS components

LABORATORY MEASUREMENTS

Clipping output level: 8.85 volts Sensitivity (for 0.5-volt output): CD, 34 mV; phono, 0.32 mV (MM) and 38 µV (MC) A-weighted noise (referred to a

0.5-volt output): CD, -83.5 dB; phono, -77.2 dB (MM) and 75.2 dB (MC)

1,000-Hz distortion (THD): 0.0032% at 2 volts Phono-input overload (20 to 20,000 Hz): MM, 65 mV; MC,

Phono-input impedance: 44,000 ohms in parallel with 200 pF RIAA equalization error: +0.3, 0 dB from 20 to 20,000 Hz

TEST REPORTS

The IRIS controller is at least as unusual as any of the active signal circuits of the IRIS preamplifier. It is easily the most intuitive remote control we have used. A glance at the manual is enough to learn its basic operating features, after which its use is automatic, without fumbling or guessing. Better yet, it is (and presumably will continue to be) a multicomponent control. We used the IRIS FM tuner with the preamplifier and found no problems in using the same buttons on the remote unit for different functions (they are, after all, related in being selections, whether of presets or signal sources). It is not hard to see how the controller's use could be extended to a CD player or other component.

The knob-operated remote volume control is another feature that sets this unit apart from the rest. True, there are many remote-control systems that adjust volume by means of up/down pushbuttons, but that cannot match the feel of turning a knob. We did note a slight time lag in the operation of the volume control, especially when the volume change was large, but that was easy to get used to. As Hafler claims, the level variations sound continuous, with no trace of "stepping." We also confirmed that the remote control operated the preamplifier regardless of where it was pointed or located in the room. If the green light on the preamplifier panel blinks rapidly when one of the remote unit's knobs is touched, you know that the control link is functioning.

Another appealing characteristic of the Hafler IRIS preamplifier was its totally transient-free operation. The only result of pressing a button was the intended one, with never a click or thump to mar the effect. This may not seem like an unusual property, but it is surprising to find how many components accompany a control operation with some sort of click or other extraneous sound.

The Hafler IRIS system, as exemplified by the preamplifier, is both novel and useful, to say nothing of delivering outstanding audio performance. We look forward to future extensions of this concept.

Circle 140 on reader service card



DESIGN ACOUSTICS PS-3 MICRO-MONITOR SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

HE Design Acoustics PS-3 Micro-Monitor speaker system consists of two small satellite speakers and a separate bass module. Although the manufacturer refers to the bass module as a "subwoofer," its operating range extends to 200 Hz, well above the subwoofer range.

The satellites are true minispeakers, measuring only 73/8 inches high, 41/8 inches wide, and 41/4 inches deep and weighing a mere 31/2 pounds each. Their attractive oak-grain wooden cabinets are finished on all sides and have rounded edges. Each two-way satellite contains its own crossover network and has a 31/2inch "woofer" with a compliant rubber surround, operating in a sealed volume, and a 34-inch polycarbonate dome tweeter with ferrofluid cooling that takes over above 3,000 Hz. Spring-loaded connectors on the back of the cabinets accept stripped wire ends.

The bass module, a black-finished box measuring 21 inches wide, 13 inches deep, and 634 inches high, is designed to be placed on the floor, where it may be concealed from view. It contains two separate 61/2inch drivers with treated-paper cones and Kapton voice-coil formers for increased power-handling ability. Each bass driver has its own input terminals and crossover network (a 200-Hz low-pass filter). The drivers face downward and radiate through a 7/8-inch-wide slot next to the floor around the periphery of the enclosure. The bass unit weighs 25 pounds.

Since each speaker unit contains

STEREO REVIEW DECEMBER 1989 69

TEST REPORTS

its own crossover components, system wiring is simple. You simply connect the drivers for each channel in parallel, taking care to maintain correct polarity throughout the system. There is complete flexibility in routing the wires between the three modules and an amplifier or receiver since the sequence of connection is unimportant.

Speaker placement is also much more flexible than in conventional two-unit speaker installations. The satellites can be placed in any acoustically desirable position with a minimum of aesthetic compromise. For example, they will fit inconspicuously on any bookshelf, even among paperback books. The satellites can also be hung on walls (the back panels are slotted) or placed on free-standing pedestals. The bass module can be located almost anywhere, flat on the floor or on one of its sides to fit behind furniture, although it is desirable to have it at the end of the room containing the satellites. The bass response can be adjusted for the best sound by changing the position of the bass unit relative to the room walls.

The PS-3 Micro-Monitor system specifications include a frequency response of 50 to 20,000 Hz, with no tolerance given, and a power-handling rating of 20 to 100 watts per channel. The rated sensitivity is 88 dB sound-pressure level (SPL) at 1 meter with a 1-watt input. Price: \$600 for the complete system. Design Acoustics, Dept. SR, 1225 Commerce Dr., Stow, OH 44224.

Lab Tests

We placed the PS-3 satellites on 26-inch stands about 2 feet in front of a wall. The bass module was flat on the floor, midway between them and about the same distance from the wall. The room response had the usual irregularities below 500 Hz because of boundary effects, and the speakers' output dropped off by roughly 10 dB between 4,000 and 20,000 Hz.

The close-miked frequency response of one of the bass drivers resembled the response of a resonant circuit tuned to 100 Hz with a Q of about 3.5. Relative to its maximum value, the output was down 15 dB at 50 Hz and down 12.5 dB at

the nominal crossover frequency of 200 Hz. The satellite "woofer" had an extremely flat, smooth response over much of its range, varying only ± 1 dB from 165 to 1,400 Hz (the close-miked measurements are not valid at higher frequencies).

Combining room curves and close-miked response curves to form a composite curve is a tricky process for any conventional speaker system. It is much more difficult for a three-piece system since the

Listening blind to the Design Acoustics PS-3 Micro-Monitor, without knowledge of its components, you would never guess that most of its sound comes from two tiny speakers.

bass module's contribution depends in large measure on its location, both in the room and relative to the satellites. Nevertheless, the composite curve we derived from our measurements seemed consistent with what we heard from the PS-3 system. The output was within ± 5 dB from 60 to 20,000 Hz. Despite the small size of the tweeters, they became directive above about 4,000 Hz. From on-axis to approximately 30 degrees off-axis, the output typically varied 5 to 8 dB in the range between 4,000 and 18,000 Hz. The 31/2-inch driver in the satellites had a sharp cutoff rate of about 21 dB per octave below 150 Hz.

The system's minimum impedance of 4.8 ohms occurred at 100 and 700 Hz, and the maximum was 18 ohms at 4,000 Hz. Its sensitivity, measured 1 meter from a satellite with a pink-noise input of 2.83 volts, was a relatively high 91-dB SPL. The bass module's harmonic distortion, with a constant input of 2.5 volts (equivalent to a 90-dB SPL). was about 3 percent below 30 Hz, declining to 2 percent at 50 Hz, 0.9 percent at 70 Hz, and 0.4 percent or less between 100 and 200 Hz. The overall group-delay variation was 0.4 millisecond from 1,000 to 22,000 Hz.

Despite its diminutive size, the

PS-3 was able to handle considerable short-term input levels without damage or serious distortion. The bass module's woofers "bottomed" audibly with a 100-Hz input of 390 watts into the 4.8-ohm impedance. The capacity of the satellite system at 1,000 and 10,000 Hz exceeded the output capability of our amplifier, which clipped at 1,150 and 825 watts, respectively, into the 5.5- and 8-ohm impedance loads at those frequencies.

Comments

The Design Acoustics PS-3, like most well-designed three-piece systems, sounded much better than you might conclude from examination of its room-response curve. With any speaker, of course, there is an uncertain correlation between the shape of the response curve (no matter how it was measured) and what the speaker sounds like in the measurement environment. And it is absolutely certain that the sound will be different again in a different listening environment.

Listening blind to the PS-3, without knowledge of its components. you would never guess that the bulk of its sound comes from two tiny speakers. Even if they are in plain view, as they were in our installation, any listener would assume that another, larger system was playing. The sound in our listening room was smooth and well balanced, and even though the low bass (under 60 Hz) did not match that of speakers much larger than the bass module, it was by no means lacking. We did find it preferable to place the bass unit against the wall for our listening since that gave the overall sound a more balanced character. Although the bass unit was close to one satellite and 6 to 8 feet from the other, there was no sense of a separate bass source.

The Design Acoustics PS-3 is an excellent choice for installations where larger, more visible speaker cabinets are unsuitable for any reason. Its price is highly competitive with those of most conventional systems of comparable quality. And if you do place the satellites where they are fully visible, they are attractively styled and finished.

Circle 141 on reader service card

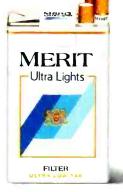
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CONRAD-JOHNSON DF1 COMPACT DISC PLAYER

Julian Hirsch, Hirsch-Houck Laboratories

T first sight, it is clear that the Conrad-Johnson DF1 is unlike any other CD player on the market. In spite of its compact chassis—it measures 19 inches wide, 12 inches deep, and 33/4 inches high—it weighs a surprisingly heavy 19 pounds. The satin-gold front panel, slotted for rack mounting, contains a single row of round, polished-metal control buttons and a large knob. The display window is only 7/8 inch high and 25/8 inches wide, and I inch of that width is devoted to the infrared sensor for the remote control. The window normally displays only the current track and index numbers, although the total number of tracks appears when a disc is first loaded.

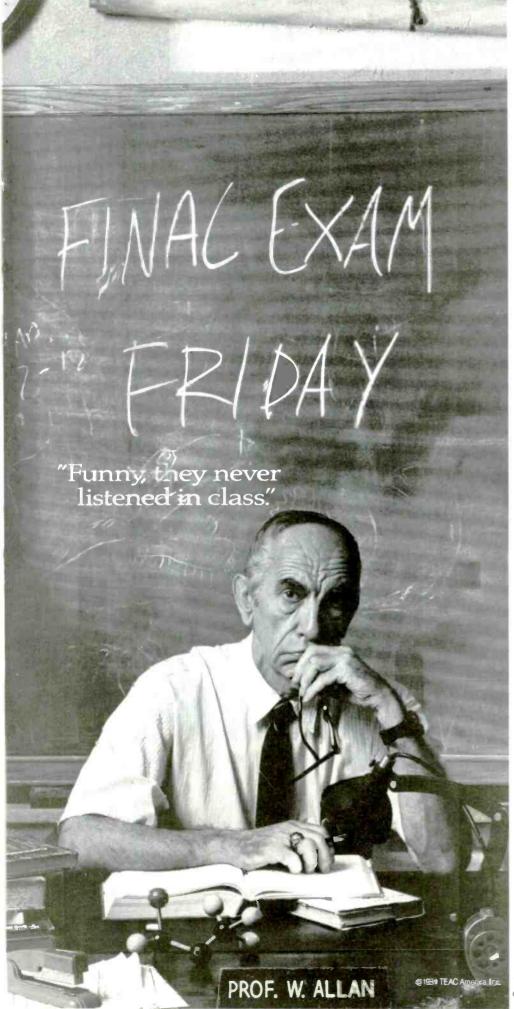
One of the buttons below the window, marked O/C, opens and closes the disc drawer, which will

not accept CD-3's without an adaptor ring. The PROG button is used to enter up to twenty track numbers for programmed playback, and TIME/TRACK switches the display to the elapsed time in the current track. Adjacent red lights identify the selected display mode. The other buttons control the disc transport functions, track skipping (PREV and NEXT), and fast search in either direction with audible sound. In the pause mode, four small dots flash sequentially across the bottom of the display window.

Between the transport buttons and the power switch at the right of the panel are three controls unique among CD players. The DF1 includes a built-in preamplifier with a high-level auxiliary input and input/output jacks for use with a tape deck. The LEVEL knob adjusts the

gain of the preamplifier to a maximum of twenty times the input. One of two pushbuttons just left of the knob selects the source or the tape-monitor signal, and the other supplies either an external program source or the CD player's output to an external amplifier. The four pairs of jacks on the rear apron of the DFI are marked AUX (for the input from an external signal source), TAPE IN, TAPE OUT/CD DIRECT (which feeds a tape recorder or external amplifier with a constantlevel signal), and MAIN OUT. The last, whose level is controlled by the front-panel knob, is the normal output from the DF1. If a tape deck is not used, the tape connectors can be used to insert an external signal processor or equalizer into the signal

Conrad-Johnson considers polarity (which the company refers to as "phase") to be an important consideration and designed the DF1 so that its direct CD output is noninverting, but the preamplifier section inverts the signal polarity. A portion of the instruction manual explains the significance of signal po-















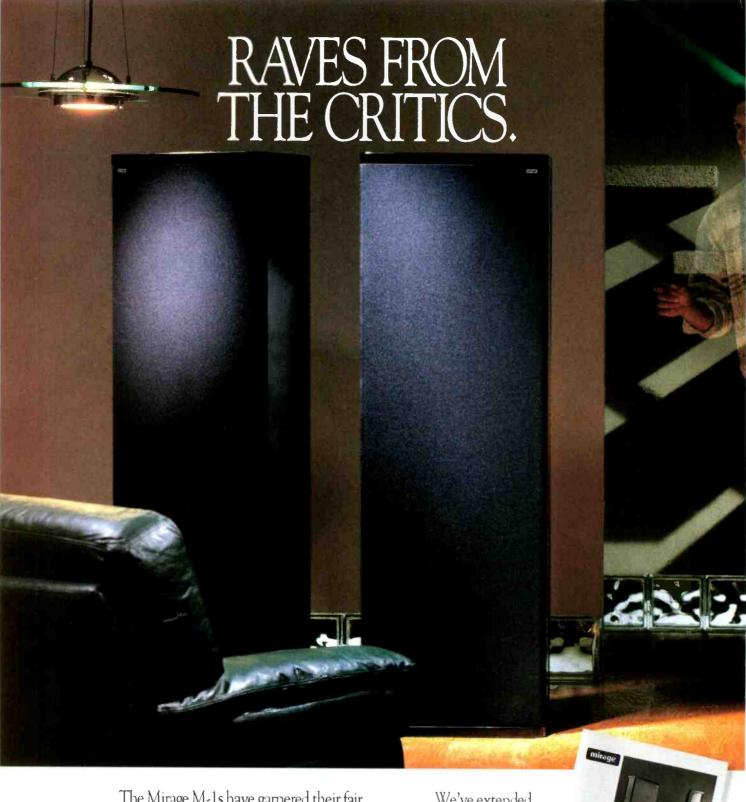


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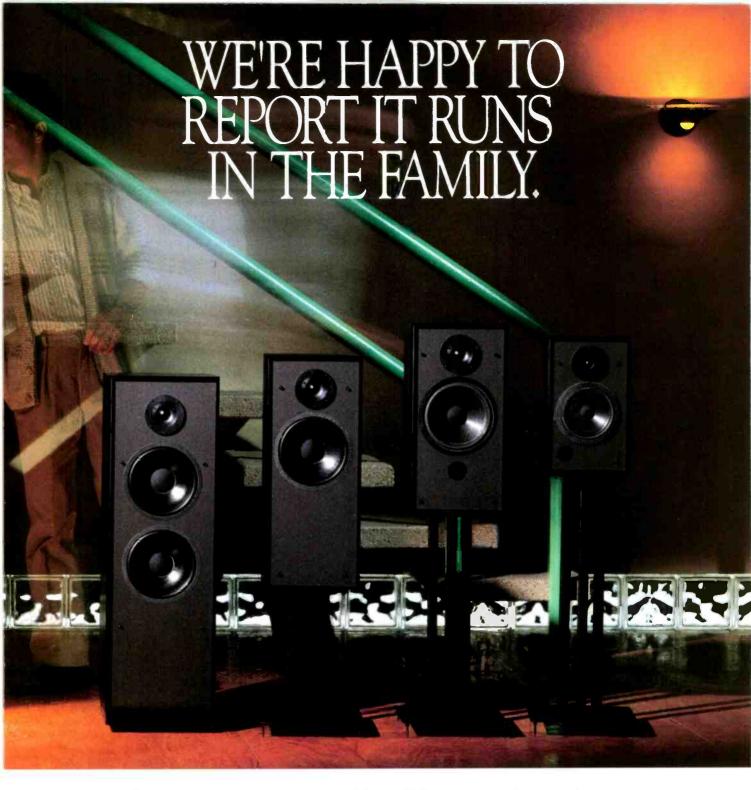
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larity and suggests how to polarize a system correctly. It also recommends experimenting with the orientation of the power plug to reduce hum and noise from system ground loops and leakage paths. Finally, because the company believes that interconnect and speaker wires have a considerable effect on the ultimate sound, users are advised to consult their dealers for specific connection recommendations.

The DF1 is based on the wellregarded Philips disc-playing mechanism, which has apparently been slightly modified to suit Conrad-Johnson's requirements. The only obvious alteration is the addition of a damping material to the disc clamp. The analog and preamplifier circuits are built on two boards, heavily populated with capacitors. The cabinet, including its base and top plate, is made of heavy-gauge steel, accounting for a good part of the unit's weight. Heat-sink fins extending from the rear apron help to cool the electronic circuitry. The DF1 is supplied with an infrared remote control that duplicates its basic operating controls and has a repeat button that repeats only a programmed sequence of tracks.

The specifications of the Conrad-Johnson DF1 are surprisingly modest compared with those of other current CD players. The distortion at the direct CD output is rated as less than 0.25 percent, with a noise level of 85 dB below 1 volt. The rated output of 1.1 volts is roughly half that of most CD players. The digital-to-analog (D/A) conversion circuits are said to provide 16-bit resolution and use four-times-oversampling (176.4-kHz) digital filtering. Frequency response of the CD section is rated as 5 to 19,000 Hz $\pm 0.5 \, dB.$

The preamplifier section (at the MAIN OUT jacks) has a rated maximum gain of 26 dB, with a 5-volt maximum output. Its frequency response is said to be from 5 Hz to more than 100 kHz, with hum and noise in the audio band 82 dB below 1 volt output. Distortion is specified as 0.25 percent at rated output (presumably 1 volt). Price: \$1,595. Conrad-Johnson Design, Inc., Dept. SR, 2800R Dorr Ave., Fairfax, VA 22031.

Lab Tests

For most tests, our outputs were taken from the CD DIRECT (fixed-

level) jacks. A 0-dB, 1,000-Hz test track produced an output of 1.157 volts. The frequency-response curve showed the "ripples" above 1,000 Hz that used to be typical of CD players but have become rare in the past couple of years. The response variation, referred to a 1,000-Hz level, was ± 0 , -1 dB from 7 to 20,000 Hz. The 1,000-Hz distortion, including noise, was about 0.24 percent at 0 dB. Channel separation, identical for both channels, was far less than we have ever before measured from a home CD player, 60 dB up to 1,000 Hz and decreasing gradually to 56 dB at 20,000 Hz.

The noise-spectrum level during an "infinity zero" test track was between -110 and -120 dB over most of the audio range, with a -92-dB hum peak at 120 Hz. The A-weighted noise was -99.2 dB. At a 0-dB level, the total harmonic distortion (THD) plus noise was constant across the audio range up to 10,000 Hz, measuring 0.18 percent in the left channel and 0.09 percent in the right channel. The readings decreased at higher frequencies to 0.05 percent at 20,000 Hz. The 1,000-Hz distortion was typically between 0.006 and 0.01 percent from -20 to -60 dB, increasing to about 0.06 to 0.18 percent at 0 dB.

Although the linearity of the DF1's D/A converters was good down to $-70 \, dB$, at $-80 \, dB$ the output was about 6 dB higher than it should have been, and at -90 dBthe error was +9 dB. Interchannel phase shift was less than 1.2 degrees over the audio range from 5,000 to 20,000 Hz. The de-emphasis response was accurate to within better than 0.5 dB up to 16,000 Hz. The dynamic range (EIAJ) was 88 to 90 dB (there was a slight difference between the channels). Quantization noise was about -80 to -81dB. The frequency (speed) error was a mere 0.0005 percent.

We also made some measurements on the preamplifier section alone. It apparently uses relatively little global feedback, resulting in a gradual overload rather than a sudden onset of clipping at some critical level. At 2 volts output, the FHD plus noise was 0.29 percent, increasing smoothly to 0.35 percent at 3 volts and 0.61 percent at the rated

FEATURES

- ☐ Single-beam laser pickup☐ Four-times-oversampling
- (176.4-kHz) digital filters
 □ Display of current track and index numbers or elapsed time in track; shows total tracks at
- Programmable to play up to twenty tracks in any order
 Track skipping and fast scan
- ☐ Track skipping and fast scan (with audible sound) in both directions
- □ Built-in preamplifier with front-panel gain control
 □ Preamplifier input switchable between CD and external
- high-level source

 Tape recording/monitoring
- ☐ CD output at fixed level or variable through preamplifier ☐ Infrared remote control for front-panel functions and repeat of programmed sequence

LABORATORY MEASUREMENTS

Maximum output level: fixed, 1.157 volts: variable, approximately 6 to 8 volts

Total harmonic distortion at 1,000 Hz: typically less than 0.01% from -10 to -60 dB, about 0.1% at 0 dB

Signal-to-noise ratio (A-weighted): 99.2 dB

Channel separation: 60 dB below 1,000 Hz, 56 dB at 20,000 Hz

Maximum phase shift (5,000 to 20,000 Hz): -1.2 degrees at 20,000 Hz

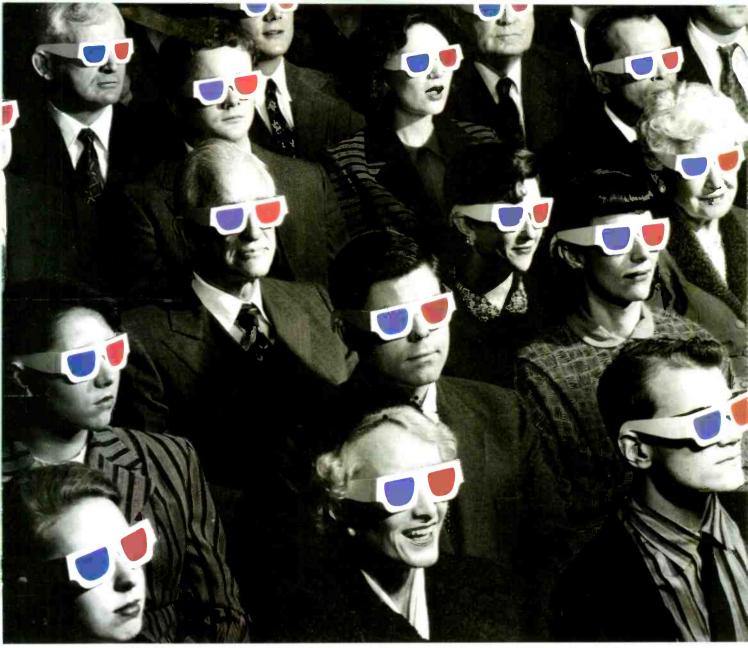
Frequency response: +0, -1 dB from 7 to 20,000 Hz

Low-level linearity error: less than 1 dB down to -70 dB, +6 dB at -80 dB, +9 dB at -90 dB

Cueing time: 5 seconds Cueing accuracy: A

Impact resistance: top, A; sides, A
Defect tracking: tracked 1,500micrometer defects on Pierre

Verany #2 test disc



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maximum of 5 volts. The output was visibly clipped at 8 to 9 volts. The preamplifier frequency response was ± 0.03 dB from 20 to 20,000 Hz.

The Philips mechanism has always been noted for long slewing and access times, and this one was in that tradition, although it is much improved over the earliest versions. Moving from Track 1 to Track 15 of the Philips TS4 test disc took 5 seconds, about twice as long as most current players and four to five times as long as the fastest of them. The cueing was always accurate, however, and the player handled and operated smoothly.

In the error-correction test, the DF! was able to track through a 1,500-micrometer defect without audible problems, but the next higher level (2,000 micrometers) on the Pierre Verany #2 disc shut down the player instantly. The player also shut down at Track 41 of that disc. which combines a 1.500-micrometer defect with minimum track pitch, and would not play any level of the track having two successive dropouts. Offsetting these results was the way the heavy cabinet isolated the laser mechanism from mechanical shock. Nothing less than a hard slap on the top of the player with the palm of the hand had the slightest effect on its playback, earning it an A rating in this respect.

Comments

Our measurements of the Conrad-Johnson DF1 were discouraging when compared with the performance of other current CD players. In general, however, our results agreed with the specifications in the player's manual.

The DFI's analog circuits were apparently designed with minimal global feedback, possibly in accordance with the view that high feedback can cause transient intermodulation distortion. Even though the bandwidth of a CD program is rigidly limited to 20,000 Hz, too low to cause such distortion in any properly designed amplifier, we could accept this approach as a designer's choice in spite of the higher (but still inaudible) conventional harmonic distortion that it produces.

Less easy to understand was the

low channel separation, which was at least 30 to 40 dB worse than that of any other home CD player we have tested. Fortunately, there was no audible penalty, since 60 dB is far more than is needed for full audible stereo separation.

It is a fact, however, that we do not hear specifications. Surprisingly few of the measurements one can make on a modern audio component can be correlated successfully with its sound characteristics. In addition, the measurable aberrations of any CD player (including this one) are infinitesimal compared with those of most other system components. In spite of its test results, we expected the DF1 to sound perfectly satisfactory.

Well, it did that, and more. The sound we heard from the Conrad-Johnson DF1 was as good as we have heard from any other CD player. In fact, at first we thought it was slightly smoother and easier sounding than most, so we set up an A/B comparison between the DF1 and a measurably first-rate player. With identical discs in each, synchronized in time and exactly matched in level (the DFI's level control was invaluable for this), it was soon apparent that their sound qualities were identical.

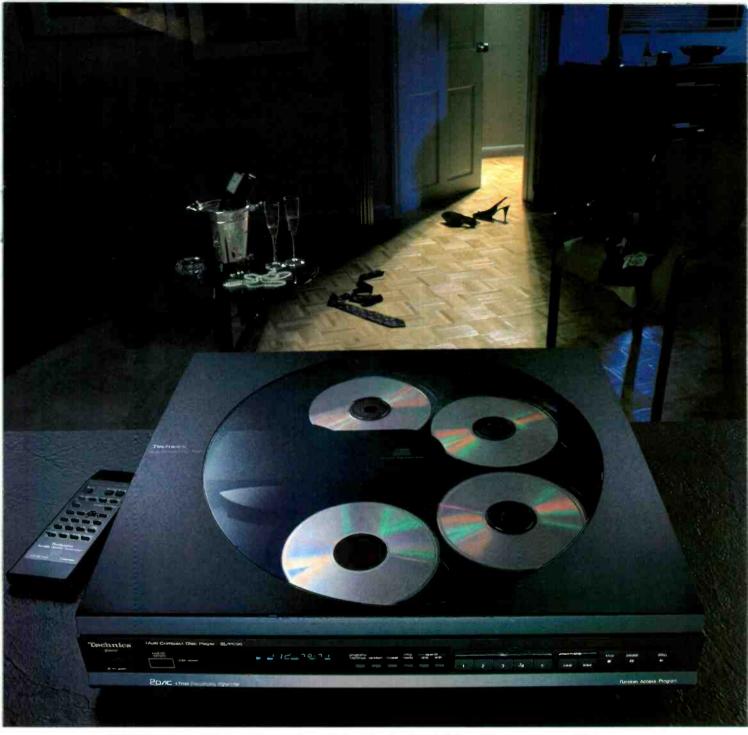
That would be no surprise if both

had similar measured performance. But the comparison player's measurements were up to today's state of the art, with channel separation well over 100 dB across the audible range and distortion and noise readings far lower than those of the DF1. Even the ripple-free and ruler-flat response curve of the comparison player (within a small fraction of a decibel up to 20,000 Hz) did not distinguish its sound from that of the DF1, with its almost 1-dB variation over that range.

For listening, then, we would rank the Conrad-Johnson DF1 with today's best CD players. Beyond that, it is an uncommonly attractive component, far more ruggedly built than most in its price range and better than most, regardless of price, in dealing with external shock and disc errors. Our most serious criticism of its design concerns the display. which seems to carry simplicity too far. In our view, a CD player should show at all times at least the current track number and the elapsed time. The DF1 can display both those items, but not simultaneously. Its built-in preamplifier with tapemonitor loop, however, adds a new dimension of versatility; this genuine convenience also sets the DF1 apart from other players.

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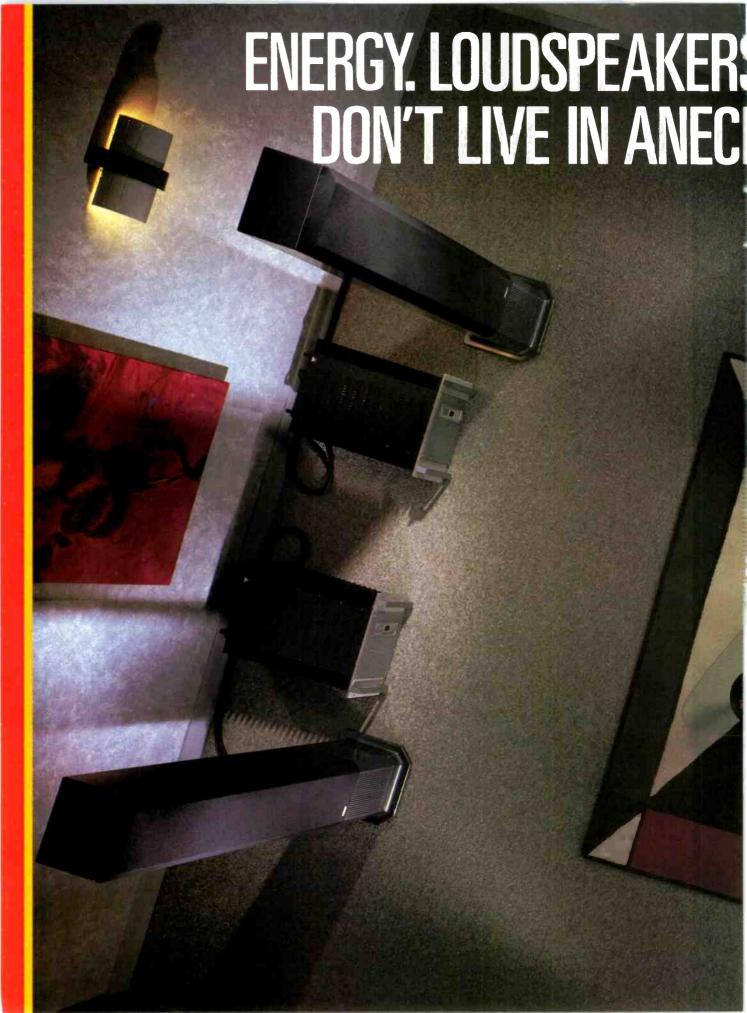
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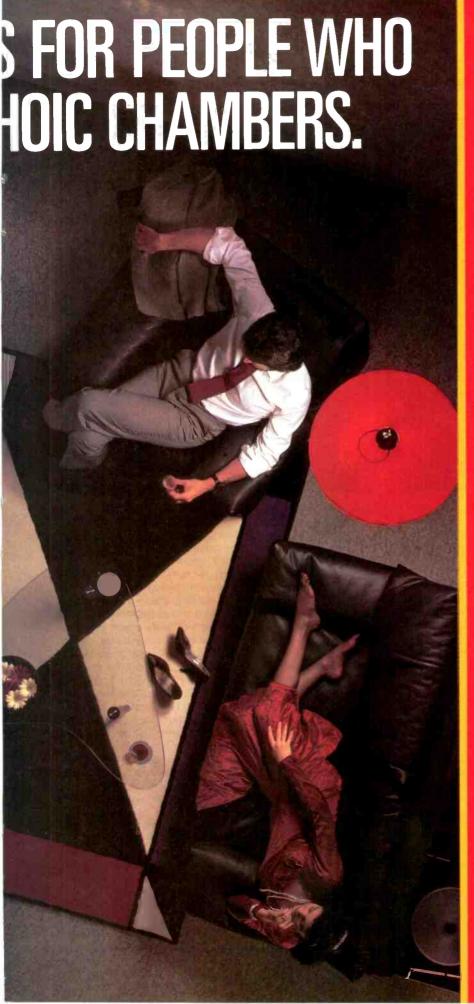
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The true performance of a loudspeaker can only be measured in the real world. Not the ideal environment of an anechoic chamber. Even though Energy loudspeakers are the result of highly-sophisticated CAD/CAM modeling and anechoic testing, we take the extra measure of fine-tuning them through an exhaustive series of real-World listening tests. That's why Energy is the preferred choice of thousands of demanding listeners. Our unique tweeter design is case-in-point. It provides ideal off-axis frequency response for superior imaging, extended soundstage, and exquisite transparency. The "dual hyperdome" configuration dramatically increases low-frequency power handling when compared with conventional designs. It allows the lowfrequency transducer to roll off naturally for a smoother transition to the tweeter. Our op-of-the-lin model utilizes a triplechamber ented woofer enclosure that greatly extends bass response and acoustically cancels output non-linearities between the two woofers. The 7th order bandpass design provides exceptional woofer damping for flatter response across the entire woofer range. All this "fechnospeak" is fine—and necessary for understanding why all Energy models sound so amazing. But the real test is your ears. Energy loudspeakers are more natural no matter what the listening room is like. Where the speakers are placed. Do your senses a favor. Take time to include them in your listening comparisons. You'll be immediatelyconvinced of their sonic faithfulness and uncanny musicality.



AUDIO PRODUCTS INTERNATIONAL CORP. 641 McNicol Ave. Scarborough. Ontario, Canada M1X 1G5 (416) 321-1800

CIRCLE NO. 58 ON READER SERVICE CARD



PIONEER SP-91D DIGITAL SOUND PROCESSOR

Julian Hirsch, Hirsch-Houck Laboratories

IONEER'S SP-91D, a recent addition to the company's Elite series of audio components, is a digital sound processor designed to simulate a variety of acoustic characteristics, or sound fields, in a listening room to enhance the sound of stereo reproduction. It also includes Dolby Pro Logic circuitry for decoding the surround-sound tracks of video programs.

The SP-91D provides eight surround-sound effects and sixteen preset sound-field control programs. The key parameters of all the sound-field programs are user-adjustable, and a modified or newly created program can be stored in any of sixteen user memories for later recall, giving a total memory capacity of thirty-two sound-field programs.

The adjustable parameters are: initial delay (the time between the

direct sound and the first reflected sound to reach the ear), room size (the delay between the several early reflections), liveness (the decay time of the early reflections), reverb time (the time required for the later multiple reflections to decay), HF reverb (the decay time of high frequencies, which can be faster than the decay of low frequencies), and equalization (the frequency response of the processed-signal channels).

Not all of these parameters are adjustable for each stored program. For four of the programs, room size and liveness are not adjustable, being replaced by reverb-time and HF-reverb adjustments (which cannot be varied in the other twelve programs). Equalization is separately adjustable for the front and rear channels for all programs using a built-in seven-band digital equalizer with a ± 12 -dB control range in each band. Each preset mode has its own

specific equalization characteristic (easily changed as desired) stored in memory.

The surround modes include Dolby Pro Logic with a phantom center channel, 3-CH LOGIC, which adds a separate center-channel output, two theater modes, stadium and studio modes, and two simulated surround modes for use with mono program sources. Most of the parameters for surround operation are not adjustable because of the specific requirements of the Dolby Pro Logic system. The exceptions are the initial delay, which is normally 20 milliseconds (ms) but is adjustable from 15 to 30 ms, and the rear-channel equalization.

The SP-91D is normally connected in a tape-monitor or external-processor loop of a preamplifier or receiver. Its master volume control then becomes the system volume control. There are two basic operating modes: four-channel and six-channel. Four-channel is the simpler to install, requiring only the addition of a pair of rear speakers and an amplifier for the delayed and

processed signals from the SP-91D.

A processed program is also deliv-

ered to the main (front) speakers,

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TEST REPORTS

where the delayed and modified signals are combined with the original program. The relative proportions of all signals are fully adjustable, separately for the left and right channels in both the front and rear speakers.

The six-channel mode is similar except that it calls for a separate pair of front processed-sound speakers driven by their own amplifier. The main front speakers reproduce only the original, unmodified stereo program. In either mode, additional power amplifiers are required if you use the center-channel or subwoofer outputs.

The front panel of the SP-91D contains two small knobs to adjust input level and balance and a larger master volume knob. Small buttons operate the tape-monitor and audio-mute functions. A display window in the center of the panel shows all pertinent information on the operation of the unit, including the current surround mode, indication of sound-field or surround operation, status of the equalizer and parameter adjustments, and the settings of each of the equalizer bands. Flat keys below the window select the digital equalizer, surround, sound-field, or user-set modes, and there is a pair of up and down keys to adjust their parameters.

The rear apron of the Pioneer SP-91D contains jacks for signal input, line-level outputs (and a selector switch) for the four- and six-channel operating modes, a center-channel output, and a mono output for driving a subwoofer. The tape-recording and tape-monitoring output jacks carry only unprocessed signals.

Pioneer's block diagram of the SP-91D shows that in the sound-

field modes the signals first go through analog-to-digital (A/D) converters, then through a digital signal processor (DSP), a large-scale integrated circuit. After processing, the digital signals pass through digital filters and four digital-to-analog (D/A) converters whose outputs be-

The Pioneer SP-91D provides eight surroundsound effects and sixteen preset sound-field control programs. Ŭsers can adjust all key parameters and store sixteen new programs.

come the front processed and rear signals. The Dolby Pro Logic portion of the unit appears to use standard analog circuits, although the nominal 20-millisecond delay is presumably derived from the unit's digital system.

The SP-91D is furnished with a remote control whose keys operate all of its signal-processing functions. including setting the individual parameters with the aid of the frontpanel display. A random-noise test signal, activated from the remote unit, automatically switches sequentially through the front left, center, and right speakers, then the two rear speakers, as an aid in balancing their levels. When the volume is controlled from the remote unit, the main volume knob is operated by a motor.

The Pioneer SP-91D is attractively styled to match other Elite series components, with glossy woodgrain end plates and gold markings on a glossy black panel. It measures 18 inches wide, 13 inches deep, and 4 inches high, and it weighs 131/4 pounds. The chassis is copperplated for electrical conductivity and formed with a pattern of depressions for mechanical rigidity. Price: \$1,000. Pioneer Electronics (USA) Inc., Dept. SR, 2265 E. 220th St., Long Beach, CA 90810.

Lab Tests

The maximum level of the processed front-channel outputs was 7.36 volts at the clipping point. Our measurements were made with the level adjustments set for unity gain (0.5 volt input for 0.5 volt output at 1,000 Hz). The total harmonic distortion was 0.008 percent at 1 volt output and 0.0018 percent at 2 volts, all third-harmonic, and it reached 2 percent at 3 volts, where several harmonics were present in the output. The A-weighted noise level in the processed output was 90.5 dB referred to a 0.5-volt level, about 12 dB lower than the rated 90 dB referred to 2 volts output.

Driving the SP-91D with singlecycle tone bursts, we examined the processed output on an oscilloscope to verify the delay times listed in the instruction manual. The initial delay was as specified, usually 10 or 20 milliseconds but adjustable in 1-ms steps between 1 and 50 ms. A typical preset mode (HALL 1) follows the initial delay with four smaller reflections of different amplitudes at 10ms intervals. In others, such as HALL 4, these later reflections are accompanied by an extended lowlevel reverberation. Highly reverberant modes, such as CHURCH, have negligible early-reflection signals, with most of the interval between pulses occupied by a relatively large, decaying reverberation that appears on an oscilloscope like a random noise (as it should).

conventional frequency-response curve measured in any of the sound-field modes had a ragged. irregular appearance, similar to a room-response curve for a loudspeaker, and it looks that way for the same reason: interference between a number of signals that have different propagation times. smoothed curve, however, showed

FEATURES

- ☐ Sixteen factory-preset sound-field programs and memories for sixteen user-selected programs
- □ Dolby Pro Logic decoding with eight program modes

 Adjustable for initial delay, room size, liveness, reverb time,
- HF reverb, front and rear equalization ☐ Four-channel and six-channel
- ☐ Seven-band digital graphic equalizer; independent settings for front and rear processed signals
- ☐ Motor-driven master volume control; can serve as system volume control
- ☐ Display of complete system operating status
- Infrared remote control for all adjustm**e**nts



JVC Super Digifine Audio Series — In full view of the possibilities



SUPER**DIGIFHNE**

Digital Technology is no longer a shimmer on some distant horizon. We are now in full view of the possibilities that the technology affords us. The Super Digifine Series from JVC turns these possibilities into reality.



RX-1010VTN Audio/Video System Control Center

CSRP — Getting control over the possibilities

With technologies as advanced as Digital Acoustics Processing, Dolby Pro-Logic, electronics equalization and digital delay processing plus the variables of front and rear channel levels, balance, loudness compensation and even room compensation, the RX-1010VTN is an engineering marvel. It can quite literally recreate any acoustic experience, whether it be a movie in your neighborhood theater or the sound of a choir in a great cathedral. But how does one control the over 10 million possible settings necessary to achieve this?

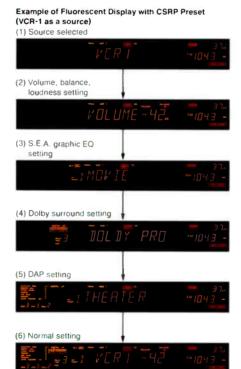
CSRP — or COMPU LINK Source-Related Presetting — does the chore completely and automatically. Touch a single button and all the parameters change to a setting that is appropriate for the source you've selected.

Then if your listening determines that some fine tune adjustments should be made, make them. One more button updates the memory with your changes and from then on recalls all the settings everytime you return to that source.

For example: When you turn on your hi-fi system and listen to a CD, you get response specially customized for CD listening. Level and channel balance are properly adjusted, a customized equalization is recalled, and parameters for JVC's sound field processor — the Digital

Acoustics Processor — are all optimized for the size and acoustics of your listening room.

Or, as you switch to video, settings you've preset for the Dolby Pro-Logic decoder, such as the center-channel





Audio/Video Inputs and Outputs on Back (S-Video Terminals Included)

mode and center and rear levels, are automatically recalled.

This also holds true for all program sources — records, tapes and even individual radio stations. Since the RX-1010VTN accepts connection of up to eight audio and video programs, and provides presets of 40 FM/AM stations, this means it can handle customized control settings for a total of 48 different program sources or stations. That's control.





DAP — Digital Acoustics Processing

In the RX-1010VTN, there's a ROM (Read-Only Memory) that stores the sound field patterns we measured at famous halls and theaters all over the world. Seven patterns, from symphony hall to movie theater, are programmed in memory for instant recall.



And you can fine-adjust these pat-

terns to suit the size, "liveness" and wall type of your listening room. This ensures that the ambience of your listening room is completely compensated for so that you enjoy the reflections and reverberations of only a desired hall.

Dolby Pro-Logic



With sound steering, active matrix and center channel output, Dolby Pro-Logic Surround provides you with an enhanced sense of direction and sharply centered dialog. When

watching videos, it will make you feel as if you were sitting in a first-class movie theater, especially since the digital acoustics processor is already at work.

The remote is a convenient LCD touch panel. The amplifier is a state-of-the-art Super-A design.

Our RX-1010VTN simply does everything and keeps everything simple.

*"Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.





XL-Z1010TN Compact Disc Player

K2 Interface — Revealing possibilities at the source

Changing the digital code on a CD into music requires that a digital-to-analog converter choose 1 of 65,536 possibilities every 1/44,100th of a second.

It's commonly assumed that digital signal is composed of 1's and 0's, each represented by the presence or absence of a square-shaped pulse. But the fact of the matter is, a digital signal contains ripple — a type of distortion that changes the shape of a waveform — and jitter, components that move the timing of a pulse forward or behind.

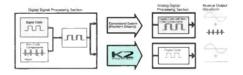
These "non-code" components can result in a sound that differs from the intent of the digital source. The K2 Interface solves this problem by completely regenerating the digital signal. At the heart of the K2 Interface is essentially an ultra-high-speed camera with a shutter speed of 20 nanoseconds (20 billionths of a second). Based on these quick snapshots, it recreates the digital signal as a perfect square wave.

Providing a perfect signal to the D/A converter allows for accurate reproduction of all the nuances such as sound staging and depth.

As a matter of fact, in many ways both frequency range and dynamic range are expanded. High frequencies sound clearer. There is a heightened sense of the power in the mid- to low-frequency range.

Comparison of K2 Interface and Conventional Transmission System

The JVC K2 Interface strips the transmitted signal of ripple and jitter as it travels from the digital to analog processing circuit.



Data Transmission Waveforms

The clean shape of data transmission waveforms indicates that the K2 Interface has removed ripple and litter.





The K2 Interface optically decouples the digital from the analog section

Music seems to acquire more depth and width, providing clear images of instruments and voices. Overall, sound is smoother and more natural across the audio spectrum.

Precision D/A Converter System Using Four D/A Units

The XL-Z1010TN features two D/A converter units for each channel four in all. There is a 16-bit converter for the most significant bits and a 2-bit converter for the two least significant bits. Since the least significant bits have greatest bearing on the sound quality at low level, JVC uses an elaborate discrete D/A converter system for these bits to ensure higher precision. All four converters operate with 18 bits "full time" whether the level is high or low. Our "quadruple full-time linear 18-bit combination D/A converter" allows you to enjoy digital sound at its most delicate and dynamic.





XP-A1010TN Digital Acoustics Processor

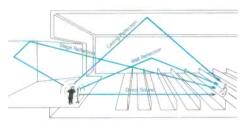
Bringing new possibilities to the home

Many of us have already invested in fine audio systems for our homes. Even the best, however, sound like music being played in a home environment.

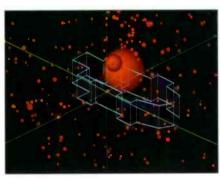
A new age is dawning in audio realism, thanks to the vast advancements in digital engineering. Now it is possible to simulate the acoustic ambience of a live music space — concert hall or movie theater — and recreate it right in your own listening room.

The new JVC XP-A1010TN Digital Acoustics Processor is the key. No other component available today so accurately brings concert hall ambience to the home.

The processor features a ROM (Read-Only Memory) containing a huge amount of data on reflections and reverberations — "sound field patterns" — our engineers measured in actual halls and theaters throughout the world.



Acoustic Response of a Musical Space



CHURCH
Sound Field Analysis Pattern

JVC's Unique Advantages of Acoustics Synthesis

The JVC XP-A1010TN offers a number of unique advantages. One,



Symmetrical 6-Point Sound Field Measurement

excessive reflections and reverberations added by your listening room can be compensated for, and so can reverberations contained in the source program. This means a precise sense of the size and shape of a simulated space is accurately recreated in any listening room.

Two, the entire process, from input to output, is performed channel by channel independently. Therefore, critical time-related information contained in music is retained, providing a natural sound field ambience.

Three, the size of the sound source — a point, like a solo or a spread, like an orchestra — is precisely reproduced.

The XP-A1010TN comes with sound fields from 20 actual concert halls, jazz clubs, theaters and stadiums. You can customize an additional 20 patterns of your own. With the XP-A1010TN, the possibilities now include the recreation of the concert halls around the system in your home.





AX-Z1010TN High-Power Class-A Amplifier

Digital Pure-A — New possibilities for class-A

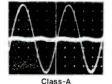
There's no doubt that an amplifier operating in class-A mode provides lower distortion and cleaner sound than those in popular class-B or class-AB. Their inefficiency, however, makes class-A amplifiers require elaborate heat sinking, and still the amps waste much of their power in the form of heat. This results in inflated cost and relatively low power output. But to enjoy the dynamic sound of digital programs, you need a lot of power.

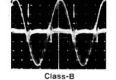
How to combine the low-distortion sound of class-A with efficiency and power demanded by digital audio?

Class-A vs. Class-B Operation

With class-A, combined output from the paired transistors looks very close to that of the input. With class-B, this is not so, leading to crossover and switching distortion.

Output Waveform

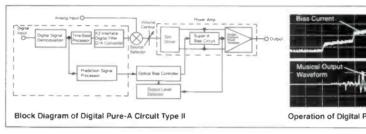




Enter the Digital Pure-A Type II

JVC has the solution — the Digital Pure-A Type II circuit featured in the AX-Z1010TN "Digital" Integrated Amplifier.

The main signal is sent to a time base processor where it's stored in memory for a fraction of a second before it goes to the D/A converter. The prediction signal is sent to the bias circuit to optimize bias applied to the power transistors depending on dynamics of the upcoming signal. What you get out of this is low-distortion class-A sound with high efficiency and high power.



This ingenious design takes the advantage of the fact that digital signals can be stored in memory temporarily without changing their frequency response or phase response.

In the Digital Pure-A Type II, digital signals fed directly from digital equipment are split into two: the main signal and the "prediction" signal.

The AX-Z1010TN is a "digital" integrated amplifier incorporating a D/A converter system complete with the K2 Interface, 8-times oversampling and quadruple D/A converters.

And the amp features a special design for analog programs too — Opt Super-A, another JVC exclusive combining low distortion and high efficiency.





TD-V1010TN Discrete 3-Head Cassette Deck

The world's finest cassette deck? A distinct possibility!

When it comes to specifications for cassette decks - such as wow & flutter, frequency response and signal-to-noise ratio — we can safely say today there is only marginal room for further improvement. This is because of the steady but sure advances over the years in mechanical design, heads, noise reduction designs and tapes.

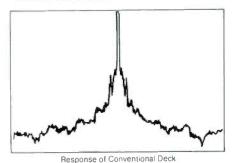
We have isolated "dynamic" response as one of the final steps in ensuring taped sound that's as pure and transparent as can be. We even developed a new specification to measure the degree of purity and transparency a cassette deck can provide: acoustic modulation noise.

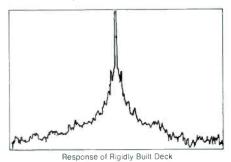
In this measurement system, the test deck is subjected to a high 100-phon sound pressure during recording and playback. More rigorous than conventional modulation noise tests, this new method better simulates a real-world situations where the deck must operate while speakers are playing music.

Taped Sound Free of Acoustic Modulation Noise

Based on what we discovered from

"Acoustic Modulation Noise"







Closed-Loop Dual-Capstan Drive Mechanism

our test, we've developed solid mechanical designs in order to suppress resonance and vibration. The result of our efforts is taped sound that rivals digital.

Moreover, there are other ways we've improved clarity and purity of the taped sound of the TD-V1010TN. A "CD DIRECT" switch lets you route the signal from your CD player direct to the cassette deck. We've cut down wiring to a minimum length using remote rods and controls. We use the time-proven closed-loop dualcapstan tape transport to suppress modulation noise. "Fine" amorphous heads, highly pure PCOCC copper wire and high bias frequency also enhance the purity and transparency of the taped sound.

If you think that taped sound cannot compare with digital programs, you owe yourself a listen to the TD-V1010TN.



SUPERDIGIT INE

FX-1010TN Computer-Controlled FM/AM Tuner

Self-adjusting to the possibilities

The FX-1010TN is a smart tuner that adjusts itself to the endless possibilities in the capture of radio signals.

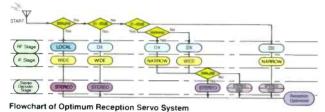
Our reception servo automatically selects the optimum operating mode — front-end gain,

IF bandwidth, stereo mode, etc. — after checking the degree of interference and the strength of the station you're tuned to. It guarantees you get the best reception anywhere and from every station. And yet the digital noise, which a

computer could create to muddy sound, is cut down by the "Opticalink" system separating the digital section from the analog.

The computer is put to use for special conveniences, too. You can preset up to 40 FM/AM stations for one-touch recall, and give a name to each preset station. You can let the tuner automatically preset all 40 FM/AM stations for you. You can "shop" for stations one by one. Also you can set the muting level to tune all stations in your area or only a few powerful ones.

Add circuitry designed for low distortion and wide dynamic range and you'll see that the FX-1010TN is the tuner that addresses the practical world of radio reception.





We are no longer at the threshold but have passed well into the world of digital technologies and their applications. In full view of the possibilities, we have endeavored to develop products that will endure the test of time and stand as small reminders that technology can advance while remaining sensitive to the needs of its users.



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TEST REPORTS

that the overall frequency response of the SP-91D was generally quite flat over the full audio range. With the sound-field processor switched off, the front-channel response of the SP-91D was down 0.2 dB at 20 Hz and 1 dB at 20,000 Hz. The center frequencies and amplitudes of the equalizer response curves were as specified.

Comments

As we have observed in previous test reports, measurements of digital signal processors like the Pioneer SP-91D convey little useful information about their sonic characteristics. Listening is the true test of such a device.

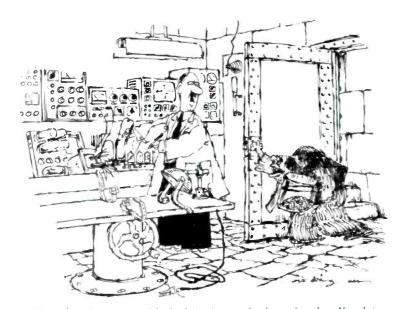
Despite its deceptively simple front panel, the SP-91D is a very complex product with far more versatility (and potential for misuse) than meets the eye. The instruction manual is quite good, especially compared with some we have encountered for earlier signal-processing devices, but it does require careful reading and hands-on practice to get the best results.

One characteristic the SP-91D shares with other sound-field processors is that the effects of most changes in its parameters are quite subtle. In many cases a parameter can be varied through its entire

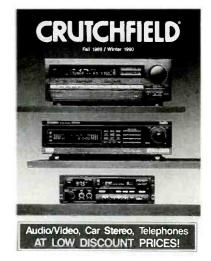
range with little or no audible effect on the sound of a particular program. But with a different program, or with another combination of parameters, varying the same parameter might produce more audible results.

Fortunately, the sixteen factorypreset modes offer enough variety that there should be little need for user modifications in most cases. Once you have a bit of practice in adjusting levels throughout the system, the contribution of the SP-91D becomes more striking. As with all such systems, its contribution should never be obvious; if the effect of the processing is clearly audible, it is being misused. When the system is operating correctly, you should be able to walk into the room and simply hear a naturalsounding performance without audible clues as to the speaker configuration or other special qualities of the system. Only when the processing is shut off (by a button on the remote control) should the presence of the SP-91D become unmistakable—by its absence! The resulting collapse of the sound field into the front speakers will be so apparent that you will wonder how you ever got along without sound-field enhancement.

Circle 143 on reader service card



"You idiot, Igor, stop with the bringing me brains, already—I'm doing vacuum-tube amplifier research!"



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CRUTCHFIELD

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Lab Tests: How do leading players measure up in audio and video performance?

Y interest in videodiscs goes back to my involvement with the ill-fated EVR (Electronic Video Recording) system developed many years ago at CBS Laboratories. The resolution of

that optically based system was so much better than you could get from tape in those days that I was spoiled for life. When I saw my first Laser-Vision demo, it was, in the immortal words of Yogi Berra, "déjà vu all over again." The picture was sharp, the colors were snappy, and video noise was noticeably lower than in the VHS and Beta VCR systems of the day. Even the sound was better: wider frequency response, greater dynamic range, and wow and flutter low enough to be inaudible. The only thing the tape formats had over LaserDisc was the ability to record.

Although the videodisc format has always trailed tape in popularity, it has continued to evolve and to grow in strength. The latest development is the combi-player, which can reproduce every type of consumer optical disc—audio or video—including 3and 5-inch audio CD's, 8- and 12-inch CAV (constant angular velocity) and CLV (constant linear velocity) laser videodiscs, and the gold-colored 5-inch CD-V's that combine 5 minutes of video

BY ED FOSTER Diversified Science Laboratories





PHILIPS CDV487 (\$949)



HE CDV487 is one step down from Philips's top combiplayer, the CDV488, which was reviewed in the October issue.

It lacks the CDV488's video frame memory. Thus, it provides still-frame, bidirectional frame advance, and multispeed playback (in nine steps from 3 seconds per frame to three times normal speed) only for CAV videodiscs. Since today's videodiscs are almost always recorded in the CLV mode, to increase their playing time to an hour per side, video special effects won't be available for most of them with this player.

The CDV487 does give you direct access to any video chapter or audio track via keypads on the main chassis and the remote control. It also permits direct access to any video frame on a CAV disc by the same means, as well as bidirectional chapter/track skipping and dual-speed scanning from the

remote control or the front panel. On CLV discs, you can cue to an "elapsed time" from the beginning of the disc, and on any kind of disc, you can return to the beginning of the current chapter or track by pressing play a second time. On videodiscs recorded with a table of contents and CD's with index points, you can skip from point to point.

As many as twenty chapters or tracks can be programmed for playback in any desired order, and there's a repeat function that replays the programmed sequence, the current chapter or track, the entire side of the disc, or any portion of it that has been marked as a block. You can play the tracks of any CD or CD-V in random order. In addition, you can use the Philips Favorite Track Selection system to store programs for as many as 218 CD's, CD-V's, and videodiscs (if they have tables of contents).

with an additional 20 minutes of digital audio. The three players reviewed here—the Philips CDV487 (\$949), the Pioneer CLD-3070 (\$1,200), and the Yamaha CDV-1600 (\$899)—are among the finest examples of this new breed.

Lab Tests

In the early days, the soundtracks on LaserDiscs were recorded using a stereo frequency-modulation system similar to those later adopted for Beta Hi-Fi and VHS Hi-Fi. Shortly thereafter, a CBS-developed noise-reduction system called CX was applied to improve the dynamic range, which in the Laser-Disc system was not nearly so good as it would be in hi-fi VCR's. After the compact disc was developed, 16-bit digital encoding was added to the LaserDisc system as well. Current videodiscs are almost always recorded both digitally and with the CX-enhanced FM system so that they will be compatible with players that don't have digital decoders.

The three combi-players reviewed here, of course, do have digital audio decoders. Each also has an FM decoder with CX noise reduction so that it is compatible with older discs. The players detect the presence of a digital audio signal and automatically use that system whenever they can. You can, however, force them to switch to the analog soundtrack by pressing a selector button

Diversified Science Laboratories tested the audio performance of the players in both modes of operation, using the CBS CD-1 test CD to evaluate the digital systems and the Pioneer M-1 test LaserDisc to spotcheck playback of the FM tracks. In the FM mode without CX, the Philips CDV487 had a slightly better Aweighted signal-to-noise ratio (S/N) than the other players (62 dB, compared with 61 dB for the Pioneer and 59 dB for the Yamaha), but with the noise-reduction system on, the Yamaha topped the list at 74 dB. compared with 70 dB for the Pioneer and 70.8 dB for the Philips.

Output from a signal recorded at 0 dB was close to a half volt from all three players, which should be adequate considering that the FM track on a videodisc can be recorded somewhat above that level. Total harmonic distortion (THD) plus noise at 0 dB and 1,000 Hz ranged from a low of 0.24 percent on the Pioneer to 0.31 percent on the Phil-

YAMAHA CDV-1600 (\$899)



HE CDV-1600 is the simplest and easiest to use of the three players reviewed here. Yet it is the only one that enables you

to cue directly to CD index points. (The Philips CDV487 permits index skipping, but not direct access to an index point by number.) And in a world where black seems to have become the standard high-tech color, I find the CDV-1600's titanium finish a welcome alternative.

For CD's and CD-V's, the Yamaha offers cueing by track number, elapsed time, or index number; on videodiscs, you can search by chapter number (on discs with a table of contents), frame

number (on CAV discs), or elapsed time (on CLV discs). You can skip across a disc a chapter or track at a time or scan it at fifteen or sixty times normal speed. A "single-play" function can be set to pause the player at the end of the current track or chapter. Still-frame, frame-by-frame advance in either direction, and multispeed playback (bidirectionally in ten steps ranging from three frames per second to twelve times normal speed) are available for CAV videodiscs. The CDV-1600 has a fifteen-selection memory and can be set for repeat play of a single selection, a programmed sequence, an entire side, or a portion set off by block markers.



ips, with the Yamaha nipping the heels of the CLD-3070 at 0.26 percent. The three figures are so close that they're not a deciding factor. Channel separation was a remarkably high 82 dB at 1,000 Hz on the Yamaha, but both the Philips and the Pioneer came in at slightly more than 70 dB, which is much greater than you need in any event. Channel-imbalance figures for the Yamaha and Pioneer players were less than a third the already negligible 0.23 dB of the Philips, but these are not significant differences either. For FM audio performance, chalk up a dead heat.

Undoubtedly, the digital audio performance of these players is more important than that of their FM systems, and here there were more significant differences. By the numbers, the Philips CDV487 had the smoothest frequency response, beating out the Yamaha by a whisker. The eight-times-oversampling Yamaha produced less ripple in the audio band, however, and since its response departed from perfect flatness only above 15,000 Hz, I'm not sure that I wouldn't give it the nod. The Pioneer had the most ripple. and its response above 8.000 Hz rose gradually to a peak of 0.2 to 0.3 dB between 14,000 and 18,000 Hz before dropping sharply.

Basic response was measured without the slight high-frequency rolloff needed to flatten the response of CD's recorded with preemphasis, which can be used to reduce noise at high frequencies. (Most CD's are recorded without pre-emphasis.) The de-emphasis error was least (no more than 0.1 dB) on the Philips player and worst (about 0.5 dB at 4,000 Hz) on the Yamaha.

The Yamaha CDV-1600's digitalto-analog (D/A) converter was the most linear of the three. In fact, it had one of the most linear conversion systems that I've yet measured on a regular CD player, to say nothing of a combi-player. The CDV-1600's linearity was within 0.1 dB at -80 dB, 0.6 dB at -90 dB, and 0.8 dB at -100 dB, which is truly remarkable performance. The Philips converter was also very good and suffered only by comparison with Yamaha's. It was on the money down to -70 dB and off by 0.6dB at -80 dB; the greatest nonlinearity (3.4 dB) occurred at the -90dB level. The Pioneer CLD-3070 came in a somewhat distant third. It



PIONEER CLD-3070 (\$1,200)



OUCH potatoes will love the Pioneer CLD-3070. Of the three players covered in this review, it is the only one

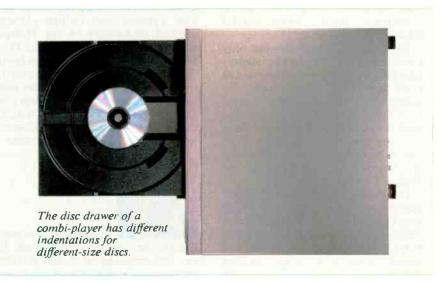
capable of playing both sides of a videodisc by itself (CD's and CD-V's are recorded on only one side, so there is no advantage with them). The Alpha Turn mechanism that Pioneer developed to rotate the laser pickup from one side of a disc to the other increases the player's height, but many users will consider that a small price to pay for the convenience of almost uninterrupted playback.

The CLD-3070 is also the only one of the three players to have a video frame memory. That means it can offer video special effects on CLV as well as CAV discs. The special effects are controlled with the JOG-dial/ SHUTTLE-ring combination located on the front panel and replicated on the remote unit. The JOG dial enables you to control the frame rate by hand at anywhere from double speed in either direction down to stop-motion. The SHUTTLE ring offers fast-forward or reverse playback at two, five, or ten times normal speed. The JOG/SHUTTLE combination also serves to zip you around CD's and CD-V's.

With the CLD-3070's video memory, you can get strobe motion at rates

ranging from fifteen frames per second (that is, every other frame) to one frame every 3 seconds, or you can capture and display a single frame using its one-shot memory function. If you want to view a still frame while listening to music, this is the way to do it. Intro-scan plays the first 8 seconds of each video chapter (the last frame of each chapter is stored and displayed by the one-shot memory while the player searches for the start of the next chapter). With CD's and CD-V's, intro-scan plays the first 8 seconds of each track. There's also a random-play feature for CD's and CD-V's and chapter/track skip and scan to get you around the disc.

Using the player's ten-key pad, you can do a direct search for any chapter on a videodisc recorded with chapter numbers or for any CD track. On CAV videodiscs you can search by frame number as well; for CD's and CLV videodiscs, this feature is replaced with a search-by-elapsed-time function. The CLD-3070 has a twenty-slot program memory for rearranging chapters or tracks. It works with CD's, CD-V's, and videodiscs that are encoded with chapter numbers. The deck can repeat a programmed sequence, an entire disc, or any section you have set off with block markers.



| Chroma level (above to high) ≤0.009% ≤0.085% <0.005% | | PHILIPS | PIONEER | YAMAHA |
|---|--|--------------------------|-------------------------|-------------------------|
| Deemphasis error (maximum) | DIGITAL AUDIO | | | |
| Signal-to-noise ratio (A-weighted) 111.5 dB 101.3 dB 108 dB | Frequency response (20 to 20,000 Hz) | $+0, -0.1 \mathrm{dB}$ | ±0.3 dB | +0, -0.15 dB |
| Distortion at 0 dB | De-emphasis error (maximum) | -0.1 dB | -0.2 dB | +0.56 dB |
| Linearity (at 1,000 Hz) | Signal-to-noise ratio (A-weighted) | 111.5 d в | 101.3 dB | 108 dB |
| Linearity (at 1,000 Hz) | Distortion at 0 dB | | | |
| -60 dB | (THD + N, 20 to 20,000 Hz) | ≤ 0 .009 % | ≤0.085% | < 0.005% |
| -70 dB | Linearity (at 1,000 Hz) | | | |
| -80 dB | −60 dB | 0 dB | −0.5 dB | 0 dB |
| -90 dB | −70 dB | 0 dB | -0.1 dB | $-0.1 \mathrm{dB}$ |
| -100 dB | −80 dB | −0 .6 d B | −0.4 dB | −0.1 dB |
| Channel separation (at 1,000 Hz) > 120 dB 110 dB 105.3 dB Channel balance (at 1,000 Hz) ± 0.03 dB ± 0.02 dB ± 0.01 dB Line output (maximum) 1.89 volts 1.95 volts 1.95 volts FM AUDIO Signal-to-noise ratio (A-weighted) CX off 62 dB 61 dB 59 dB CX on 70.8 dB 70 dB 74 dB Distortion at 0 dB (THD + N at 1,000 Hz) 0.31% 0.24% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000) Hz) ± 0.12 dB ± 0.04 dB ± 0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt ViDEO Video frequency response at 2.0 MHz -2 dB -2 dB -1.8 dB at 3.0 MHz -3.4 dB -4 dB -4 dB at 4.1 Mtz -6 dB -6.3 dB -3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) | -90 dB | −3.4 dB | −3.7 dB | -0.6 dB |
| Channel balance (at 1,000 Hz) ± 0.03 dB ± 0.02 dB ± 0.01 dB Line output (maximum) 1.89 volts 1.95 volts 1.95 volts FM AUDIO Signal-to-noise ratio (A-weighted) CX off 62 dB 61 dB 59 dB CX on 70.8 dB 70 dB 74 dB Distortion at 0 dB (THD + N at 1,000 Hz) 0.31% 0.24% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000 Hz) ± 0.12 dB ± 0.04 dB ± 0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response at 2.0 MHZ −2 dB −2 dB −1.8 dB at 3.0 MHZ −3.4 dB −4 dB −4 dB at 4.1 MHZ −6 dB −6.3 dB −3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) −5 to −3.5 dB −7 to −6 dB −4.8 to −4.5 d Chroma differential gain <th< td=""><td>-100 dB</td><td>-2.4 dB</td><td>$-4.5\mathrm{dB}$</td><td>-0.8 dB</td></th<> | -100 dB | -2.4 dB | $-4.5\mathrm{dB}$ | -0.8 dB |
| Line output (maximum) 1.89 volts 1.95 volts 1.95 volts | Channel separation (at 1,000 Hz) | >120 dB | 110 dB | 105.3 dB |
| FM AUDIO Signal-to-noise ratio (A-weighted) CX off 62 dB 61 dB 59 dB CX on 70.8 dB 70 dB 74 dB Distortion at 0 dB (THD + N at 1,000 Hz) 0.31% 0.24% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB 82 dB Channel balance (at 1,000 Hz) ± 0.12 dB ± 0.04 dB ± 0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response at 2.0 MHz -2 dB -2 dB -1.8 dB -4 dB -4 dB -4 dB at 4.1 MHz -3.4 dB -6 dB -6.3 dB -3.8 dB Luminance level (low to high) -5 to -3.5 dB -7 to -6 dB -4.8 to -4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | Channel balance (at 1,000 Hz) | $\pm 0.03 \mathrm{dB}$ | $\pm 0.02 \mathrm{dB}$ | ±0.01 dB |
| Signal-to-noise ratio (A-weighted) CX off 62 dB 61 dB 59 dB CX on 70.8 dB 70 dB 74 dB 74 dB Distortion at 0 dB (THD + Nat 1,000 Hz) 0.31% 0.24% 0.26% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000) Hz) ±0.12 dB ±0.04 dB ±0.03 dB ±0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt 0.45 volt VIDEO Video frequency response at 2.0 MHz -2 dB -2 dB -1.8 dB -4 dB at 3.0 MHz -3.4 dB -4 dB -4 dB -4 dB -4 dB at 4.1 MHz -6 dB -6.3 dB -3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) -5 to -3.5 dB -7 to -6 dB -4.8 to -4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% ≈5% | Line output (maximum) | 1.89 volts | 1.95 volts | 1.95 volts |
| CX off | FM AUDIO | | | |
| CX on 70.8 dB 70.8 dB 70.8 dB 74 dB Distortion at 0 dB (THD + N at 1,000 Hz) 0.31% 0.24% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000) Hz) ±0.12 dB ±0.04 dB ±0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response at 2.0 MHz −2 dB −2 dB −1.8 dB at 3.0 MHz −3.4 dB −4 dB −4 dB −4 dB at 4.1 MHz −6 dB −6.3 dB −3.8 dB Luminance level (low to high) −5 to −3.5 dB −7 to −6 dB −4.8 to −4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | Signal-to-noise ratio (A-weighted) | | | |
| Distortion at 0 dB (THD + N at 1,000 Hz) 0.31% 0.24% 0.26% Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000) Hz) ± 0.12 dB ± 0.04 dB ± 0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response 2 dB −2 dB −1.8 dB at 2.0 MHz −3.4 dB −4 dB −4 dB at 4.1 MB at 4.1 MHz −6 dB −6.3 dB −3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) −5 to −3.5 dB −7 to −6 dB −4.8 to −4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | CX off | 62 dB | 61 dB | 59 dв |
| Channel separation (at 1,000 Hz) 70.5 dB 72 dB ≈82 dB Channel balance (at 1,000) Hz) ±0.12 dB ±0.04 dB ±0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response at 2.0 MHz −2 dB −2 dB −1.8 dB at 3.0 MHz −3.4 dB −4 dB −4 dB at 4.1 MHz −6 dB −6.3 dB −3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) −5 to −3.5 dB −7 to −6 dB −4.8 to −4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | CX on | <mark>70.8 d</mark> в | 70 dB | 74 dB |
| Channel balance (at 1,000) Hz) ±0.12 dB ±0.04 dB ±0.03 dB Line output (at 0 dB) 0.40 volt 0.49 volt 0.45 volt VIDEO Video frequency response at 2.0 MHz −2 dB −2 dB −1.8 dB at 3.0 MHz −3.4 dB −4 dB −4 dB at 4.1 MHz −6 dB −6.3 dB −3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) −5 to −3.5 dB −7 to −6 dB −4.8 to −4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | Distortion at 0 dB (THD + N at 1,000 Hz) | 0.31% | 0.24% | 0.26% |
| Video frequency response -2 dB -2 dB -1.8 dB at 2.0 MHz -3.4 dB -4 dB -4 dB at 4.1 MHz -6 dB -6.3 dB -3.8 dB Luminance level 94% 105% 96% Chroma level (low to high) -5 to -3.5 dB -7 to -6 dB -4.8 to -4.5 d Chroma phase error (low to high) +5° to +6° +5° +4° to +7° Chroma differential gain ≈15% ≈10% ≈5% | Channel separation (at 1,000 Hz) | 70.5 dB | 72 dB | ≈82 dB |
| VIDEO Video frequency response at 2.0 MHz $-2 dB$ $-2 dB$ $-1.8 dB$ at 3.0 MHz $-3.4 dB$ $-4 dB$ $-4 dB$ at 4.1 MHz $-6 dB$ $-6.3 dB$ $-3.8 dB$ Luminance level 94% 105% 96% Chroma level (low to high) $-5 to -3.5 dB$ $-7 to -6 dB$ $-4.8 to -4.5 d$ Chroma phase error (low to high) $+5^{\circ} to +6^{\circ}$ $+5^{\circ}$ $+4^{\circ} to +7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | Channel balance (at 1,000) Hz) | $\pm 0.12 \mathrm{dB}$ | ±0.04 dB | $\pm 0.03 \mathrm{dB}$ |
| Video frequency response at 2.0 MHz $-2 dB$ $-2 dB$ $-1.8 dB$ at 3.0 MHz $-3.4 dB$ $-4 dB$ $-4 dB$ at 4.1 MHz $-6 dB$ $-6.3 dB$ $-3.8 dB$ Luminance level 94% 105% 96% Chroma level (low to high) $-5 to -3.5 dB$ $-7 to -6 dB$ $-4.8 to -4.5 d$ Chroma phase error (low to high) $+5^{\circ} to +6^{\circ}$ $+5^{\circ}$ $+4^{\circ} to +7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | Line output (at 0 dB) | 0.40 volt | 0.49 volt | 0.45 volt |
| at 2.0 MHz $-2 dB$ $-2 dB$ $-1.8 dB$ at 3.0 MHz $-3.4 dB$ $-4 dB$ $-4 dB$ at 4.1 MHz $-6 dB$ $-6.3 dB$ $-3.8 dB$ Luminance level 94% 105% 96% Chroma level (low to high) $-5 to -3.5 dB$ $-7 to -6 dB$ $-4.8 to -4.5 d$ Chroma phase error (low to high) $+5^{\circ} to +6^{\circ}$ $+5^{\circ}$ $+4^{\circ} to +7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | VIDEO | | | |
| at 3.0MHz -3.4dB -4dB -4dB at 4.1MHz -6dB -6.3dB -3.8dB Luminance level 94% 105% 96% Chroma level (low to high) $-5 \text{to} -3.5 \text{dB}$ $-7 \text{to} -6 \text{dB}$ $-4.8 \text{to} -4.5 \text{d}$ Chroma phase error (low to high) $+5^{\circ} \text{to} +6^{\circ}$ $+5^{\circ}$ $+4^{\circ} \text{to} +7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | | | | |
| at 4.1 MHz $-6 dB$ $-6.3 dB$ $-3.8 dB$ Luminance level 94% 105% 96% Chroma level (low to high) $-5 to -3.5 dB$ $-7 to -6 dB$ $-4.8 to -4.5 d$ Chroma phase error (low to high) $+5^{\circ} to +6^{\circ}$ $+5^{\circ}$ $+4^{\circ} to +7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | | | | |
| Luminance level 94% 105% 96% Chroma level (low to high) -5 to -3.5 dB -7 to -6 dB -4.8 to -4.5 d Chroma phase error (low to high) $+5^{\circ}$ to $+6^{\circ}$ $+5^{\circ}$ $+5^{\circ}$ $+4^{\circ}$ to $+7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | at 3.0 MHz | | | |
| Chroma level (low to high) -5 to -3.5 dB -7 to -6 dB -4.8 to -4.5 dChroma phase error (low to high) $+5^{\circ}$ to $+6^{\circ}$ $+5^{\circ}$ $+5^{\circ}$ $+4^{\circ}$ to $+7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | at 4.1 MHz | | | |
| Chroma phase error (low to high) $+5^{\circ}$ to $+6^{\circ}$ $+5^{\circ}$ $+4^{\circ}$ to $+7^{\circ}$ Chroma differential gain $\approx 15\%$ $\approx 10\%$ $\approx 5\%$ | | **** | | 1 9 /- |
| Chroma differential gain ≈15% ≈10% ≈5% | | | | -4.8 to -4.5 di |
| | | | | |
| Chroma differential phase $\pm < 5^{\circ}$ $\pm < ^{\circ}5$ $\pm < ^{\circ}$ | | | | |

was off approximately 0.5 dB at -60 dB, 3.7 dB at -90 dB, and 4.5 dB at -100 dB.

The CLD-3070 was also the only player to have measurable distortion pretty much across the board at 0 dB (full level). At 10,000 Hz, its second-harmonic distortion measured 0.065 percent, which was the high for the group. The A-weighted S/N was lowest on the Pioneer, at 101.3 dB, compared with 108 dB for the Yamaha and 111.5 dB for the Philips CDV487.

In other electrical characteristics, the players were impeccable. Output voltage at 0 dB was the usual "slightly less than 2 volts," channel balance was well within 0.1 dB, and channel separation was greater than 105 dB. There were differences in measured tracking ability, however. The Yamaha and Philips players vaulted all hurdles on the Philips 410 056-2 test disc, whereas the Pioneer stumbled on the highest-level "black dot" test (800 micrometers). Interestingly, the Pierre Verany test disc tripped up the Yamaha first (on the 0.55-millimeter dropout band); the Pioneer held out to the 1.00-mm level and the Philips to 1.25 mm.

LL three players per-

formed well in the video tests. If you are accustomed to the picture quality typical of VCR's, any of these

units will give you an eye-opening experience. The Pioneer and Philips players had almost identical video frequency responses—down about 6 dB at the highest test frequency, 4.1 MHz. This implies a horizontal resolution of about 330 lines, which equals the best you could get from an NTSC-standard broadcast. Although that is perfectly adequate performance, the Yamaha CDV-1600 was able to do a bit better. Its output was down only 3.8 dB at 4.1 MHz, which is as extended a video frequency response as I can recall measuring. On the basis of viewing a standard wedge pattern from a test disc, I would estimate that the CDV-1600 is good for at least 350 lines of horizontal resolution.

Each player delivered a lumi-

nance level within 6 percent of standard, which is essentially perfect, and a chroma differential phase (a measure of how tint changes with scene brightness) of less than 5 degrees, which is as low as can be measured. Chroma differential gain (change in color saturation with scene brightness) ranged from a low of 5 percent on the Yamaha to a maximum of 15 percent on the Philips; the Pioneer split the difference at about 10 percent.

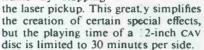
s is usually the case. the chroma output from the players was below standard. The Yamaha and Philips units were down about 4.5 dB, and the Pioneer was approximately 6.5 dB low, but all three figures are within the correction range of the auto-chroma-level circuitry in modern monitors and should not be a cause for concern. The Yamaha's output had the most nearly constant level across the color spectrum, so it may be expected to reproduce the various shades with slightly more uniform saturation than the other players. On the other hand, the Pioneer delivered the lowest and most uniform chroma phase error and therefore might be expected to produce slightly more accurate hues than the others. But in either case we're splitting hairs.

Conclusions

All three of these combi-players performed quite well, and choosing among them is not simple. The Pioneer CLD-3070 clearly outshines the others in features. Not only does it play both sides of a laser videodisc without human intervention, but it is also the only one of the three to offer video special effects on garden-variety CLV discs. That can be an important consideration for videodisc collectors. Philips's Favorite Track Selection (FTS) system distinguishes the CDV487, which also boasts fine audio and video performance and produced some of the best measurements of the lot. Compared with the other two players, the Yamaha CDV-1600 is relatively plain, but I think it's the one I'm going to miss most when I have to send them all back. Its sound is sparkling, its pictures sharp, and its colors gorgeous!

A GLOSSARY OF VIDEO TERMS

CAV disc: a laser videodisc recorded at a constant angular velocity-that is, at a fixed rotational speed of 1,800 rpm. At this rate, one video frame is recorded for each revolution. or "track," of the disc, making it possible to freeze a frame by stopping



chroma differential gain: a measure of the degree to which chroma level (color saturation) varies with scene brightness. Usually the error is in the direction of reduced color saturation with increasing scene brightness. Ideally, differential gain would be zero.

chroma differential phase: a measure of the degree to which chroma phase (hue) varies with scene brightness. A perfect reading is zero.

chrominance (chroma) level: the output level of each chrominance (chroma, or color) component of a v-deo signal. Chroma level determines relative color saturation. The maximum output for each hue is standardized, which enables us to report the amount of error, in decibels, compared with the correct level. It is very common to find chroma levels ranging from -4 to -6 dB. Modern monitors have automatic chromalevel circuits that can usually correct for low chroma output from a video source. If color saturation is inadequate, reset your monitor's color control.

chrominance (chroma) phase: the relative phase angle of each chrominance (chroma, or color) component of the video signal with respect to the phase of the chroma burst. Chroma phase determines hue, or tint. The phase angle for each hue is standardized, which enables us to report the measured chroma phase as the error, in degrees, relative to the standard. A perfect reading is 0 degrees. Readings within ±2 degrees are essentially perfect. Errors that are fairly constant across all colors can be corrected by touching up the tint control on the monitor. Therefore, the spread of the chroma-phase readings is more significant than the magnitude of the errors.

CLV disc: a videodisc recorded at constant linear velocity, such that a fixed length of track passes the laser pickup each second. A CLV disc rotates at a variable angular rate (from 500 to 1,800 rpm on a 12-inch disc) depending on the radius where the laser pickup is located. The number of frames per track



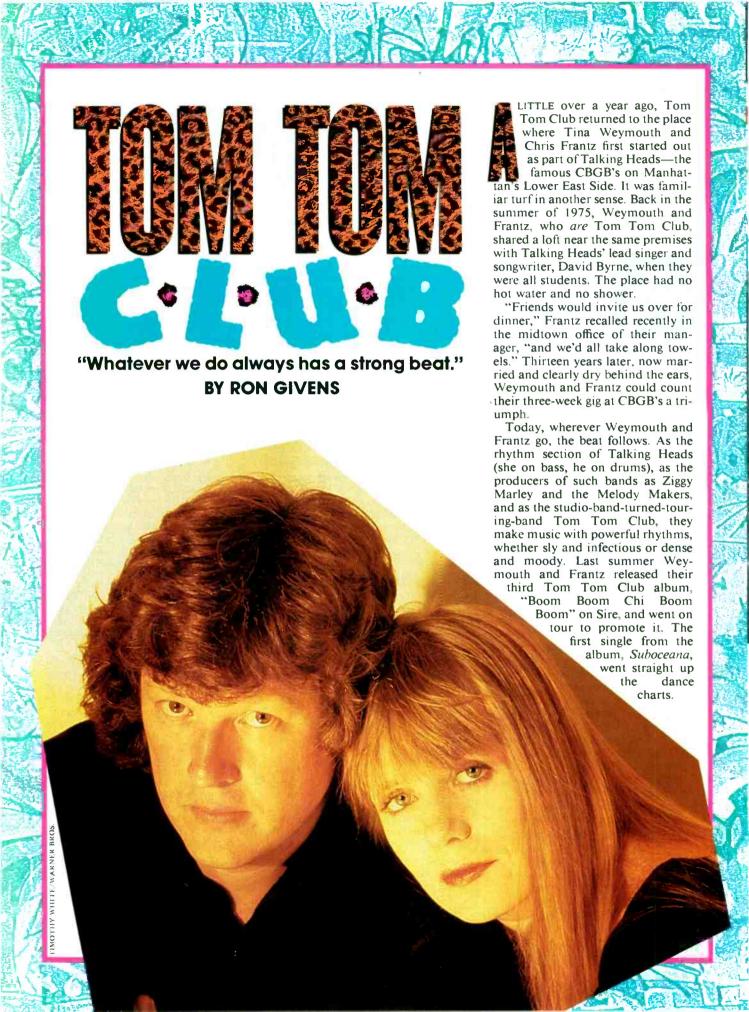
varies, and it is not possible to produce special effects merely by stopping the pickup. On the other hand, since none of the track length is wasted, the playing time of a 12-inch CLV disc can be as much as 60 minutes a side.

horizontal resolution: the number of individual vertical lines that can be distinguished in a monochrome picture across a width equal to the height of the picture. Horizontal resolution (in lines) car be no more than approximately eignty times the video bandwidth (in MHz), and the quality of a monitor's CRT and focusing circuit may further limit the resolution, Potential horizontal resolution can be calculated from the video response or estimated by viewing a "wedge" pattern.

luminance level: the output level of the luminance (black-and-white) component of a video signal for a white screen of naximum brightness. Together with the black level, the luminance level establishes the contrast range of the picture. The output level for a 100-percentwhite picture is standardized, which enables us to report the measured luminance level as a percentage of this standard level. A perfect reading is 100 percent. Readings lower than that indicate that the equipment being tested will not drive a monitor to full brightness with standard control settings. It may be necessary to turn up the monitor's picture or contrast control to compensate. Readings greater than 100 percert suggest the opposite condition.

video frequency response: a measure of the potential horizontal resolution of a mcnochrome picture. Video response is usually measured with a "multiburst" signal comprising bursts of sine waves. On a monitor, this pattern produces sets of vertical bars that are spaced more and more closely together as the frequency is increased. There is no universally accepted rule to determine what constitutes "acceptable" signal loss. We use a very stringent criterion and establist the video bandwidth by the frequency at which response has fallen 6 dB. Since the bursts occur only at specific requencies, it is often necessary to est mate the -6-dB point.

video noise: a reference to luminance noise, which produces "snow" in a mcnochrome picture; chroma AM noise, which produces a blotchy effect in color scenes; and chroma phasemcdulation (PM) noise, which causes rardom color changes.



"Our breakthroughs, in Talking Heads as well as Tom Tom Club, have been made in dance music," said Weymouth. "Whatever we do always has a strong beat."

"Dance is probably what we do best," Frantz agreed. "Whenever we try to do something in a dance style, it works. We'd be fools not to take advantage of what we do best."

Dance music has seldom been given such a multifaceted showcase as in Tom Tom Club's new album. Call of the Wild, for example, is perky and syncopated. Weymouth's breathy vocals seem like a cross between Betty Boop and Marlene Kewpie-doll-like Dietrich, throaty. Suboceana, on the other hand, is danceable despite its dense, somber synthesizer textures and slowly gliding pulse. Challenge of the Love Warriors is a percussion festival for drums, bongos, synths, and heavy female breathing. Femme Fatale is a remake of the classic Lou Reed song, with Reed himself on guitar along with the other Heads, Byrne and guitarist-keyboardist Jerry Harrison.

ERSONAL and professional interruptions made for an onagain, off-again recording process for "Boom Boom Chi Boom." Weymouth gave birth to the couple's second son, Egan, in 1986. (Their first, Robin, is seven.) In addition to the songs they wrote for the films Siesta and Married to the Mob, Weymouth and Frantz also produced two albums for Ziggy Marley and the Melody Makers. Although they enjoy producing other musical acts, they don't actively seek this work. "We get asked to produce a lot of bands at this point, and we almost always say no," Frantz said. "We only want to produce something if we think that it's terrific and that it'll be a pleasure to produce."

Another major distraction was the last Talking Heads album. "Naked." The Heads recorded most of the music for it in Paris, and its world-beat emphasis drew great critical praise, but sales were disappointing. The band didn't tour in support of the album and did very little video promotion either. In a sense, the individual Heads had so much to do outside of the group



Backstage at CBGB's: from left, guitarist and touring-band member Mark Roule, Lou Reed, Tina Weymouth, Chris Frantz, and touring keyboardist Gary Pozner

that they had little time for their work together. David Byrne had movie projects of his own: composing music for *The Last Emperor* and trying to raise money for filming a theatrical piece, *The Forest*, that he created with avant-garde dramatist Robert Wilson. Jerry Harrison had an album by his solo band, Casual Gods, and a tour of his own. And Weymouth and Frantz were plugging away on "Boom Boom Chi Boom Boom."

When they started Tom Tom Club, it was as a studio band that would give them a different kind of creative satisfaction from their work in Talking Heads. But things have changed. The Heads haven't toured since 1982, so the couple has gone on the road with Tom Tom Club. At this point, they still get many of their creative opportunities from their affiliation with Talking Heads, but it now appears that the Heads won't release another new album until sometime next year—at the earliest.

Frantz believes that the band has lost some of its audience by not playing live. "Because we haven't toured as Talking Heads, sales there have gone from Platinum to mere Gold," he said. "Making the record is only half of it. Performing is essential."

"Our live audiences for Tom Tom Club are great," Weymouth added. "We can be very playful with them, and that's important because it keeps the music alive." Frantz has strong disdain for bands that perform in concert with taped backing tracks, and he believes that the music-video scene has been polluted by

commercialism. "The videos all look exactly like commercials, and the commercials for soda pop and automobiles are made to look like music videos," he said.

they feel, and this fall they've been touring to parts of the country where Talking Heads has never performed and sharing stages with bands that play very different styles of music. "It'll be nice for us to gain an audience that isn't automatically a Talking Heads audience," said

Strangely enough, as Tom Tom Club tries to gain a wider audience, Weymouth and Frantz find themselves competing with their older selves. The push for "classic rock" on radio stations today means that airplay frequently goes to oldies by bands like Talking Heads and Tom Tom Club instead of to newer material

"It's a battle for us," said Frantz. "Everybody plays the stuff we did ten years ago, but they won't play what we've just done." In concert, Weymouth explained further, "they yell for our hit, so we get it out of the way early and do *Genius of Love* second in the set."

What's most important to the two of them, however, and what makes any aggravation worth bearing, is the chance to perform in front of a live, engaged, and appreciative audience. "There's nothing like it," Frantz said. "With Tom Tom Club, we just want to get out and rock the house."

Long may they rock.

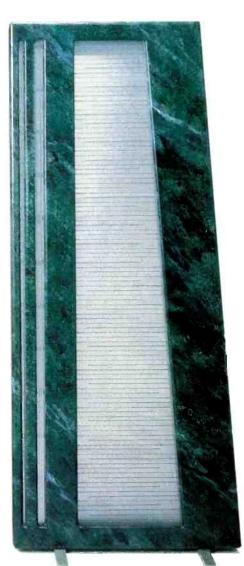
BY WARREN BERGER

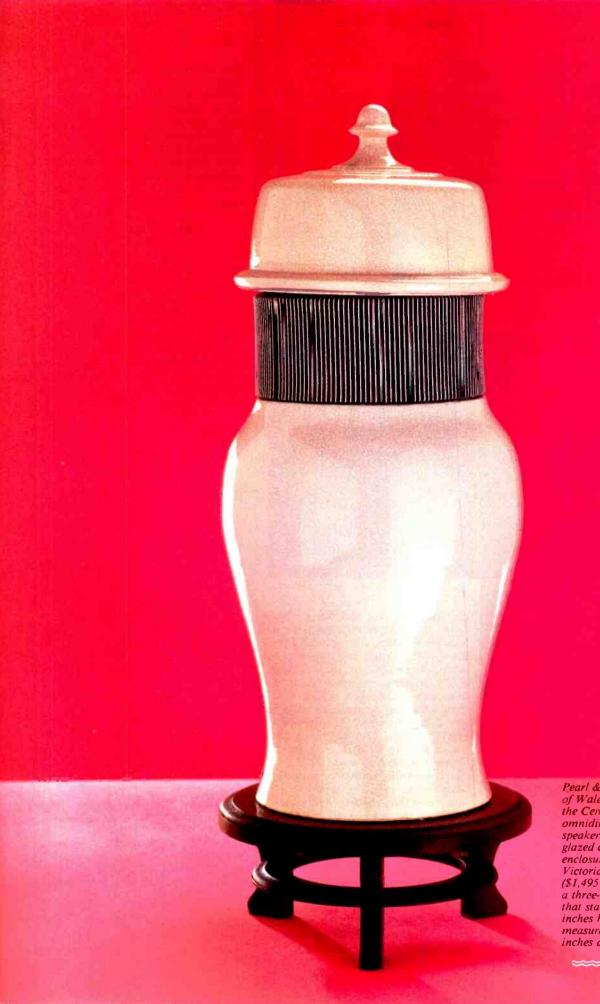
HERE was a time, and it wasn't long ago, when the finer points of audio equipment design—appearance, ergonomics, and the like—were regarded lightly, if at all, by hi-fi companies. It was the Age of Engineering, when style was out of style, and all that seemed to matter were the specs, the size, and the number of buttons and switches.

That era has now passed, and a new age of enlightened audio design is in full swing. Blame it on style-conscious yuppie consumers (they get blamed for everything else), or credit it to a new generation of audio designers who will no longer be pushed around by

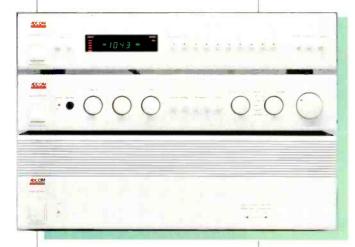
Apogee Acoustics' Diva full-range ribbon speakers are available in optional faux finishes such as the grigio perla marble shown here. The Diva systems are 73 inches high, 31 inches wide, and only 3 inches thick. A pair costs \$9,450 in faux finish.







Pearl & Oakley of Wales makes the Cerca brand of omnidirectional speakers in glazed ceramic enclosures. The Victoria 120 (\$1,495 a pair) is a three-way system that stands 33½ inches high and measures 13¾ inches across.



Adcom offers white and silver front panels as stylish alternatives to the usual black look. At left are the GFT-555 tuner (\$350), the GFP-555 preamp (\$550), and the GFA-545 power amp (\$550).

The Proton 600 Series (right) combines style and performance in an integrated amp with 6 dB dynamic headroom, a tuner with Schotz II circuitry, a cassette deck, and a compact disc player.



tweaky engineers; whoever's responsible, the world of hi-fi has never looked better. And more often than not, contemporary audio equipment designs are as practical as they are pretty.

Characteristic of the new look are sleek components in basic black or muted dark colors, with clean, uncluttered control panels and easy-touse remotes. One "smart" switch often takes the place of two singlefunction controls, and lesser-used controls may be hidden behind movable panels. The pieces of a system can complement each other aesthetically and logically, right down to the speakers. And those speakers do not resemble the plain brown boxes of old—they come in a growing variety of shapes and colors, with some even resembling works of art.

The revolution in design didn't happen overnight. Bang & Olufsen was creating audio "designs for liv-

ing" decades ago, and other European manufacturers have, for a number of years, also strived for a sense of stylishness and user-friendliness. Examples of these efforts could be seen over the years at European audio fairs, which have always focused as much on style as sound, but it wasn't until recently that the audio fashion movement began to take hold in the United States, traditionally known for a serious, no-frills approach to audio design. And even the Japanese are now becoming stylish, fighting off an old enthusiasm for techno-flash.

"It's a response to what today's customer wants," explained Steve Girod, vice president of marketing at Yamaha. "People are more concerned than ever about how audio equipment looks in the home environment, how it fits," he told me. "Women are getting more involved in the purchase of hi-fi equipment and bringing their sensibilities into

the market, and at the same time men are becoming more conscious of style. In the past people responded to technology and buttons, but that's not the case any more."

Girod pointed to the latest line of Yamaha components, the 90 Series, as an example of how the company is reacting to this phenomenon. The pieces of the new line are smaller, rounded at the edges, and finished in dark blue. Girod and other Yamaha marketing people refer to the look as "Euro-style." As it happens, they're not the only ones using that term lately. From the Far East to the West Coast, "Europhilia" is alive and well among audio designers.

"Europe has always had a reputation for turning out the best designs, whether it's in automobiles, furniture, or hi-fi," said Lee Adams, managing director of Soundstream Technologies, which is based in Japan. According to Adams, Soundstream's designs "combine a number of different European influences, including some German touches and some Italian."

The current popularity of European styling has naturally benefited companies from that continent, and they're now making the most of their design savvy. It's a boomtime for Bang & Olufsen, which now feels that "the rest of the industry is moving in our direction and trying to catch up," according to John Stone, B&O's U.S. product manager.

HAT won't be easy for some manufacturers. B&O has refined its design approach—an attempt to create user-friendly systems that blend into the home—over a period of decades, and not without struggles. "Good design is not something that's easily mastered," Stone said. "Over the years, we've worked hard to resolve the natural conflict between engineers and designers—and even now it's not a simple matter."

Still, it's a challenge that many companies are now prepared to undertake, perhaps out of necessity. As Stone pointed out, technological differentiation is becoming harder and harder to achieve. Nowadays, the company whose products stand out by virtue of appearance and functionality has a significant edge.

Purposeful Design

How does one recognize and judge good design in audio? At the Museum of Modern Art in New



associate curator Cara York. McCarty looks for audio designs that are "new and innovative, but with a purpose." Among the audio products on display at MOMA are several B&O components, which McCarty praises for "simplicity and unobtrusiveness-they blend into a living room like furniture." Similarly, McCarty spoke of the beauty and practicality of a Brionvega system designed by Mario Bellini: The components are housed in an elegantly minimal cube, which opens and closes.

McCarty noted that the B&O and Brionvega systems, along with other hi-fi pieces on display at the museum, always incorporate user benefits into the stylish package. In the best designs, style and function are so intertwined they are virtually inseparable.

While there are, of course, some radical audio designs on the market today that could be labeled "art for art's sake," the better ones almost always manage to balance function and form. "In all instances, we strive for design that's simple, understated, and ergonomically smart," said Soundstream's Adams. Indeed, function takes precedence with some designers: "The main purpose of industrial design is to make the operation of advanced technology easier for the consumer," declared René Weiss, who designs for Proton and other audio companies.

HAT sense of balanced design can be seen in Weiss's work for Proton. Weiss's sleek, allblack finishes have helped forge the company's identity, while his placement of controls has made the components easier to use. In the company's new 600 Series, buttons are grouped together by function, and seldom-used controls are concealed behind motorized, rotating panels.

An interesting blend of style and function can also be found in the components of Adcom (whose current fashion statement includes the white look), a/d/s/, Revox, Meridian, NAD, and others. With occasional exceptions, these companies opt for subtlety in design rather than outrageous shapes and colors. "We feel that far-out designs are a curiosity more than anything else," a/d/s/ consultant Larry Daywitt told me.

Curiosity pieces do have their

place in the audio world, particularly where turntables are concerned. Perhaps in response to those who would dismiss the turntable as a thing of the past, a number of manufacturers have opted for a futuristic look. European companies such as Grundig and Goldmund, as well as Canada's Museatex, create state-of-the-art turntables that put some or all of the complex internal workings on display for a high-tech appearance.

Remote Possibilities

In contrast, a low-tech appearance is what counts with remote controls: The more functions are concealed, the better. Remote control is now a key element of the design process; it has, in effect, allowed designers to clean up and simplify component faceplates, since much of the operation is now handled by the remote unit. At the same time, however, it has forced designers to come up with creative approaches to fitting all of those controls onto an even smaller surface

The best remotes on the market are those that limit the number of buttons, group them logically, and provide visual aids, such as colorcoding or varied shapes and sizes, to cut down on confusion. As Yamaha's Girod pointed out, "Manufacturers started out trying to impress consumers with a hundred buttons on a remote, but consumers have rejected that completely proach."

Now companies such as Mitsubishi are concealing buttons (the remote control for the M-AV1 receiver has a sliding cover plate over lessused buttons). The a/d/s/ RC-1 remote uses an internal "page" system, also concealed under a panel, to provide hundred-function access without the mess. Obviously, with a remote, functionality is most important; still, a little style, perhaps in the form of interesting color and contours, can make the unit look better on the coffee table.

Speakers as Art

Ergonomics is less of an issue with speakers, though style may be particularly important considering that speakers tend to be the most visually prominent elements of a sound system. Rebelling against the intrusion of speakers in interior designs, a growing number of styleconscious consumers and installers have recently been hiding speakers in the walls, though in some cases that has led to compromised sound quality.

Now, a number of speaker manufacturers are responding with models designed to "fit in" with room decor. Pearl & Oakley Acousties, a newcomer to the audio market, has introduced a line of ceramic speakers with antique-porcelain finishes, such as the Victoria, which is shaped to resemble an elegant vase. The "speaker as art" approach is also in vogue at Apogee, where speakers are being hand-painted. Artists create individual designs on high-density particleboard exteriors; customers select speakers as they would works of art, or request custom work for an additional charge. "If these speakers are going to be the focal point in a room, they need to look the part," said Sara Bloom, who oversees this design process for Apogee.

HILE not many speaker makers are commissioning modern-day Michelangelos to paint speakers, many are expanding the variety of finishes they offer. MB Quart, for example, now offers at least nine finishes for each model. "A customized approach is very important now the idea is to fit in," said Andy Oxenhorn, the company's North American sales manager.

Of course, there is also something to be said for speaker designs that do stand out in a room, as MB Quart knows. One of the company's most talked-about speakers right now is the new Aera, which features a pulsating sphere on top of a rhomboid-shaped box.

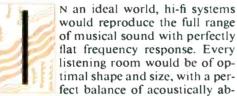
Another eye-eatcher is the Duetto from Revox, a one-piece, prismshaped speaker system that produces a stereo sound stage: The speaker houses two sets of three drivers on opposite sides of a single cabinet; the sets of drivers are acoustically coupled to each other,

building a stereo matrix.

Whether the aim is to blend in or to make an artistic statement, design is of the essence in hi-fi today. And as one manufacturer told me, that's good news for the family audiophile. "What it means," said Brian Gammon of Museatex, "is that your equipment won't have to be hidden in a basement recreation room any more. Stereo systems can now be brought out of the dungeon and into the living room."

WHAT DO SIGNAL PROCESSORS DO? COULD YOU GET BETTER SOUND YOU ADDED ONE TO YOUR SYSTEM?

BY DAVID SIMON



sorptive surfaces and live, reflecting ones.

All musical recordings would be mastered with exemplary tonal balance-not too bright, not too dull, but just right. And the blend of direct, pinpoint imaging and spacious reflected sound would be equally flawless, reproducing the original acoustic space of the live performance with complete authenticity.

Dynamic range would be no problem in this ideal world. An amazing medium that stores sound as digital code on a shiny plastic disc the size of a large coaster would be able to play back music with every nuance of loud to soft found in the concert hall.

One out of five isn't bad. We've got the CD, a digital medium whose dynamic range approaches perfection. But the fact is, we do not live in an ideal world-or anything very like one. And nearly every other link in a hi-fi system's signal chain can be subject to sonic compromise.

Most loudspeakers, for example, are in truth limited. They don't reproduce the entire range of deep bass or all the semiaudible high-frequency overtones, they are not perfectly evenhanded in meting out bass, midrange, and treble sound, and they interact with the listening room in unpredictable, less-than-ideal ways.

Recordings—even in this digital age—do not adhere to any standard of tonal balance. There are bright ones, dull ones, and

in-between ones. The reproduction of acoustic space is all over the map, too. You can find spacious discs, dead-sounding discs, reverberant discs, and purely studioproduced, "multi-mono" recordings that make no effort whatsoever to create a concert-hall sound.

Even dynamic range remains an area of concern. While many CD's are essentially unfettered in this regard, plenty were mastered from older recordings—particularly those of historic performances from before about 1970—that cannot utilize all of the digital medium's potential. And analog LP records remain strictly limited to about 20 dB less dynamic range than the typical compact disc. What's more, the CD's wide dynamic range is just too much for many listening situations: Soft passages can be lost in a room's background noise, and louder ones and sudden transients may blow you out of your seat.

What's a poor hi-fi fan to do? Look into signal processors, that's what.

Transducers such as microphones and speakers change information from one medium to another-from sound waves to electrical waves, and back again. Program sources such as phonographs, tape decks, tuners, and even CD players are also basically transducers, turning a recorded or broadcast signal into an equivalent electrical audio signal that can be sent to an amplifier. Amplifiers take the audio signals they receive and make them bigger—more voltage, more current, more watts-without, in theory, changing the essence in any respect.

Almost every other audio component is a signal processor, a device that changes

(processes) the audio waveform (signal) in some way. The bass and treble tone controls on a receiver are the most common examples of signal processors: They alter the balance of low-frequency and high-frequency signal content, making the sound brighter or duller, richer or thinner.

Of course, the goal of high-fidelity audio is to reproduce the original sound with as little change as possible, so many audio hobbyists are aghast at the notion of adding a signal processor to their systems—often to the point of favoring preamplifiers that omit even those basic bass and treble knobs. But if you accept the idea that we live in an imperfect world, and that our hi-fi systems are forced to play imperfect material in environments that are far from flawless, then plugging in a signal processor makes sense.

Hooking It Up

Signal processors are often hooked up to a system between the preamp and power amplifier. Since most are "unity-gain" devices—the signal they put out is no stronger or weaker overall than the signal they receive—when set for zero processing they should have no effect on the system's performance. And when a processor is wired up this way, the preamp's own controls, including the all-important volume adjustment, will operate as usual.



F course, many of us use receivers or integrated amplifiers in place of separate components. In such cases, a processor should be patched

into a tape-monitor loop, and for the best signal-to-noise performance, processors should be inserted through a tape loop with separates also. This way, whenever the tapemonitor button on the receiver or amp is pressed, the signal processor's effects will be heard, modifying whatever source-CD, tuner, tape deck, or turntable—is selected. Fortunately, most signal-processor components provide a set of tape jacks, switched from the front panel, to replace the loop the processor fills on the receiver or amp. Many processors also permit the signal sent to a tape deck connected to their jacks to be processed, which is useful in making tapes for playback on other systems—in the car, for example.

Equalizers

By far the most common signal processor in home hi-fi systems is the *equalizer*, an apparatus that is simply an elaboration on the tone-control concept. The name comes from the device's ability to even out, or equalize, frequency-response irregularities. Where bass and treble controls provide only two bands of equalization corresponding to their names—that is, low frequencies and high frequencies—an equalizer provides more precise processing that usually extends over the entire range of audible sound.

There have been many types of equalizers over the years. Professional recording studios routinely use parametric equalizers, which can be set to fine-tune either a very specific, narrow range of frequencies or to act on a broader sonic region. Graphic equalizers are the type most often encountered in home hi-fi systems. Most graphic equalizers have ten discrete bands of operation, each one roughly corresponding to an octave of audible musical sound. They usually sport a slider control for each band, often arranged in ten pairs to permit separate control of left and right channels. The sliders operate just like the round knobs used for most tone controls, but linearly. Each band can be boosted or cut by as much as 12 or 15 dB.

There are several advantages to having such fine control over the tonal balance of music. Most worthwhile is the ability to correct for frequency-response errors that exist in the program source, that are caused by the reproduction system, or that are caused by the listening room itself.

Take the first case. With a graphic equalizer, an overly bright recording is no problem. Since you have control over as many as three or four different precise "treble" ranges, you can adjust the top-end balance to taste without simultaneously modifying the upper midrange—a crime of which many simple treble controls are guilty.

The second case: Like the vast majority of audio fans, you probably listen to speakers whose bottom octave is substantially rolled off. The very deepest bass—say, below 40 Hz—is not as powerful in playback as it was in the original per-

formance. With an equalizer, you can raise the lowest-frequency band (usually centered around 30 Hz) by a few decibels without also boosting the mid-bass "boom" region. As long as you maintain an overall volume setting that avoids overstressing either your woofers or your amplifier, you can discover deep-bass capabilities in your system you may never have dreamed it had.



INALLY, consider the listening room. The typical American living room is far from ideal for hi-fi reproduction. Its dimensions usually induce standing waves

that make almost any loudspeaker's bass reproduction less accurate than its designers intended. The room is usually packed with soft, acoustically absorbent furniture, carpeting, and draperies that swallow up a great deal of treble energy before it can reach the listener's ears. Too often, side walls crowd in or a sofa blocks the way, causing reflections or sonic "shadows" that make the critical midrange less than flat as well.

An equalizer permits you to correct—to some degree—each of these problems. Of course, you might also want to have some plain fun. Individual bands can be used to isolate a particular instrument or vocalist, or to suppress one. Or you might load up the low-bass and high-treble ends of the spectrum to create a "disco" effect for your next party.

These days, most serious equalizers include much more than just a bunch of sliders. The most common addition is a spectrum analyzer, which provides a bar-graph display of actual response levels in each octave band. Some models even include a calibrated microphone and a built-in generator that sends pink noise-a full-range test signalthrough your system. With the microphone placed at the listening position, you play the test signal through your system at an average listening level and adjust the individual sliders until the spectrum analyzer shows the smoothest possible response—in your listening room, with your speakers.

Dynamic Range and More

Equalizers are only one kind of signal processor. Another sort is the dynamic-range processor, which controls how wide a dynamic



DAVID RELLEY



Yamaha's DSP-3000 Digital Sound Field Processor (\$1,899) has sophisticated built-in programs to simulate acoustic spaces ranging from a small jazz club to a cathedral.

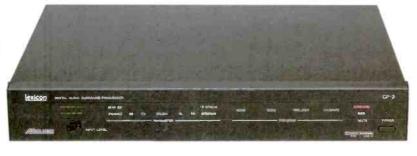


The dbx 3BX-DS Dynamic Range Controller provides expansion or compression of as much as 50 percent in each of three frequency bands. The amount of processing is individually adjustable for each band. Price: \$499.

BBE Sound's Model 1002
Sonic Maximizer (\$189)
includes a dynamic
treble equalizer and a phasecorrection circuit tailered
to the characteristics of
typical loudspeakers. It is
designed to increase
clarity without adding
harshness.



The fully digital CP-2 is an economy version of Lexicon's superb CP-1 surround processor. It provides Dolby Pro Logic decoding for movie soundtracks as well as some ambience-synthesis features. Price: \$995.







Two graphic equalizers from Soundcraftsmen, the company responsible for popularizing this type of component: The Pro-EQ 44 (top, \$549) has twenty-one bands for one-third-octave control; the AE2000 (bottom, \$849) is a tenband equalizer with a spectrum analyzer.

range—how much variation between loud and soft—will be reproduced by the system. There are two types of dynamic-range processing: expansion and compression. Expansion increases the dynamic range, making loud peaks louder and soft passages softer—an effect useful for many analog LP's, cassette tapes, and FM broadcasts since these media inherently impose some restriction of dynamic range. A fringe benefit of most expansion systems is a significant reduction in audible background noise.

Compression actually reduces dynamic range, automatically "turning up" soft passages or notes, and "turning down" loud ones. Why would you want to compress music? One good reason is to create constant-level, continually audible background music, as for a cocktail party. Another is to enable a widedynamic-range recording, such as from a compact disc, to be dubbed onto cassettes for car listening. Judiciously applied compression can make an enormous difference in how enjoyable wide-dynamic-range material, such as some classical music, will be in the noisy automotive environment, where road and engine noise often blots out most musical subtleties.

Many signal-processing components are a bit more difficult to pigeonhole. Subharmonic synthesizers, for instance, actually create new bass information. They can restore bottom-end impact to historic recordings—your old Paul Revere and the Raiders records, for example—and add an earth-shaking foundation to modern ones. While some audiophiles may debate the aesthetic merit of subharmonic synthesizers, no one can deny their impact, which is substantial.



UDIO "sweeteners" are another processor category intended to make recorded music sound better than new. One product, for example, performs a number of

subtle transformations on an audio signal, dividing it into three bands, dynamically equalizing the treble range, and applying independent "phase corrections" to all three bands. The result can make a definite sonic difference, giving more snap to transients, additional detail to treble material, and more "air" to the acoustic space.

Another hard-to-categorize box is

Carver's outboard Sonic Holography Generator (the same function is built into most Carver preamplifiers). This device performs some quite complex phase processing, including interaural-crosstalk cancellation, to create a stereo image that with many recordings extends to the left and right beyond the speakers.

Surround Sound

After equalizers, the most common signal processors these days are surround-sound devices. These come in a bewildering variety of shapes, sizes, and models. Most offer at least two basic functions: decoding Dolby Surround information on video soundtracks, and synthesizing surround effects from unencoded music sources. Today, both functions are widely available as integral features of many highend receivers, integrated amps, and preamps as well.

Dolby Surround is a process originally devised by Dolby Labs for film sound. It extracts a rear-channel signal from specially encoded video sources, including videodiscs, hi-fi videotapes, and broadcasts. The rear-channel signal, which requires an additional, modest pair of speakers and amplification, reproduces ambient sound and behindyou and to-the-side sound effects, just the way the filmmaker intended, for an immeasurably more engrossing audio/video experience. Dolby Pro Logic, an enhancement available in the more sophisticated Dolby Surround processors, adds a center-front channel to keep dialogue firmly anchored on-screen and improves the separation and naturalness of the surround effects.

Ambience processors (which are often included in Dolby Surround and other surround-sound processors) perform a different set of manipulations on the audio signal, specifically for music listening rather than video sound. They, too, yield one or more channels beyond the basic stereo pair, and these outputs will require one or more additional speakers and amplifiers. The difference is that ambience synthesis does not require an encoded signal but works on any stereo audio source.

The goal of most ambience processors is to simulate an acoustic space like that in which the original performance might have taken place—in many cases, a specific concert hall. A well-designed processor that's properly set up with appropriate secondary speakers and amps—these can make a real difference—will provide an astonishingly lifelike sense of transporting you to the concert venue of your choice.



N the more sophisticated units, ambience processing involves some very complex machinations in the digital domain. These ambience processors first transform the

signal from the source into a digital audio "bit stream." Then they perform a variety of digital operations: delaying the rear channels, digitally synthesizing reverberations, and applying carefully tailored equalization to imitate the tonal characteristics of hall reflections.

Digital Signal Processing

The new digital ambience processors are a window on the future of signal processing, where everything will be accomplished wholly in the digital domain. The secret of digital signal processing, or DSP, is that once an audio signal is converted to a stream of binary numbers, what you can do to it is limited only by your imagination and taste—and by digital memory capacity and processor chip speed. A new generation of DSP chips will soon make the digital signal processing options available to us all but boundless. Whether you want to change a signal's amplitude, as with equalizers and dynamic-range processors, or time, as with ambience processors, or whether you actually want to synthesize new information, as with subharmonic synthesizers, DSP will be the way to go.

The DSP approach has another advantage: It can easily accept outside information. For instance, a DSP processor in your car might monitor road speed and engine noise and continually adjust its dynamic compression to compensate for a clamorous automotive environment. An ambience processor in your home system might read an identifying code from each CD, DAT, or whatever in your library and automatically dial up the acoustic space appropriate to that particular musical performance. And those are only two of the more obvious examples. Just turn up your imagination for others. And keep one eye on the horizon and an ear to the ground it's an ongoing process.

We're making a big deal out of practically nothing.

The most difficult job for a compact disc player is to reproduce low amplitude signals. Fortunately, Yamaha has created a remarkable CD player that rises to the occasion.

The CDX-1120 reproduces those low

amplitude signals that until now, have been distorted or lost

in the noise generated by the digital-to-analog conversion process in most CD players.

Allowing you to distinguish the subtle variations between, say, both an oboe and clarinet softly playing middle C

As well as enjoy improved ambiance, revealing the acoustic characteristics where the performance took place.

And superior imaging, clarifying the placement of each instrument in an orchestra.

All worthy reasons to take a good, soft listen to our remarkable new CDX-1120. Only then, can you truly appreciate Yamaha's Super Hi-Bit Technology.

Yamaha's exclusive Super Hi-Bit System utilizes the additional information generated by our 20-bit digital filter to more accurately reproduce the low amplitude signals coming from the disc.

To achieve this superior sound definition, Yamaha uses four 18-bit D/A converters, each with an exclusive 4-bit Floating

System to boost linearity to 22-bits. Delivering four times greater resolution of low amplitude signals than even fixed 20-bit D/A converter

What's more, Yamaha's exclusive Super Hi-Bit DAC Direct Output provides phase accuracy so close to the original recording, it's unprecedented in the industry.

The CDX-1120 also features Digital DeEmphasis and Digital Volume Control to give the best possible signal output - - uncompromised by analog components.

To fully appreciate the phenomenal CDX-1120, pay a visit to your local Yamaha dealer.

advantages will come across loud - and soft and clear.

gramming.

A full-function A full-function remote lets you control every-thing. With 24-track random access pro-





"McIntosh . . . no other transistor amplifier is capable of reproducing as well."

"All the sounds, even those different one from another, remain separated and distinctive. There results a sensation of contrast, precision, and uncommon clarity.

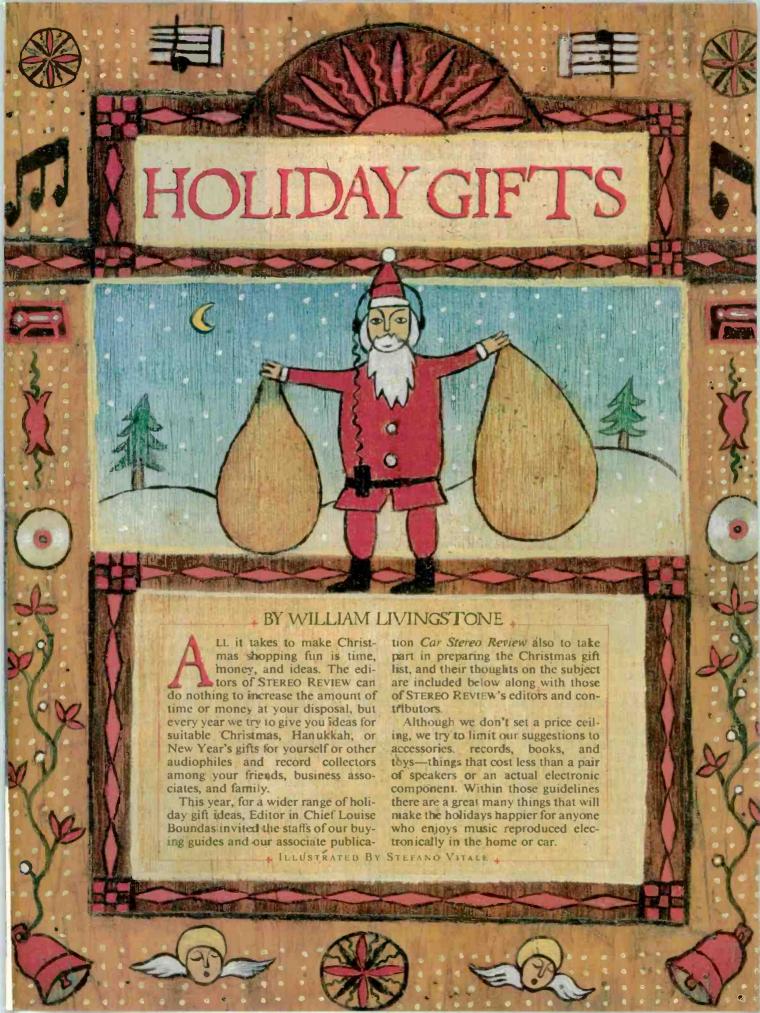
... A close analysis of different frequencies reveals an extremely deep bass, very rich in spatial detail... The upper bass region is very linear testifying to an extraordinary richness of information. The very structured mid-range contributes enormously to listening pleasure.

The feeling of power is never refuted and instead of stunning the listener, the 7270 recreates an audio environment of a majesty that no other transistor amplifier is capable of reproducing as well." Need we say more?

-REVUE DU SON, foremost French stereo magazine.

For a copy of the REVUE DU SON and information on the McIntosh MC 7270 Amplifier and other McIntosh products write: McINTOSH LABORATORY INC. P.O. Box 96 EAST SIDE STATION, DEPT. A47 BINGHAMTON, NY 13904-0096







The care and feeding of compact discs are on a lot of people's minds this year. Senior

Editor Rebecca Day suggests the revolving Diamond Tec CD holder, which takes up little space and stores fifty-six CD's. It costs \$21.99. For cleaning CD's and even removing light scratches, Music Editor Christic Barter recommends Bib's A-640 Compact Disc Polish set. It includes a polishing cloth and a supply of spray that will clean five hundred CD's for \$12.95. It also works on laser videodiscs.

To take along a supply of CD's for use with car players or portables, Assistant Editor Jae Segarra recommends Geneva's PF-750 leather CD tote, priced at \$30. Before going out, you remove the CD's from their jewel boxes and put them in the tote's clear plastic antistatic sleeves. It holds ten CD's along with their booklets.

For maintenance of your CD player, you can use Discwasher's CLD 2 laser lens cleaner, \$27.95, a



Always welcome is a gift of blank tape for either audio or video recording.

gift suggested by Managing Editor David Stein. Louise Boundas's list includes AudioSource's LLC One CD Laser Lens Cleaner at \$29.95.

Contributing Editor Craig Stark is fascinated by the Pierre Verany test disc (Compact Revue du Disque Laser) CDPV/2. It is a two-CD set that can be used for laboratory analysis or simply to see how well your compact disc player performs when faced with such faults in CD's as dropouts, multiple errors in a row, and so forth. The set is available from Old Colony Sound Lab, P.O. Box 243, Peterborough, NH 03458-0243 for \$34, plus \$2.25 for shipping and handling. For telephone orders with credit cards call (603) 924-6371.

Cleanliness counts for a lot in getting the most out of your audio equipment, particularly for playing LP records. Christie Barter suggests the Ortofon RC-013 record-care kit for anyone with an LP collection. The kit includes a stylus cleaner and a record-cleaning brush and solution to remove dirt and eliminate static. Price: \$16.95.

Contributing Editor Ralph Hodges, who writes the "High End" column for STEREO REVIEW, thinks a good present for the LP collector would be the Cantosweep, a small record-care brush that rides ahead of the cartridge, removing static charges and dirt from the grooves during play. It is distributed by Canton North America for \$30. Move fast on this one—when present supplies are sold, Canton plans to discontinue the product.

Senior Editor Robert Ankosko chooses Trackmate's TM161 cassette-deck maintenance kit (\$14.95). which cleans and demagnetizes your tape deck's heads in one pass. I've had good results with Realistic's head demagnetizer, which costs \$9.95 at Radio Shack stores. Assistant Art Director Catherine Fleming recommends the Nakamichi DM-10 head demagnetizer, which costs \$38.50, and Executive Editor Michael Smolen, a strong advocate of digital audio tape, points out that Allsop has already introduced a gift for those happy few who own DAT players. It is the Model 7500 DAT cleaning system (a wet/dry system that cleans both heads and tape path). Price: \$29.95.

Senior Editor William Goldman thinks blank audio or video tape makes an excellent gift, and he mentions such standard brands as BASF, Fuji, Maxell, Memorex, Sony, TDK, and 3M. He finds the 100-minute audio cassette length particularly useful and recommends Denon's HD8-100 or Maxell's XLII-S100, both \$4.99 each.

To make a more equipmentoriented tape fan happy, Robert Ankosko says give him (or her) Niles Audio's TSB-3 Tape Deck Switch Box, which makes it easy to record, play back, and dub from any of three tape decks. Price: \$80.

Similarly thinking of the real equipment lover and user, Michael Smolen suggests Kinetic Audio's Stereo Amplifier/Line Level Control (\$150) for bi- and multi-amping and other amplifier level adjustments. Smolen also recommends



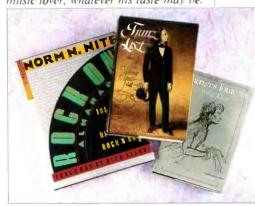
A set of infrared wireless headphones will give the user freedom of movement.

Kinetic's Stereo Amplifier/Speaker Selector (also \$150), which switches the outputs of two stereo amplifiers into a single pair of speakers or runs two pairs of speakers from a single amplifier.

The editors of this magazine find some of the claims made for the very heavy and costly interlinks and speaker cables unconvincing, but if you know someone who thinks they improve sound, give that person as much of the weighty wire as you can afford. David Stein says a more modest solution is Vampire Wire's 2100C speaker cable at \$1.95 a foot. Another nice gift, Stein says, would be Esoteric Audio's T-Lok speaker connectors (with 24K gold plating and single banana or dual banana construction) for only \$22 a pair.

Car Stereo Review's Assistant Art Director Laura Sutcliffe and Rebecca Day are both tired of wires and like the freedom afforded by infrared wireless headphones. Ms. Sutcliffe says they permit you to exercise to music or just listen to it without disturbing your spouse or

You can find a suitable book to give a music lover, whatever his taste may be.



roommate. She chooses Sony's MDR-IF5K headphones, which feature an arc-shaped transmitter/recharger and various power and plug adaptors for \$200. Ms. Day goes for Koss's top-of-the-line JCK/300 Kordless Stereophone system with emitter panel, modulator base, and AC adaptor for \$275.

Editorial Assistant Chris Giancola, who works on our buyers' guides and Car Stereo Review, is thinking of FM reception at this holiday time. He suggests that you improve reception for yourself or a loved one with an indoor antenna, and he recommends Terk's top-of-the-line 9800 Series powered indoor FM antenna (with Schotz low-noise amplifier) for \$85. For bigger spenders Giancola suggests Parsec's AM/FM antenna for highly directional AM reception and omnidirectional FM reception. Price: \$149.95.

Database Coordinator Michael Cuffe reminds us that every owner of an audio (or audio/video) installation needs a flashlight in his tool kit to help identify the various inputs on the backs of components. The Panasonic Flexible Light, Model BF-331EBP, is especially versatile, Cuffe says. Its long flexible neck makes it easy to illuminate places that are ordinarily difficult to reach. Price: around \$9 at hardware stores. Batteries not included.



As remote controls proliferate on our coffee tables, many companies have made uni-

versal remotes to coordinate the control of a number of components in one unit. Denon's RC-605, for example, which has 130 programmable keys shared by two programs, also stores the signals of other remote controls. Price: \$120.

William Goldman recommends the Philips AK9133GY01 "Smart One" remote control, which prompts you through a learning program and tells you when you have made an error. It can handle up to three remote-controlled units at one time. Price: \$80.

Editorial Assistant Barbara Aiken likes Onkyo's RC-AV20M, a universal remote that can operate audio/video components from a variety of manufacturers. With a hundred programmable functions, it offers full control of more than ten components. Price: \$100.

For the smaller audio/video system, Editor at Large Michael Riggs suggests Radio Shack's Realistic

Model 150 universal remote control, which can learn and reproduce the commands of four individual remotes. Since it has fewer keys, it is easier to operate than the more elaborate models and is less forbidding. Price: \$49.95.

Also casting a vote for user friendliness, Louise Boundas recommends a gift for owners of Mitsubishi television sets in the form of the PRM-I, a remote control the size of a fountain pen. Compatible with Mitsubishi TV sets up to four years old, it offers the basic functions of power, volume, and channel selection. (For more complex functions, such as timer control, the full-featured remote would still be needed.) Price: \$24.95.

Ms. Boundas reminds shoppers that speaker stands are not only decorative but have an acoustic function as well. Mission's Designer stand of tubular steel, for example, features the carpet-piercing spikes that are important to some audiophiles. Price: \$149 a pair. Custom Woodwork & Design's Woodmore speaker stands come in 9-, 15-, and 30-inch heights, all with adjustable levelers. Price: \$80 to \$100.

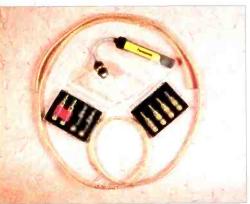
Recommended by Ms. Boundas are Sound Decor's "Speaker Chairs" in light golden oak and dark walnut oak. Each stand can be adjusted to accommodate a speaker 12 to 22 inches wide. The tilt angle can be adjusted from 90 to 115 degrees. Price: \$89 a pair. Available only from Sound Decor, 419 Main St. #14, Huntington Beach, CA 92648. Write or call for shipping costs: (714) 969-1406.

Technical Editor William Wolfe is also the Editor of Car Stereo Review, and his gift selections have to do with car electronics. He recommends Soundquest's Model 2030 "Silencer," which mutes your car stereo system whenever a call is received by your cellular phone.

The range of music now available on compact discs makes it possible to find a CD to match anyone's taste—rock, pop, jazz, solo piano, opera, or Christmas music. Exciting new releases make excellent gifts for collectors of video discs and tapes.







Give convenience with remote controls such as those from Onkyo and Mitsubishi (top). Panasonic's flash will light the way to tidy connections with Vampire Wire and Esoteric's T-Loks.

You don't miss calls when you're playing the system loudly, and you don't have to look away from the road to turn the system down before answering. Price: \$70.

As a gift for those who have removable car stereo head units, Wolfe suggests Clarion's CCC-100, a case that makes carrying such a unit easier and prevents it from getting scratched or dented. Price: \$30. For the same purpose Rebecca Day suggests Coast's AT-10 car stereo tote bag, which costs \$19.95.



Contributing Editor Ken Pohlmann, who also serves as Technical Editor for Car Ster-

eo Review, thinks of driver safety at holiday time. He recommends Shure's ClearVoice 800 HF Microphone, which clips onto the shoulder strap of a driver's seat belt making it possible to talk on a cellular phone system conveniently and safely. Price: \$135.

Instead of accessories, many of the gift ideas submitted by our staff and contributors were LP's, tapes, or CD's. Art Director Sue Llewellyn

recommends Peter Gabriel's "Passion," the music for the film The Last Temptation of Christ (Geffen 24206, two LP's or cassettes or one CD). "It's incredible," she says. "I've listened to it at least once every day since I got it."

Rock fans in the office have been impressed by Lenny Kravitz's "Let Love Rule" (Virgin 91290), which tops the list of Car Stereo Review's Art Director Loren Falls. She likes the obvious influence of John Lennon and notes that Kravitz's collaborator in writing two of the songs was his wife, the actress Lisa Bonet. A pop/rock CD suggested by William Wolfe is the Replacements' "Don't Tell a Soul" (Sire/Reprise 25831).

Every record that comes into the office passes through the hands of Editorial Assistant Maryann Saltser, who chooses Rykodisc's David Bowie package "Sound + Vision" (RCD 10120/21/22). The three-CD set includes such classic early-Bowie albums as "Ziggy Stardust" and "Diamond Dogs," rare singles, and previously unreleased recordings. Pressed for a description, Ms. Saltser responded succinctly: "Great!"

Car Stereo Review's Associate Editor Michael Mettler says, "Two boxed-set retrospectives that belong on the holiday gift list of every serious fan are the Allman Brothers' 'Dreams' and the Rolling Stones' 'Singles Collection-The London Years'." The Allman collection from Polydor (839417) comes on six LP's or cassettes or on four CD's. The Stones retrospective from Abkco (1218) is on four LP's or cassettes or three CD's.

Contributing Editor Chris Albertson highly recommends the jazz singer Susannah McCorkle's sublime "No More Blues" on LP, cassette, or CD (Concord Jazz 370). Louise Boundas is equally enthusiastic about the classical pianist Carol Rosenberger's serene recital "Night Moods" (Delos 3006), a collection of meditative pieces by Chopin, Fauré, Granados, and others.

Not a member of the early-music cult, I would still like to throw my considerable weight behind two Beethoven recordings on period instruments. One is the new release of Beethoven's Fourth and Fifth Symphonies by Roger Norrington conducting the London Classical Players (Angel 49656, cassette or CD); the other is Anthony Newman's performance of Beethoven's

Piano Concertos Nos. 2 and 4 with the Philomusica Antiqua of New York under Stephen Simon (Newport Classic 60081, cassette or CD). Both are exciting and make clear that it is not the age of the instruments that counts, but the performers' musicality.

Cartoonist Charles Rodrigues says the five Saint-Saëns piano concertos performed by Aldo Ciccolini with the Orchestre de Paris under Serge Baudo have given him great pleasure on LP's for years. He recommends the new reissue of the set on two CD's (Angel 69443) for a gift of musical joy.

"Give a surprising gift," says David Stein, "in the form of an unheralded gem on a small label." One he endorses is "Music of Arnold Rosner," four orchestral works and a Magnificat by a contemporary American composer who deserves to be better known (Laurel Record, 2451 Nichols Canvon, Los Angeles, CA 90046-1798; \$15.98).

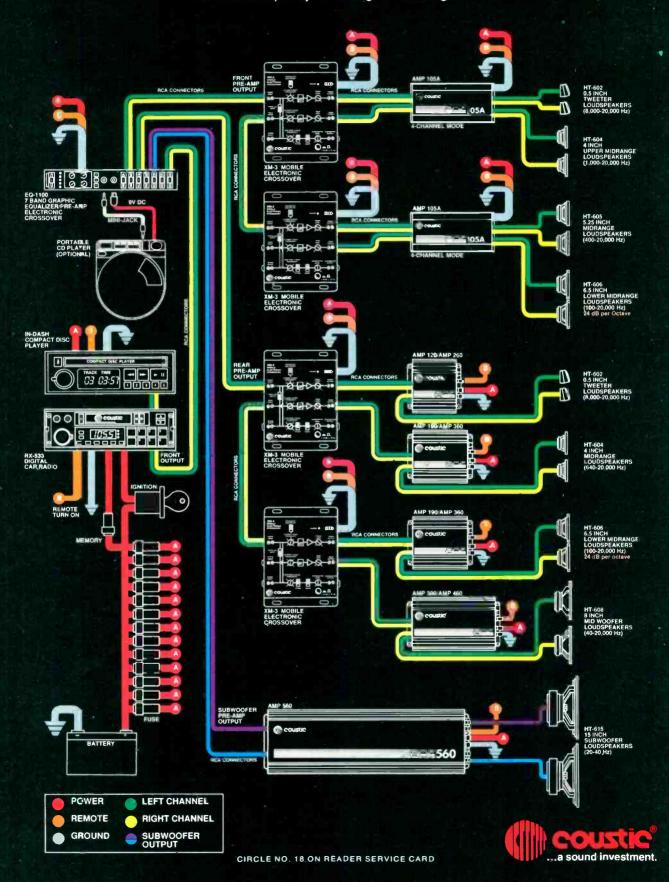
Contributing Editors David Patrick Stearns and Eric Salzman both stand behind the new full-scale operatic recording of Gershwin's

Entertaining gifts for kids feature singer/songwriter Joe Scruggs (shown with characters from his songs), Top Cat, and Raffi. The ROBO cassette player is a new model from Sanyo.



Double Scoop

When one is plainly not enough ...indulge!



Porgy and Bess (Angel 49568, three cassettes or three CD's). Opera reviewer Robert Ackart chooses the very exciting performance of Strauss's Elektra with Hildegard Behrens and the Boston Symphony conducted by Seiji Ozawa (Philips 422 574, two CD's). Ackart says, "It is superb in every way."

Editorial Assistant Rocco Mattera, a devoted opera fan, recommends the digitally remastered CD reissue of tenor Mario Lanza's durable "The Great Caruso" (RCA 60049) and the recording debut of soprano Susan Dunn, an aria recital conducted by Riccardo Chailly (London 421 420). Mattera says, "Of the new young American divas I've heard, Dunn is the most impressive."

Contributing Editor Roy Hemming, a specialist in American theater and film music, adds to the list "Starring Fred Astaire," a two-CD or two-cassette set (Columbia 44233). He says the thirty-six songs here prove Astaire was a first-class singer as well as a first-class dancer.

An original gift suggestion from Contributing Editor Ian Masters is membership in the BMG Compact Disc Club (6550 E. 30th St., Indianapolis, IN 46219-1194) or the CBS Compact Disc Club (P.O. Box 1129, Terre Haute, IN 47811-1129).

Loren Falls thinks this is an appropriate time to give the gift of holiday music. That might be "Ricky Van Shelton Sings Christmas" (Columbia FCT 45269), in which the country star performs the best-known Christmas songs in a pleasing pop style. Similar songs and carols are delivered in jazz fusion style by Dave Grusin, Lee Ritenour, Diane Schuur, Chick Corea, and others on "A GRP Christmas Collection" (GRD 9574).

Recorder player Michala Petri



The Country Music Hall of Fame's calendar will give pleasure for a year.



Adjustable stands, such as the Speaker Chairs from Sound Decor, make it possible to position loudspeakers for the best performance they can deliver.

stars in a lovely collection of old English carols and North European holiday music, "Noel! Noel! Noel!" (RCA Victor 60060, CD or cassette). Petri is accompanied by the Westminster Abbey Choir and the National Philharmonic Orchestra conducted by Martin Neary.

Contributing Editor Alanna Nash recommends Peter Guralnick's book Lost Highway: Journeys and Arrivals of American Musicians (Harper and Row), \$12.95 paper-bound. It's not just about country music, but Ms. Nash says it handles that subject sensitively.

According to Ms. Nash, the 1990 calendar from the Country Music Hall of Fame is the best one yet, with photographs of current country stars along with pictures and interesting information about those of the past: \$8.95 plus \$2 postage from Country Music Foundation Press, 4 Music Square East, Nashville, TN 37203. Call 1-800-255-2357.

Louise Boundas recommends Rock On Almanac (Harper and Row), a chronology of the first four decades of rock-and-roll, by Norm N. Nite. Price: \$27.50 hardbound, \$16.95 paperbound. To the book list Christie Barter adds Rock Movers and Shakers (Billboard), an A to Z of the people who made rock happen, edited by Barry Lazell, \$16.95 paperbound.

The Great Song Thesaurus by Roger Lax and Frederick Smith (Oxford University Press), \$75, strikes Contributing Editor Ron Givens as a marvelous gift. "It's a treasure trove of information," he says, "that is arranged in ways that make it a wonderful reference book but also entertaining to read."

According to Contributing Editor Phyl Garland, a wonderful trip through the greatest period of jazz is provided by *Miles: the Autobiography* by Miles Davis with Quincy Troupe (Simon and Schuster), \$22.45 hardbound. "After all the studies by others, Davis is finally telling his own story with eloquence and charm and fresh insights into his life and music," Garland says.

With so many new recordings of early music, Contributing Editor Stoddard Lincoln says record collectors need the background provided by Harry Haskell's book The Early Music Revival (Thames and Hudson), \$29.95. Contributing Editor David Hall recommends Eric A. Gordon's "boldly honest" Mark the Music: The Life and Work of Mark Blitzstein (St. Martin's), \$29.95. According to Hall, this biography of the composer tells everything you wanted to know about the American theater of the Thirties through the Fifties but were afraid to ask.

Contributing Editor Richard Freed waxes eloquent on Franz Liszt: The Weimar Years, 1848-1861, the recently published second volume of a Liszt biography by Alan Walker (Knopf), \$39.95. Freed calls it "a noble, altogether outstanding achievement in behalf of a unique figure who could not be served with less."



To the Liszt list I would like to add An Artist's Journey, Liszt's own writings from

1835-1841, edited and translated by Charles Suttoni (University of Chicago), \$24.95. The New York *Times Book Review* called it "superb."

New books by STEREO REVIEW's own writers include *Opera in Crisis* by our distinguished London Editor Henry Pleasants, which is hot off the press (Thames and Hudson), \$19.95. Also new is Ken Pohlmann's *The Compact Disc, A Handbook of Theory and Use* (A-R Editions), \$45.95 hardbound, \$29.95 paperbound. The paperback edition can be ordered by mail for \$29.95 postpaid from A-R Editions, 801 Deming Way, Box P, Madison, WI 53717. Phone: (608) 836-9000.

For anybody who watches movies on home video, Julian Hirsch, the director of Hirsch-Houck Laboratories, recommends the gift of a rewinder for videocassettes. Ambico's V-0757, on our list last year, is still available at the same price, \$49.95. A new model, the V-0755, which

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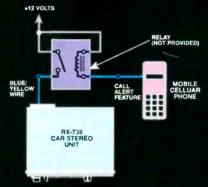
stereo separation and audio bandwidth. Automatically eliminating signal overload and the picket-fencing effect of multipath interference to produce the best stereo performance and cleanest FM reception possible.

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prone) tape head that shifts linearly (up or down) into perfect azimuth alignment whenever tape direction is changed. This minimizes high frequency loss



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winds tape faster and also cleans it, costs \$69.95.

Our principal rock critic, Steve Simels, is also an avid videophile, and at the top of his list of recommended videodiscs this Christmas is the carefully restored version of the 1956 science-fiction classic Forbidden Planet (Criterion Collection 53, two discs, \$99.95). Presented in its original wide-screen aspect ratio, the disc version includes scenes deleted from the film. Simels calls it "tremendously exciting."



A more recent sciencefiction classic is Blade Runner (1982). Now available in the Super

VHS format (\$59.95), it would make a tremendously exciting gift for the owner of an S-VHS deck. I also recommend the bent fairy tale The Princess Bride in S-VHS (\$49.95). Both are available from Super Source Video, P.O. Box 410777, San Francisco, CA 94141; add \$4.50 shipping and handling for the first tape and 50¢ for each additional one. For phone orders or information on S-VHS videotapes of the Bolshoi Ballet using Sony's new D2 digital technology, call 1-800-331-6304; in California, (415) 558-8688.

Contributing Editor Louis Meredith recommends a video version of Handel's Messiah performed with great conviction by soloists, chorus, and the Atlanta Symphony under Robert Shaw. Video Artists International, VHS Hi-Fi (VAI 69050, \$49.95). Excellent sound.

There are lots of sources of video for kids, featuring Peanuts, the Disney characters, and others. Sue Llewellyn says that when she was a child, her favorite cartoon character was Top Cat, and for a video gift for good children we recommend the recently released feature-length Top Cat and the Beverly Hills Cats (Kids Klassics 6704, \$9.95).

An audio cassette containing songs for Thanksgiving and Hanukkah as well as Christmas and New Year's is Francine Lancaster's beautifully arranged and performed "Favorite Holiday Songs." Price: \$9.95, or gift-boxed with a book, \$16.95, from Lancaster Productions, P.O. Box 7820, Berkeley, CA 94707. For ordering information call 1-800-634-4476; in California, (415) 549-7110. Lancaster also distributes a very pretty new recording of the complete score of The Nutcracker performed by the San Francisco



When you give accessories that clean equipment (top), store compact discs (center), or carry removable car stereo equipment (bottom), you are still giving the gift of music.

Ballet Orchestra conducted by Denis de Coteau. Price: \$11.95.

The trick with musical gifts for children is to find things the parents can stand to hear repeated. Michael Riggs, the father of a four-vear-old son, recommends the work of Raffi, the Springsteen of children's music, available in all formats from A&M. Riggs particularly favors Raffi's cassettes "Singable Songs" (CS 0202) and "More Singable Songs" (CS 0204), which are available together on one CD (SD 2202). A live performance with some participation from a young audience, "Raffi in Concert with the Rise and Shine Band," is available on audio tape (CL-0235), videocassette (A&M VC 61719, \$19.95), and videodisc (A&M LV 38402, \$29.98).

Riggs's son David is also a fan of Joe Scruggs, whose recordings for the young-such as "Traffic Jams," "Abracadabra," and "Even Trolls Have Moms"—have stood the tests of time and repetition with children and adults in my family. Scruggs has just released his first Christmas album, "Merry Christmas," a collection of nine standard Christmas songs in fresh new arrangements plus four up-to-date originals. Honest adults confess that they play Scruggs tapes even when the kids are not around. I recommend them all. Price: \$9.95 each plus \$1.50 shipping and handling from Educational Graphics Press, P.O. Box 180476, Austin, TX 78718. Call 1-800-274-8804 for phone orders.

Just in time for Christmas, Scruggs has made his first video, appropriately titled "Joe's First Video." Cleverly combining live actors with animated characters, it presents nine Scruggs hits, including Late Last Night and kids' fave Goo Goo Ga Ga. Price: \$19.95 from Educational Graphics.

Similar to the My First Sony line of colorful audio products for children (which continues to grow), Sanyo's new ROBO line includes easy-to-operate voice recorders, telephones, and a talking clock. Louise Boundas recommends the ROBO-01 stereo cassette player, which works on AC power or batteries and weighs only three pounds. Price: \$79.99.

Database Assistant Adam Herbst recommends a toy for the child in all of us, the Rockin' Flowers by Takara. They are sound-sensitive, bespectacled plastic flowers, which, when placed in front of speakers, will gyrate in response to music. Price: \$30 from such toy stores as F.A.O. Schwartz.

In response to the request for gift suggestions, Database Assistant Tommy Lau submitted a list of what he would like to receive himself. "For the outdoors I'd like the Rockustics Rocky, Jr. speakers at \$700 per pair. They camouflage well with their stonelike enclosures. For the living room I'll stick with the camouflage motif with the Cerca Classic 120's (\$1,700 a pair), which come in ceramic vase enclosures. For a listening room the size of Montana, I want the Custom Monitor from Guss Enterprises at a mere \$100,000 per system. I hope these fit in the sleigh."

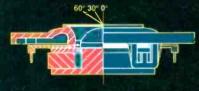
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tainly appreciate the combination of *HIGH TEMPERATURE ALU*-MINUM VOICE COIL and HI-EN-ERGY STRONTIUM MAGNET STRUCTURE built for maximum heat dissipation and extreme power handling capability, with more accurate cone displacement resulting in faster transient re-

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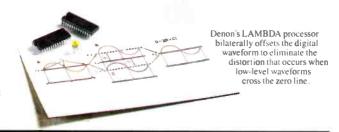
sponse and lower distortion.

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Starting with the first digital recording of music in 1972, Denon has produced an unbroken string of digital audio breakthroughs.



The LAMBDA Super Linear Converter: Another significant digital audio first from the first company to record music digitally.



player innovations include the Super Linear Converter, the 20-bit digital filter, the real 20-bit converter and noise-shaping filter circuitry.

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And why a leading hi-fi journal found that a moderately-priced Denon equalled or outperformed all others tested, including machines costing over \$1800.

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LINDA RONSTADT: ROCK WITH A POP FLAVOR

ROM one point of view, Linda Ronstadt's recording career during the 1980's has been a Grand Tour of Pop. She's sung classic American tunes, British light opera, Mexican mariachi-but not the rock or countryrock that made her a solid-gold artist. Now with her new album, "Cry Like a Rainstorm, Howl Like the Wind," she's come home to rockand-roll, although it sounds like a much different place.

Vocally Ronstadt has never sounded better. Whether she's blasting a high note across several bars, or caressing an extra ounce of tenderness out of a soft phrase, or gracefully angling toward a melismatic throb, Ronstadt knows just how she wants to use her voice. Unquestionably, working in styles where she couldn't rely as much on lung power has given her a further education in phrasing and enunciation. Not to mention confidence: Here she sounds at all times relaxed and secure.

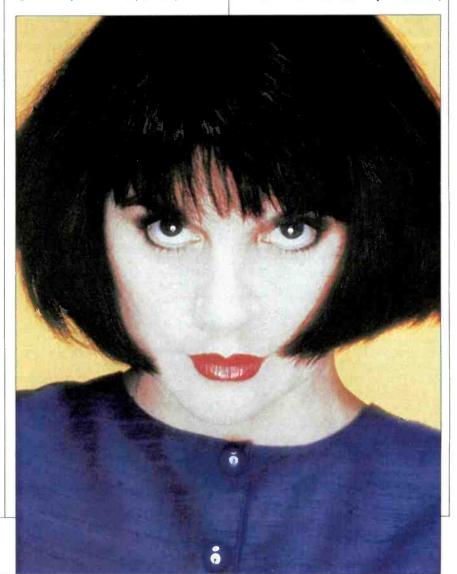
That confidence may explain why she's challenged herself by prominently featuring guest vocalist Aaron Neville. A charter member of the Neville Brothers and the man who brought us Tell It Like It Is, Neville is a singer of breathtaking beauty. Only a self-assured artist would risk a duet with this guy-and Ronstadt does four. The blend of these two sweet, creamy voices is exquisite. And the dipping-and-swirling, twovoices-as-one ending of the Isaac Hayes-David Porter classic When Something Is Wrong with My Baby is worth the price of admission all by itself. But there are other highlights. Ronstadt must be a long-time Paul Carrack fan, since two songs in the album come from his superb, woefully neglected "Suburban Voodoo" album of 1982. And the Barry Mann-Cynthia Weil-Tom Snow ballad Don't Know Much is an anthemic gem.

"Cry Like a Rainstorm, Howl Like the Wind" may be the first true pop-rock album. This synthesis has been achieved by someone who understands and loves both pop and rock. It took Ronstadt several years to make the necessary discoveries, and the trip has brought her back where she belongs. Ron Givens

LINDA RONSTADT: Cry Like a Rainstorm, Howl Like the Wind. Linda Ronstadt, Aaron Neville (vocals); other musicians. Still Within the Sound of My Voice; Cry Like a Rainstorm; All My Life; I Need You; Don't Know Much: Adios; Trouble Again; I Keep It Hid; So Right, So Wrong: Shattered; When Something Is Wrong with My Baby; Goodbye My Friend. ELEKTRA 60872-1, © 60872-4, © 60872-2 (42 min).

SPIRITED STRAUSS FROM GERARD SCHWARZ

ERARD SCHWARZ and the New York Chamber Symphony have just come up with a wonderful recording of the incidental music Richard Strauss provided for Molière's Le Bourgeois Gentilhomme. Originally intended to serve as the dramatic pretext for the first performances of the Strauss/Hofmannsthal opera Ariadne auf Naxos in 1912, the Molière framework was subsequently spun off and restaged as a three-act comedy with additional incidental music. What Schwarz gives us on his Pro Arte disc is the complete score used in that production,





Schwarz: delightful Strauss

EW YORK CHAMBER SYMPHONY

which was directed by Max Reinhardt in Berlin in 1918.

Not only is it fascinating to hear Strauss's witty and colorful music presented in full and in its original order, but Schwarz's elegantly spirited performance is the best I have heard on records since the memorable versions of the familiar suite from Sir Thomas Beecham and Fritz Reiner (the Reiner is now available on CD). The excellent recording has just the right degree of intimacy for the chamber-orchestra instrumentation. The annotation, however, fails to offer either a German-English text for the vocal and choral portions or a synopsis of the play itself, not to mention the casting for the singing roles, which include, among others, Jourdain (the bourgeois "gentleman"), the "Mufti" in the Turkish scene, and the shepherd and shepherdess. But in terms of listening the disc is truly delightful. David Hall

R. STRAUSS: Le Bourgeois Gentilhomme, Op. 60. Kaaren Erickson (soprano); Cynthia Clarey (mezzo-soprano); Roger Roloff (baritone); New York Chamber Chorus and Symphony Orchestra, Gerard Schwarz cond. PRO ARTE © CCD 448 (66 min).

STEVIE RAY VAUGHAN IS "IN STEP"

EXAS guitar slinger Stevie Ray Vaughan is in fine form in his fifth album, "In Step," serving up a heaping helping of hard-charging, roadhouse rock and blues. It's a nonstop, jukejoint blowout that doesn't let up until the very end, at which point Vaughan eloquently takes his leave with the reflective eight-minute instrumental Riviera Paradise. For the combustible Stevie Ray, this record represents a career plateau. He has conquered his demons, a struggle forthrightly documented here in the song Wall of Denial, and his clear-headed, gutsy guitar work comes straight from the heart.

He dives right in with The House Is Rockin', a number in which the tension between strict meter and frenetic release recalls Jerry Lee Lewis's irresistible call to get crazy, Whole Lotta Shakin' Goin' On. The next two songs, Crossfire and Tightrope, address, in similarly metaphorical terms, the dangerous and disorienting currents one can get caught in after catching the rockand-roll wave. Crossfire has an infectious, Al-Green-in-Memphis soul groove, and by the time Vaughan takes his second solo, after the last chorus, his fingers are on fire.

Vaughan plays what he means in "In Step." The emotions are very near the surface, and they're honest ones: a love of the blues and the pain that allows him to play them with authority. Wall of Denial is the pivotal song, addressing the hard facts of a troubled life with naked candor. Gritty determination to get the past behind him fuels one satisfying solo after another.

Mixed among all the foot-stomping originals are a trio of well-chosen numbers by three Chicago blues giants. Vaughan and his back-up trio, Double Trouble, tackle a fast blues by Willie Dixon (*Let Me Love You Baby*), a slow one by Buddy Guy (*Leave My Girl Alone*), and a wicked tickler by Howlin' Wolf (*Love Me Darlin'*). Each half closes

with an instrumental: Travis Walk is the sort of jumping jive that bar bands routinely end sets with, leaving the crowd hungry for more, but Riviera Paradise is a long, drifting, bell-toned piece of guitar impressionism whose low-key, jazzy ambience finds Vaughan wandering into Wes Montgomery and Kenny Burrell territory. It's a lovely meditation, revealing a sensitive side of himself that this tall Texan rarely shows.

Vaughan sings and plays like a champion, pulling no punches, wasting no notes, and laying down a fiery groove that will have you dancing the blues right out of your system. In its emotional generosity, "In Step" recalls a quote from Duane Allman: "Records are really gifts from people. To think that an artist would love you enough to share his music with you is a beautiful thing." Amen. Parke Puterbaugh

STEVIE RAY VAUGHAN AND DOUBLE TROUBLE: In Step. Stevic Ray Vaughan (guitars, vocals); Reese Wynans (keyboards); Tommy Shannon (bass); Chris Layton (drums). The House Is Rockin'; Crossfire: Tightrope; Let Me Love You Baby; Leave My Girl Alone; Travis Walk; Wall of Denial; Scratch-n-Sniff; Love Me Darlin'; Riviera Paradise. EPIC OE 45024, © OET 45024, ® EK 45024 (41 min.)

Vaughan: roadhouse rock



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FIRKUŠNÝ **PLAYS** MARTINŮ

NE of those "obvious" opportunities that no one got around to doing anything about till now has just been realized splendidly by RCA Victor: an hour's worth of piano music by the Czech composer Bohuslav Martinu, played with truly unique authority by his countryman Rudolf Firkušný. Incredible as it may seem, this elegant and vital pianist will be seventy-eight years old in February; he first met Martinu before he was out of his teens and subsequently gave the first performances of almost all of the composer's works for piano solo.

One of the works on the new disc, the pungent Fantaisie et toccata, was written for Firkušný in 1940 when both men were in southern France—Martinu having fled Paris. where he was on the Nazis' black list-waiting anxiously for passage to America. In a note of his own for the new recording, the pianist remarks, "This particular work expresses the anguish of the situation—Europe was in chaos and a return to our native country became an unattainable dream." The music contains passages that evoke Martinu's feeling for his homeland. The national feeling present in his early works had been displaced now and then by the influence of his French mentor, Albert Roussel, and by his response to jazz, but it was to be prominent in one form or another in virtually all of his compositions from the late Thirties to the end of his life, in 1959.

Most of the intervening years, from 1941 to 1953, were spent in the United States. It was here that Martinů became a symphonist and here that he composed his three books of etudes and polkas for piano in the summer of 1945. Brian Large, in his portion of the annotation, suggests Smetana's Czech Dances as the model for these ingratiatingly folk-flavored pieces, and the nine Firkušný chose for the disc certainly bear him out.

The earliest item in this collection is Les Ritournelles, a set of six pieces composed in 1932, just after Martinu's arrival in Paris: the latest is his only piano sonata, composed in Nice in 1943. Perhaps even more personal to Firkušný than the Fantaisie et toccata is the remaining piece on the disc, his own arrangement of a poignant excerpt from the opera Julietta, which he undertook with Martinu's permission and played for him often in the period just following their arrival in New York as refugees.

No one else could bring what Firkušný brings to this music in terms of understanding, commitment, or execution. Each piece opens up entirely and irresistibly to his touch. RCA has done him and Martinů proud with fine sonics and really thoughtful documentation, which includes a striking photograph of Firkušný and Martinů together in Marseilles in 1940 as well as the notes by the pianist himself and by Brian Large, the distinguished biographer of both Martinu and Smetana. Richard Freed

MARTINU: Les Ritournelles: Fantaisie et toccata; Sonata No. 1; Moderato from "Julietta"; Etudes and Polkas. Rudolf Firkušný (piano). RCA @ 7987-2-RC (59 min).

Firkušný: elegant and vital



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BABYFACE: Tender Lover. Babyface (vocals); vocal and instrumental accompaniment. It's No Crime: Tender Lover; Let's Be Romantic; Can't Stop My Heart; My Kinda Girl; and five others. SOLAR/CBS FZ 45288, © FZT 45288, © ZK 45288 (49 min).

Performance: Something special Recording: Very good

As a singer, Babyface has an exceptionally appealing approach that combines the thrusting vigor of contemporary urban pop with the lushly melodic romanticism of gentler times. The result in 'Tender Lover" is an album that immediately grabs your attention and holds it to the end. Although he has his own sound, Babyface has listened carefully to the giants of black popular music and incorporated the best elements of their styles into his work. In Let's Be Romantic, with its haunting minor mode and infectious rhythms, his model is clearly Marvin Gaye. In Can't Stop My Heart, the beat is propulsively insistent, and Babyface exudes the nervous energy of a Michael Jackson. Another jewel is Sunshine, a sweet song reminiscent of Stevie Wonder. But all of the songs are captivating, and Babyface performs them with minimal accompaniment on bass and percussion and back-up vocals in only two tracks. With his gift for song, Babyface is a most welcome new talent.

BEE GEES: One. Bee Gees (vocals and instrumentals); instrumental accompaniment. One; Ordinary Lives; Bodyguard: It's My Neighborhood: Tears; and five others (six others on CD). WARNER BROS. 25887-1, © 25887-4, © 25887-2 (52 min).

Performance: Stayin' alive Recording: Flawless

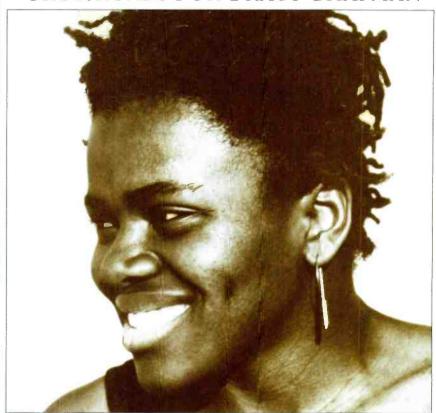
Come home, Bee Gees, all is forgiven. You don't have to be embarrassed about your disco roots any more. The Saturday Night Fever has broken, and you can go back to work now.

"One" unveils an altogether cooler

EXPLANATION OF SYMBOLS:

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CROSSROADS FOR TRACY CHAPMAN



HE brilliance that Tracy Chapman displayed in her debut last year has been sustained in her second album, "Crossroads." Again she presents compelling songs of social commentary in a plangent voice that instantly commands attention. But there is a difference this time: There are fewer grim pronouncements. Her edge of anger has been softened a bit, and there seem to be more songs about love.

Not that Chapman has changed course or made compromises in the wake of success. The center of her art remains her ability to convey a sense of the bitterness and despair that plague contemporary society while addressing some of the causes, all within the constraints of a carefully crafted four- or five-minute pop song. And she does it with a fine poetic sensibility. Subcity, which opens the second half, captures the bleakness of life among the urban poor and points the finger at an uncaring political establishment. Material World decries shoddy values, and All That You Have Is Your Soul cautions those who seek justice not to be seduced into selling out. The messages are clear, but they're not so bluntly stated as in songs like Talkin' bout a Revolution or Behind the Wall in Chapman's first

album, so that the listener is free to pay more attention to the music.

The music itself is not so unadorned on this outing as in Chapman's debut. Jack Holder weaves a lively filigree of banjo notes around her strong vocal in Freedom Now, and throughout the set various percussion instruments and even an occasional violin or viola add a good deal of textural richness without detracting from the generally lean quality of the instrumental sound. The musical climax is reached in Born to Fight, a strutting, jubilant statement of defiance laced with touches of jazz and the blues and topped off with a trumpet obbligato by Snooky Young. Here, departing from her fundamentally folkish song style, Chapman recalls something of the blues style of the young Odetta, suggesting another terrain she might explore as she continues to build a remarkable career. Phyl Garland

TRACY CHAPMAN: Crossroads. Tracy Chapman (vocals, guitars); instrumental accompaniment. Crossroads; Bridges; Freedom Now; Material World; Be Careful of My Heart; Subcity; Born to Fight; A Hundred Years; This Time; All That You Have Is Your Soul. ELEKTRA 60888-1, © 60888-4, © 60888-2 (43 min).

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Bee Gees, more temperate in their rhythms, more relaxed in their vocal approach. The same age group that raptly watched John Travolta crabwalk and somersault across a Brooklyn dance floor in 1977 has grown a tittle older and a lot richer, and "One," like a piece of modular furniture, comfortably fits in with their life style. The Bee Gees' latest recording fills the midrange frequencies with glossy, billowy vocals nested on a cushiony featherbed of electronic keyboards and drum programs. "One" is as synthetic as Sweet 'n Low, satisfying a craving for sugary pop without piling on the calories.

As always with the Bee Gees, every loose end is tucked neatly out of sight. "One" is as polished as the brasswork at Trump Tower. Peter Vettese, late of Jethro Tull, provides glossy keyboards over which the Bee Gees harmonize in their seamless, gravity-free way. Hooks come to them effortlessly. Even professed nonfans won't be able to resist the involuntarily hummable choruses of One, Ordinary Lives, Flesh and Blood, and Bodyguard, all of which are Top-40 readymades, provided radio programmers can see past their anti-Bee Gees bias. And why shouldn't they? The grating, redundant rhythms of disco have given way to a smooth, adult-rock backbeat that's sufficiently demure to let us carry on a conversation while it's playing. The vocal lines-satiny, whispered come-ons such as, "Hold me like you know me/I'm a falling star"-will provide subliminal cues to assist in whatever social endeavor you're engaged in.

So dim the track lighting, uncork that special bottle of chardonnay you've been saving, sidle up to your date on the pillowy sofa, cue up your CD of "One" with the remote control, and get ready for results.

GARTH BROOKS. Garth Brooks (vocals); vocal and instrumental accompaniment. Not Counting You; I've Got a Good Thing Going; If Tomorrow Never Comes; Everytime That It Rains; Alabama Clay; and five others. CAPITOL C1-90897, © C4-90897, © C2-90897 (30 min).

Performance: On his way Recording: Good

Newcomer Garth Brooks is a twentysix-year-old Oklahoman whose personal creed is to "get the flag back out on the porch and God back to the supper table." With that kind of an introduction, he would appear to be the stateof-the-art Okie from Muskogee, one whose taste in music never veers above the Mason-Dixon line and whose neck is as scarlet as tomatoes in June. That image fades into the sunset, however, with one spin of his debut album, produced by Allen Reynolds. In it Brooks-who in a crazy mixed metaphor wears a cowboy hat and a turtleneck shirt in the cover photo-draws on



The Graces: Gia Ciambotti, Charlotte Caffey, and Meredith Brooks

such expected tried-and-true vocal influences as Merle Haggard and George Jones. But as a writer, Brooks also calls on Dan Fogelberg and James Taylor for more contemporary inspiration.

It's in the writing that Brooks distances himself from the other George Strait and Randy Travis clones, with a couple of unexpected and somewhat offbeat tunes balancing the more standard fare. One of these, Everytime That It Rains, details a vertical tryst with a waitress in a roadside café, and another, Not Counting You, turns the tables on the swaggering, love-'em-and-leave-'em macho types. Then there's the borrowed Nobody Gets Off in This Town, a delightful, jazzy tongue-in-cheek ode to Nowhere, U.S.A. ("Nobody gets off in this town/High school colors are brown"), and the Bastian-Berghoff song Cowboy Bill, which pays a sweet and poignant tribute to a childhood hero. To be sure, Cowboy Bill lacks the depth of Guy Clark's Desperados Waiting for a Train, which plumbs the same waters, but it's a little chancy for a debut that has to fly high and quick.

As a vocalist, Brooks, the son of Colleen Carroll, who recorded two LP's for Capitol in the late Fifties, has an easygoing, lasso-throwing pace that tends to compensate for his lack of a distinctive style, his big-boy timbre, and Reynolds's fairly stock arrangements. Brooks isn't in the same league with George Strait, and probably never will be, but he comes across as immensely

likable and as one of country music's most flexible White Hats-turtleneck shirt and all.

THE GRACES: Perfect View. Charlotte Caffey (vocals, guitar); Mercdith Brooks (vocals, guitar); Gia Ciambotti (vocals); other musicians. Lay Down Your Arms; When the Sun Goes Down; Perfect View; Fear No Love: Time Waits for No One; and five others. A&M SP 5265, © CS 5265, © CD 5265 (35 min).

Performance: Driving Recording: Pretty good

It may be unfair to pick apart a group and assign overriding credit to one individual member, but I can't help thinking that Charlotte Caffey made the Go-Go's an honest-to-goodness rock band. The resemblance between the Graces, for which Caffey is the principal songwriter as well as a guitarist and vocalist, and the rockingest work of her former band is indeed great. Of course, the other members of that influential allfemale band were important, too, but none of their subsequent work has the same spirit as the best of the Go-Go's.

"Perfect View" isn't a Go-Go's record, though. Some of the songs-Lav Down Your Arms, for example—have the same drive and punch, but others-Tomorrow, for another examplearen't even close. The Go-Go's often blunted their insights with goofiness or humor, but the Graces have a serious,

STILL ROLLING



Stones Charlie Watts, Bill Wyman, Mick Jagger, Ron Wood, Keith Richards

HE 1989 Rolling Stones media circus-new album, reunion tour, fan and press hysteria-is not by any stretch of the imagination one of the more surprising affairs of the decade. We knew that they'd be back, notwithstanding the well-publicized feud between Mick Jagger and Keith Richards. Jagger's solo career was going nowhere, which for a guy with his ego was an insufferable situation, and besides, it's not every year that aging rock stars can take home \$65 million and make the cover of Forbes magazine

What is peculiar about the Stones' situation—and by conservative estimate, their new "Steel Wheels" is the band's fourth "comeback" album-is that for the very first time, the former Mod Princes have nothing to prove beyond the mundane issue of whether they can Still Do It. After all, nobody in his right mind expects the Stones to come up with a masterpiece along the lines of "Beggars Banquet" any more, and this year, unlike the good old days of 1978 and "Some Girls." there aren't any angry young punks nipping at their heels and screaming about irrelevancy. In fact, with the exception of Sting and a couple of hopelessly idealistic college kids, you'd be hard pressed these days to find a soul willing even to suggest that any pop music might mean anything important. Well, at least with a straight face.

So all the Stones have to demonstrate with their new album is that they can still sound like themselves, and on that

level they've succeeded splendidly. "Steel Wheels" was recorded in a brief period, the way they used to work in the Sixties, and it does indeed sound like the Rolling Stones in their glory days. A collection of (mostly) flat-out rockers, with the guitars cranked up, at the very least it puts pathetic Stones-manqué acts like Guns n' Roses in some kind of perspective. On the other hand, there's very little subtext here, and anybody looking for more than a good, professional, at times viscerally exciting 1989 rock-and-roll album is advised to search elsewhere.

By and large, the music in "Steel Wheels" is splendid, reminiscent of but in every way richer than the idiom explored in Richards's solo album, "Talk Is Cheap." There's the usual blues and country, with an interesting side trip into Middle Easternisms courtesy of the Master Musicians of Joujouka in Continental Drift. The band's instrumental interplay remains as telepathic as ever (all together now: God bless drummer Charlie Watts), and Chris Kimsey's production has an apparent immediacy that conceals enormous craft.

But with the exception of Richards's two big showcase numbers. Slipping Away and the amusingly adulterous Can't Be Seen, the center does not hold. To put it bluntly, Jagger's lyrics are not terribly interesting. Again, this isn't much of a surprise. The man is obviously bored with being a Rolling Stone, and while he's a vastly underrated lyricist who's never less than facile (Sad Sad Sad is the kind of throwaway trifle that's beyond the capabilities of a lot of famous but lesser rock writers), it's clear that nothing crucial is being said here, and that is, ultimately, dispiriting.

As I said, though, nobody today really expects anybody in rock to have anything crucial to say, so perhaps I'm knocking the old reprobates unfairly for doing what we've always loved them for—taking the pop trends of the day and making them their own. It's not their fault that the prevailing trend right now is bread and circuses, and in an era of diminished expectations, a betterthan-workmanlike album like "Steel Wheels" is all anybody could ask from the Rolling Stones.

Still, the idea of an essentially meaningless Stones album is a little hard for an old fan to come to terms with. I suppose what I'm really saying is that next time they come back, it would be nice if they faced a challenge more momentous than simply impersonating the Greatest Rock-and-Roll Band in the World.

Steve Simels

THE ROLLING STONES: Steel Wheels. The Rolling Stones (vocals and instrumentals); Chuck Leavall (kevboards); other musicians. Sad Sad Sad; Mixed Emotions; Terrifying; Hold On to Your Hat; Hearts for Sale; Blinded by Love; Rock and a Hard Place; Can't Be Seen; Almost Hear You Sigh; Continental Drift; Break the Spell; Slipping Away. ROLLING STONES/COLUMBIA 1 OC 45333, © OCT 45333, © CK 45333 (53 min).

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LOOK FOR THE BUYER POLL EVERY MONTH

The Stereo Review Buyer Poll will appear in every issue—just check the Table of Contents for that month's location. You can participate in any month in which you purchased audio/video equipment. Of course, even if you don't join our Poll, you can still send in the Reader Service card to get information about products advertised in that month's issue.

We hope you'll participate regularly in the Stereo Review Buyer Poll. Your answers are important to us—and you'll find the resulting benefits important to you.

Thanks for helping us out!

Stereo Review

focused intensity that isn't undercut by the catchiness of the music. In these songs, even the hooks have hooks. The three-vocalist approach lends itself to some involved harmonies and rounds. although only two songs toss the leadvocal chores back and forth among all three members of the trio. Altogether, a fresh, energetic debut.

RICHARD MARX: Repeat Offender. Richard Marx (vocals); vocal and instrumental accompaniment. Nothin' You Can Do About It; Satisfied; Angelia; Heart on the Line; Too Late to Say Goodbye; and five others. EMI E1-90380, © E4-90380, © E2-90380 (46 min)

Performance: Powerhouse Recording: Very good

Richard Marx was born to rock. His first album, "Richard Marx" in 1987. sold more than two million copies and earned him a Grammy nomination and the top spot in a number of music-magazine "Best New Male Artist" reader polls. Now, his second offering, "Repeat Offender," proves that his success was well earned. As with his debut, "Repeat Offender" is chock full of potential hit singles, all enormously hook-laden and laced with emotional urgency in melody, lyrics, and delivery. Although nothing here is quite as seductive as Don't Mean Nothing, his powerhouse single from 1987, Marx grabs hold with the first cut, Nothin' You Can Do About It, and never lets go.

As both co-producer (with David Cole) and co-creator of all the material. Marx shows that his instincts are usually right on the money. Aside from occasional forays into overproduction, especially in Children of the Night, a salute to a program for teen runaways. Marx has developed just the right intensity of dramatic performance, underscoring his stark and edgy brand of guitar-driven rock-and-roll with rollicking, goodtime blues (Real World) and soulful. caring ballads (Right Here Waiting). Although his songs are more musically dynamic than rich with lyrical content, he is careful to distance himself from excessive braggadocio and to present himself as both the vulnerable romantic (Heart on the Line, If You Don't Want My Love) and the frustrated Angry Young Man (Satisfied), all attractive themes in the land of eternal adolescence

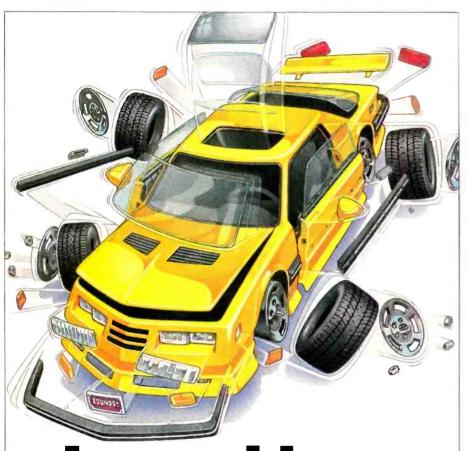
Marx is not nearly so lushly romantic as George Michael, but as If You Don't Want My Love amply demonstrates, he has studied Michael's performances and compositions for rhythmic twists and turns, for the harnessing of high energy, and for the proper attitudes of teen-idol anguish. All in all, he makes them work very well indeed.

JAMES MCMURTRY: Too Long in the Wasteland. James McMurtry (vocals, guitar); vocal and instrumental accompaniment. Painting by Numbers; Terry; Shining Eyes; Outskirts; Song for a Deck Hand's Daughter; I'm Not from Here; and five others. COLUMBIA FC 45229, © FCT 45229, © CK 45229 (44 min).

Performance: Strong Recording: Clean

Imagine Lou Reed singing Woody Guthrie songs with John Mellencamp's band. That's what James McMurtry sounds like in "Too Long in the Wasteland." The comparison may be a bit too tidy, but at least it will indicate how strong an impression McMurtry makes

First, the songs. McMurtry is a populist, which is to say he writes about ordinary people in anonymous small towns. He tells of simmering frustration, repressed dreams, and heedless escape. McMurtry's people don't have to cope with the large political and ecological problems that faced Woody Guthrie's folks, which makes their despair all the



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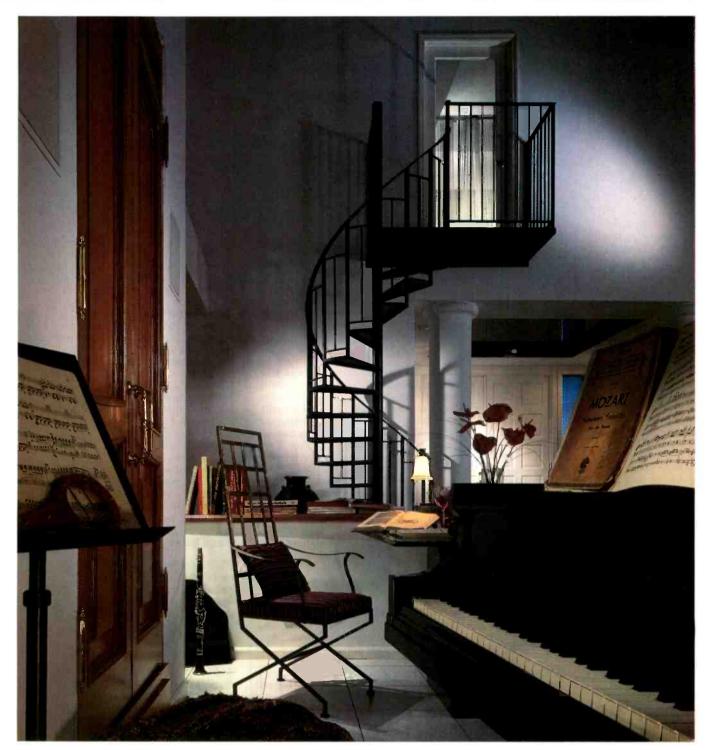
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BILLY HILL



Dennis Robbins, Martin Parker, John Scott Sherrill, Reno Kling, Bob DiPiero

UST when you'd about given up on Nashville for lack of wit, stimulus, and deep-dish funk, along comes Billy Hill to set you straight with "I Am Just a Rebel" on Reprise.

Who exactly is Billy Hill? Well, the official bio says he was born on a mountaintop in Tennessee, where his father was killed in a bar when he was only three. Any illusions that Hill might be another Davy Crockett, however, were dispelled in 1964, when he was expelled from elementary school for stealing a school bus, a tuba, and three boxes of Necco wafers.

"We knew it was him," the school principal commented at the time. "He was the only kid in the first grade whose feet could reach the pedals.

But then, of course, none of that is true, because there is no Billy Hill-just a "hill-billy" band (get it?) that reveres him as its fictional inspiration.

If Billy were real, though, he'd probably sport a ducktail, tote his cigarettes in the turned-up sleeve of his white Tshirt, and tool around town in a rusted hulk of a '68 Chevy truck, rolling the radio dial from country to rock and back again. Funkier than Southern Pacific, and far more authentic than Shenandoah or Sawyer Brown, Billy Hill makes the kind of music Levon Helm, John Anderson, and J.J. Cale would make if they got drunk together on moonshine: It's hillbilly angst on a cornlikker high.

Formed originally as a knock-around band called the Wolves in Cheap Clothing (listen for the wolf call at the end of the record), Billy Hill is made up of songwriters John Scott Sherrill, Dennis Robbins, and Bob DiPiero (responsible for such hits as American Made, Wild and Blue, and Church on Cumberland Road) as well as bassist Reno Kling, an alumnus of Steve Earle's band, and Martin Parker, former drummer for Ricky Skaggs.

Sherrill and Robbins, who alternate the album's lead vocals in a relaxed if almost self-consciously craggy style,

know from their hit-making history exactly what themes, rhythms, and melodies people like. The album's first track, Too Much Month at the End of the Money, is a classic wage-earner's lament, and Robbins serves it up as pure redneck mayhem driven by a rockabilly beat. Other tunes have a slightly more familiar ring. Rollin' Dice, a full-tilt, slide-guitar rocker, is more than just thematically akin to the Rolling Stones' Tumblin' Dice, Just in Case You Want to Know comes close to the George Jones of The Window Up Above, and the title track, I Am Just a Rebel, is Lynyrd Skynyrd with a sense of humor-innovation as creative copying. But there are other, more hauntingand more original-offerings here too, such as the backwater, big-moon sound of What's a Boy to Do and the restless ballad These Lonely Blues.

What is more impressive than the individual tunes, though, is the welloiled machinery of the band, the product of a decade or more of informal jamming and just plain good chemistry. When Robbins lets out a scintillating moan on his slide guitar, Kling's facile bass throbs with shuddering after-effect.

In the end, then, "I Am Just a Rebel" is that odd item in the country record bins-a disc for both trailer-park America and Ralph Lauren urban cowpokes. But is it really, as the promotional material boasts, "the cutting edge of Nashville music," a threat to the puffed-up pabulum that still passes for most of commercial country music? Ah, say that it's so, Billy, say that it's so.

Alanna Nash

BILLY HILL: I Am Just a Rebel. Billy Hill (vocals and instrumentals); instrumental accompaniment. Too Much Month at the End of the Money; Nickel to My Name; I Can't Help Myself (Sugar Pie Honey Bunch); These Lonely Blues; Rollin' Dice; What's a Boy to Do: Just in Case You Want to Know; I Am Just a Rebel; Drive On By; Gettin' On Down the Road. REPRISE 25915-1, © 25915-4, © 25915-2 (33 min).

more profound. A drifter in I'm Not from Here observes that his home town "looked like so many towns I might've been through/On my way to somewhere else." It didn't take a dust bowl, or capitalistic union-breakers, to dull the spirit of McMurtry's people-just smalltown life, harsh and infertile.

Now, the singing. McMurtry doesn't have a nice voice. His singing is plain and unadorned because that's all he can do. Whenever he reaches for a high note, he sounds strained. This is all to the good, because in its straightforwardness, his voice communicates sincerity. It also allows you to concentrate on his words-metaphors of barrenness like "a ghost of a moon in the afternoon" and details like the kind of car a statusconscious, Jesus-loving sister drives: an Oldsmobile.

Finally, the band. It sounds like Mellencamp's for a good reason: Mellencamp produced the album, using members of his own band. The restrained arrangements don't waste a note, and they don't distract from the writing. The sound of the album is almost identical to that of "Big Daddy," the Mellencamp album that came out earlier this year, but the clarity and purposiveness of McMurtry's recording is so vivid that I can't help wondering who influenced whom

In fact, "Too Long in the Wasteland" is such a strong, coherent piece of work that once you hear it you won't need comparisons. These are McMurtry's songs, sung by him, with a band that he owned, at least for this album. You should hear it.

YOUSSOU N'DOUR: The Lion. Youssou N'Dour (vocals); vocal and instrumental accompaniment. The Lion/ Gaiende; Shakin' the Tree; Kocc Barma: Bamako; The Truth; and four others. VIRGIN 91253-1, @ 91253-4, @ 91253-2 (49 min).

> Performance: Exhilarating Recording: Crisp

More Americans know of Youssou N'Dour than any other world-beat musician. Because he toured with the likes of Bruce Springsteen, Sting, Peter Gabriel, and Tracy Chapman, he was, naturally, heard by millions. He has since worked again with Peter Gabriel on the music for the movie The Last Temptation of Christ. "The Lion," N'Dour's first solo album since the Human Rights Now! tour, furthers his acculturation with a more professional recording job and a more sophisticated blending with Western pop stylings. For some, his music may have lost something in the translation. But "The Lion" is still powerful and true to his roots while offering music that will be palatable to American tastes.

A few cosmetic changes have been made to improve the sound quality. N'Dour's previous recordings had a tendency toward brightness that made

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them sound brittle. "The Lion," however, has genuinely low lows, and this aural bottom helps to temper the natural highs of his voice. Since N'Dour's native tongue is Wolof, there's a steep language barrier for most U.S. listeners, but one song has English lyrics—Shakin' the Tree, a duet with Peter Gabriel-and N'Dour slips into English for parts of a few others. Providing a little more instrumental focus is David Sancious, a former member of the E Street Band who solos on guitar, keyboards, and alto saxophone, relieving the music of some of its essential repetitiveness

This sweetening does not detract from the basic sound of N'Dour's music, which remains a delicious polyrhythmic stew. Drums, bass, guitars, keyboards-all offer fixed patterns as well as tiny filigrees off the beat. Over this. N'Dour presents sweet cascading melodies. His near-countertenor deftly leaps and prances around the melody. reminiscent at times, in its piercing attack and well-rounded followthrough, of the trumpet playing of Louis Armstrong. The combination rhythms, counterrhythms, melodies, countermelodies, and N'Dour's voice is exhilarating, even overpowering. R.G.

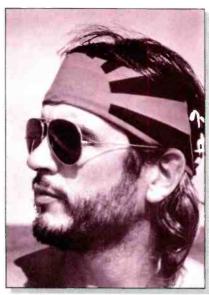
LINDA RONSTADT: Cry Like a Rainstorm, Howl Like the Wind (see Best of the Month, page 123)

DON MICHAEL SAMPSON: Crimson Winds. Don Michael Sampson (vocals, guitars, keyboards, percussion); instrumental accompaniment. Heart Pumping Like Thunder; Lone Wolf; Cherokee River; Love by Spring; Long Black Train; and five others. RED HORSE @ R-103, @ R-103CD (52 min); from Red Horse Productions, P.O. Box 158304, Nashville, TN 37215.

Performance: Finding his way Recording: Very good

Don Michael Sampson (who's taken to using his middle name since "Coyote," his impressive 1983 album) is managing a difficult balancing act these days. Since his move from California to Nashville several years ago, Sampson has attempted to write commercial hit records for other artists and still produce his own albums of songs that testify to the strength and spiritual perseverence of the heart. As far as his solo LP's go, there are definitely pluses and minuses.

On the minus side, Sampson, who's greatly influenced by two oddly similar yet opposing cultures—those of the American Indian and the roots-rock musicians of early Sun Records-has a tendency to work two or three chords to death and to let his songs drag on to infinity, smothering the poetry of his lyrics by a closed-mouthed vocal delivery and a heavy rhythmic beat. On the plus side, however, he has a wonderfully open and giving essence. Each of



Don Michael Sampson: balancing act

his songs is a palpable exploration of the power, redemption, and freedom of the soul and a passionate quest for the meaning of birth and death.

More often than not, "Crimson Winds" seems poised to make a trans-"Crimson cendent breakthrough to a place where, for Sampson at least, the smallest sign will be as eloquent and buoyant as a primal shout of joy. In its entirety, it is also an enriching chronicle of an artist still struggling to find his way.

PAUL SHAFFER: Coast to Coast. Paul Shaffer (vocals, keyboards); other musicians. When the Radio Is On; One Cup of Coffee; What Is Soul; Coast to Coast; Metal Beach; and six others. CAPITOL C1-48288, © C4-48288, © C2-48288 (42 min).

> Performance: Disappointing Recording: Excellent

Paul Shaffer is an amusing fellow, and for all the post-Las Vegas irony he displays on Late Night with David Letterman, he's a considerable musician. But this first solo outing by the best-known Canadian rocker (?) since Neil Young is pretty much what you'd expect from a bandleader with a lot of famous friends-a chaotic, though vaguely likable, mess

The basic concept is promising—different cuts reflecting the musical styles of different cities-and Lord knows the talent lineup is impressive; Wilson Pickett, Dion, Prince's David Z., Joe Satriani, the list goes on for weeks. But given Shaffer's (to be charitable) deficiencies as a singer and the Masterpiece by Committee approach necessitated by the number of strong musical personalities on board, it's surprising the album is as mildly entertaining as it is. Basically, it's a collection of cameo appearances-only the blues musicians, Koko Taylor and the still irrepressible Eric Burdon, get much solo time.

There are, of course, moments, Brian Wilson's Eighties surf instrumental Metal Beach is loopy fun, and Allen Toussaint's New Orleans arrangement of One Cup of Coffee is atmospheric enough that you can almost overlook Shaffer's anemic lead vocal. But the rest of "Coast to Coast" is so overproduced and unfocused that the mind wanders throughout. Adding insult to injury, Shaffer actually renders what may be history's first boring recorded version of the heretofore indestructible Louie Louie

Postpunk theoreticians will doubtless find the whole thing unforgivably decadent (I'm disposed to give the guy credit for trying), but one thing is certain: "Coast to Coast" will be in the bargain bins long before the next Late Night anniversary special-which is probably where it belongs.

STEVIE RAY VAUGHAN AND DOUBLE TROUBLE: In Step (see Best of the Month, page 124)

KEITH WHITLEY: I Wonder Do You Think of Me. Keith Whitley (vocals); vocal and instrumental accompaniment. Talk to Me Texas; Between an Old Memory and Me: It Ain't Nothin': I'm Over You; Turn This Thing Around; and five others. RCA 9809-1-R, @ 9809-4-R, @ 9809-2-R (33 min).

Performance: Masterly Recording: Very good

Keith Whitley was one of Nashville's most visible recovering alcoholics when he went on a fatal bender last May. shortly before the completion of this album. Whitley, who had spent his entire life in hard-country and bluegrass music, was one of those tortured souls who can't stand failure or success, and it is the final irony that this album, fraught with spectacular material and first-rate performances, would have catapulted him from impressive newcomer to real contender-a true vocal competitor with George Jones, Vern Gosdin, and Merle Haggard. As the co-producer (with Garth Fundis, of Don Williams fame), Whitley had ferreted out the kind of songs (four about whiskey and drinking) that allowed him to deliver intense, dramatic readings and to showcase his fully matured vocal stylings, never better than in Tennessee Courage, Gosdin's song about finding bravery at the bottom of a bottle. There are no wasted shots here, and nothing is overplayed.

Uncharacteristically, Nashville took Whitley's death hard-harder than any celebrity demise since that of Hank Williams-not only because of Whitley's extraordinary talent and gentle nature but because of his seeming triumph over addiction. "I Wonder Do You Think of Me" is a splendid compilation of sinewy, hard-style country. But it is also one of the saddest albums in the history of the genre. A.N.





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JIM HALL: All Across the City. Jim Hall (guitar); Gil Goldstein (piano); Steve La Spina (bass); Terry Clarke (drums). Beija-Flor; Bemsha Swing; Prelude to a Kiss; Young One (for Debra); R.E.M. State; Jane; and five others. CONCORD CJ-384, @ CJ-384-C, © CCD-4384 (58 min).

> Performance: Excellent Recording: Very good

I'd be hard put to place the music of guitarist Jim Hall in a specific jazz category. His experience runs the gamut of modern jazz, and he has been associated with some of its finest musicians. His new Concord album, "All Across the City," gives him a chance to show off some of the many facets of his talent, ranging from a bit of free-form jazz reflecting his work with Ornette Coleman to hauntingly beautiful ballad interpretations and a rather contemporary near-fusion sound. The last gets its color from pianist Gil Goldstein, an alumnus of the Gil Evans big band whose past associates also include guitarists Pat Martino and Pat Metheny. Goldstein is as versatile as Hall, which gives this album its chameleon-like quality, and they're backed by bassist Steve La Spina and drummer Terry Clark. The common denominators of this extraordinarily cohesive quartet are exquisite taste and musicianship. C.A.

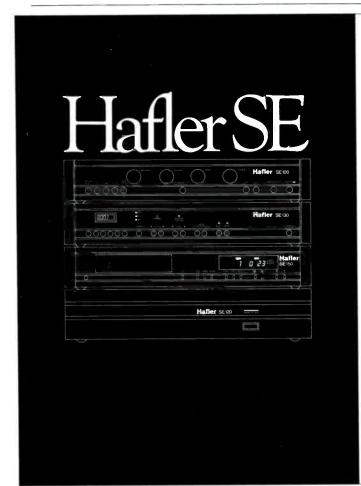
GEOFF KEEZER: Waiting in the Wings. Geoff Keezer (piano); Bill Mobley (trumpet); Billy Pierce (soprano and tenor saxophones): Steve Nelson (vibraphone); Rufus Reid (bass); other musicians. The Drawing Board; Accra; Pierce on Earth; Who Cares?; Waiting in the Wings; Personal Space; and five others. SUNNYSIDE @ SSC-1035D (70 min).

Performance: Potent debut Recording: Very good

Acoustic jazz is enjoying a healthy resurgence these days, and the remarkable thing is that much of the impetus comes from very young musicians who could easily take their careers along more lucrative pop paths. One of the most recent arrivals on the serious jazz scene is Geoff Keezer. "Waiting in the Wings," his debut album, was recorded in 1988, when he was seventeen. The fact that Keezer grew up in Eau Claire, Wisconsin, which is certainly off the beaten jazz path, rather than, say, New Orleans, Chicago, or New York, where jazz thrives, is perhaps an indication of the new jazz trend's penetration.

With its deserved focus on the leader's agile, surprisingly mature piano, this is a superb recording-and generously filled. It contains excellent performances by trumpeter Bill Mobley and saxophonist Billy Pierce, who have been around a few days longer than Keezer, and a rhythm section that reaps huge profit from the presence of Rufus Reid, one of the finest bassists around. Seven of the eleven tunes were written by Keezer, who is at least as interesting a composer as he is a pianist, so don't expect this remarkable young man to be waiting in the wings for long.

RAMSEY LEWIS: Urban Renewal. Ramsey Lewis (piano); Kevyn Lewis (keyboards); vocal and instrumental accompaniment. Jagged Edge; Eye on You; Dr. Ramsey; 2-Slam; Livin' Large; Berniece; and three others. COLUMBIA



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Performance: Popping along nicely Recording: Very good

Pianist Ramsey Lewis's infectiously rhythmic style has always managed to stir the jazz fan even when his performance bordered on pop. Hits like Hang On Sloopy and The "In" Crowd relied heavily on rhythmic patterns for their widespread appeal, and today, more than two decades later (has it really been that long since we snapped our fingers to those tunes?), Lewis is still using that successful formula. The beat is somewhat different now, and so is the overall sound, but that is largely thanks to the input from a new generation of Lewises, particularly the pianist's son. Kevyn, whose keyboards dominate "Urban Renewal." Much of the album is decidedly pop, with sound effects, programmed drums, and back-up vocals. It's only in the second half of the program that jazz enters the picture, in Berniece and There's No Easy Way, where the familiar gospel-tinged Ramsey Lewis piano comes to the fore. Put it all together, and you have an album that appeals strongly to toe tappers and finger poppers but also serves up a bit of slightly adulterated jazz. I don't take it seriously, but I rather like it.

PAT METHENY: Letter from Home. Pat Metheny (guitars, synthesizers); other musicians. Have You Heard: Every Summer Night: Better Days Ahead; Spring Ain't Here; 45/8; 5-5-7: Dream of the Return; and five others. GEFFEN GHS-24245, © M5G-24245, © 24245-2 (62 min).

Performance: Lost Recording: Cavernous

While I can admire guitarist Pat Metheny's musicianship, it is often difficult for me to admire his albums. This new Geffen release plods along listlessly and becomes interesting only on those rare occasions when Metheny takes charge, but even then the proceedings are marred by excessive echo. This is true elevator music, but it *does* contain meaningful work by Metheny. Why he allows his guitar to be drowned in a morass of trite background vocals and programmed synthesizers is beyond me. As it is, "Letter from Home" borders on being junk mail. *C.A.*

PETER MOFFITT: Riverdance. Peter Moffitt (keyboards, flute, cello, percussion); Danny Wilensky (saxophones); other musicians. Candle Power; Talk Talk Talk; Birds; Al Dente; When a Man Loves a Woman; and five others. Novus 3059-1-N, © 3059-4-N, © 3059-2-N (51 min).

Performance: Very good Recording: Excellent

I suppose you'd have to describe pianist Peter Moffitt's music as fusion, but it has greater jazz value than most music that goes under that label these days. The album relies heavily on percussion back-up to cushion the leader's keyboard (often a real, honest-to-goodness grand piano) and Danny Wilensky's sometimes grating saxophone, but Moffitt's compositions and arrangements make "Riverdance" totally appealing. He writes catchy phrases and milks them to the utmost through interesting arrangements that blend contemporary sounds with a joyful spirit lovingly borrowed from Rio or old New Orleans. There is a certain amount of programming involved, but I have heard Moffitt bring the same feeling to performances in a small Greenwich Village club. Clearly, he's a musician who loves jazz but is not tied to it.

I would like to hear Moffitt's group with a less mannered saxophonist. Wilensky has a tendency to stomp clichés into the ground, especially in live performance. Here he is more controlled, as in his featured number, the Percy Sledge hit When a Man Loves a Woman. Generally speaking, this type of music rarely moves me, except towards the nearest door, but I do look forward to Moffitt's next release.

YELLOWJACKETS: The Spin. Yellowjackets (instrumentals). Geraldine: The Spin: Storytellers: Prayer for El Salvador: Whistle While You Walk; and three others (four others on CD). MCA MCA-6304, © MCAC-6304, © MCAD-6304 (53 min).

Performance: Substantive Recording: Excellent

As I hear it, Yellowjackets is one of the few current fusion groups that has anything of substance to say to the jazz listener, and the statements made by this quartet in "The Spin" are its most relevant so far-relevant to jazz, that is. The album forms a perfect bridge for anyone wanting to cross the river of blandness that separates serious jazz from the trite pop fare that all too often passes for jazz. There is nothing bland about this album, but the music does travel from a readily accessible fusion style to sounds that ought to satisfy the serious jazz fan. Saxophonist Marc Russo modulates from a careful Jan Garbarek mode into hard-driving bop with remarkable ease, and pianist Russell Ferrante has never demonstrated his talent more effectively. Bassist Jimmy Haslip and drummer William Kennedy are also in top form here, making this a most delightful album from beginning to end. A highlight of the recording is the title tune, in which Russo soars, but my absolute favorite is a medley that combines Billy Strayhorn's A Flower Is a Lovesome Thing with Bud Powell's Hallucinations. Unfortunately, the medley-which runs eight minutes and exemplifies the high caliber of Yellowjackets' musicianship—appears only on

142 STEREO REVIEW DECEMBER 1989

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by Christie Barter & Ron Givens

Korean violinist Kyung-Wha Chung is making her EMI/Angel debut this fall as soloist in the Dvořák concerto and the same composer's Romance in F Minor, with the Philadelphia Orchestra under Riccardo Muti. She is also joined by



Kyung-Wha Chung

her sister, the cellist Myung-Wha Chung, and her brother, pianist-conductor Myung-Whun Chung, in another recording for the label, this one of piano trios by Tchaikovsky and Shostakovich.

The three Chungs, born in Korea and trained in New York, have frequently played together professionally, but their activities as a family ensemble are sure to be curtailed by their flourishing individual careers—especially since Myung-Whun's time will be taken up as music director of the Paris Opera at

Byrne (center): salsa to samba



its new home on the Place de la Bastille.

Kyung-Wha's next release as a soloist will be with Klaus Tennstedt and the Royal Concertgebouw Orchestra in Beethoven concerto. which she also recorded some ten years ago for London/ Decca. The new EMI recording was made in Amsterdam last month.

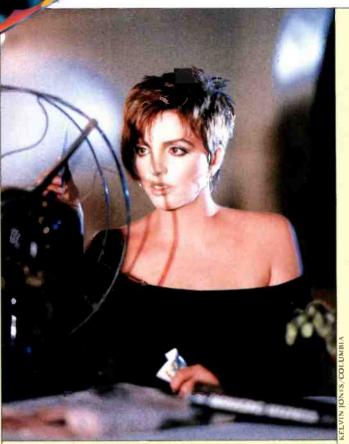
URE, David Byrne has brought us a lot of music. Ten albums with Talking Heads. An album-long collaboration with Brian Eno. Albums of musical scores for movies (The Last Emperor, True Stories, Married to the Mob, and Something Wild), theater (The Knee Plays), and dance (Twyla Tharp's The Catherine Wheel). But he has never, until now, recorded a solo album.

"Rei Momo," Byrne's latest release, is his homage to Latin music, from Mexican salsa and Caribbean merengue to Brazilian samba. It follows a period in which Byrne immersed himself in the music and culture of Brazil. He has also compiled two albums of music by Brazilians, "Beleza Tropical" (released in October) and "O Samba" (due in January).

"Rei Momo" ("King Momo," the title given to the king of Carnival) juxtaposes Byrne's hip lyrical sensibility with a variety of Latin rhythms and song forms. Among the well-known musicians performing in the album with Byrne are Herbert Vianna of Paralamas and Arto Lindsay.

OR all her success on stage and screen, Liza Minnelli has never had a hit record. Even her signature tunes, Cabaret and New York, New York, were not hits for her. It's only now, at the age of forty-three, that Minnelli has a chartbuster, and it took a couple of dance-music stars to help her do it. That song, which made the Top 10 in England, is Losing My Mind, from the Stephen Sondheim musical Follies, as produced by the Pet Shop Boys.

While the discofied Sondheim tune is anything but



Minnelli: rock reorientation

typical of Minnelli, it is representative of her new Epic release, "Results." Seven of the ten songs in the album were written by the Boys, who coproduced the record after being introduced to Minnelli by heavy-metal rocker Gene Simmons of Kiss. The new orientation may surprise Minnelli's fans, but she says rock music has appealed to her since she was a kid, "I grew up with the music my parents listened to," says Minnelli. "But in my room I would listen to Jimi Hendrix, Laura Nyro, Janis Joplin-all the usual stuff. I liked all the wild ones."

HE news from composer Jerry Herman is, first, that he's going to be teaching a course in musical comedy at the University of Miami and, second, that he'll start rehearsals in February on a new musical show, Jerry Herman, Broadway, with Leslie Uggams, Kaye Ballard, and Lee Roy Reams.

A lot of the material in that show will undoubtedly derive from the program of his songs Herman put together for his recent appearances at a New York City night club, Rainbow & Stars, high above (as they used to say) Rockefeller Plaza. The program is documented by a new live recording on Arabesque, "Rainbow & Stars: An Evening with Jer-

Herman: Broadway again



ry Herman." With assistance from Reams and Karen Morrow, Herman plays and sings songs from his Broadway hits as far back as Milk and Honey and as recent as La Cage aux folles.

POR a band that has fought and fought over the years, Jefferson Airplane seems unable to stay broken up. Various members of this legendary San Francisco group have rejoined several times. Their best-known revival. Jefferson Starship, actually produced the group's first No. 1 album, and it continues, with no former Airplane members, as Starship.

Now the major members of Jefferson Airplane have made peace long enough to record "Jefferson Airplane," their first album since 1972, for Epic. Grace Slick, Paul Kantner, Marty Balin, Jorma Kaukonen, and Jack Casady have all come aboard for the recording and an extensive tour. Kantner, for one, likes the danger of combining these volatile personalities once more. "That's what rock-and-roll is," he said. "You don't know what's going to happen."

As for the tour, which

kicked off on the twentieth anniversary of Woodstock this summer, Slick was quoted (in *Bill-board*), as saying, "The audiences are really receptive, the demographics are really wide—it's all different. We're getting everyone from dentists to kids in tie-dyes."

THE last Tears for Fears album, the 1985 "Songs from the Big Chair," sold more than ten million copies and produced two No. 1 singles, Everybody Wants to Rule the World and Shout. After touring well into 1986, the two songwriters who make up the group, Roland Orzabal and Curt Smith, took a long vacation.

Now, four years, three producers, and two completely different versions later. Tears for Fears has finally finished "The Seeds of Love" for Fontana/PolyGram. Collaborating on the album, which has a more soulful sound and less techno-pop gloss than "Songs from the Big Chair," are Phil Collins on drums, trumpeter Jon Hassell, and guitarist Robbie McIntosh (of Average White Band and Pretenders fame). But the most significant guest participant may be



Airplane's Kantner, Balin, Kaukonen, Slick, and Casady

Oleta Adams, a black vocalist who is featured in two songs and joins in on a third as well. Orzabal and Smith heard her perform in a hotel lounge in Kansas City. "She got to me," Orzabal recalled in an interview in the British magazine Melody Maker, "and, for me, if music can open you up and reduce you to tears, then it's doing its job. I thought she was one of the best singers I'd ever heard."

HEN Armin Jordan took over as music director of the Suisse Romande Orchestra in 1985, he became the first native-born Swiss conductor since Ernest Ansermet to assume that post. Ansermet resigned in 1968 (and died early the following year), leaving behind an impressive discography with the Geneva-based orchestra. And although a number of non-Swiss conductors succeeded him and made recordings of their own, no real partnership emerged until Jordan came along. The result so far is a series of eight widely hailed albums, mostly of French music, on the Erato/Cascaville label, the latest being a coupling of two works by Debussy, *Images* and *Jeux*.

Jordan and the Suisse Romande have also just concluded an American tour that began and ended with concerts at Carnegie Hall in New York, with stops as far south as Lexington, Kentucky, and as far west as Chicago in

between. They're back in Geneva now, where they'll record the rest of the Schumann symphonies in a cycle they began in September and will complete this spring.

RACENOTES. Billy Idol's new album for Chrysalis is titled "Charmed Life." Jason Bonham, son of the late John Bonham who was drummer for Led Zeppelin, has recorded an Epic album, "Bonham," with his own band. . . . Reggae's premier rhythm section, Sly and Robbie, have fused reggae with hip-hop in their latest album



Jordan in Geneva

for Island, "Silent Assassin."
... Actor Bruce Willis's second solo album for Motown is called "If It Don't Kill You, It Just Makes You Stronger."
... Bon Jovi's best-selling "New Jersey" is the first U.S. rock album to be released on the state-owned Soviet record label, Melodiya.

Tears for Fears: more soul, less gloss



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Discs and tapes reviewed by Robert Ackart, Richard Freed, David Hall, Stoddard Lincoln. Eric Salzman, and David Patrick Steams

BEETHOVEN: Piano Sonatas: No. 14. in C-sharp Minor, Op. 27, No. 2 ("Moonlight"); No. 21, in C Major, Op. 53 ("Waldstein"); No. 23, in F Minor, Op. 57 ("Appassionata"). Mikhail Pletnev (piano). VIRGIN @ VC 90737-2 (67

Performance: Splendid Recording: Well-focused

These are stimulating, satisfying, and utterly splendid performances, as fastidious and tasteful as they are brilliant. All three sonatas are demonstrably dramatic works, and Mikhail Pletnev brings out that quality to its full proportions-but never beyond. This is an aristocratic sort of drama: direct, uncluttered, poetic. Tempos are just right, rhythms steady, melodic lines clean, dynamics ideally scaled. Even in the most rapid passages in the final movements of the Moonlight and Appassionata you can appreciate the beauty of the individual notes without feeling any diminution of the momentum. The power, the poetry, the color all seem to rise naturally from within the music; Pletnev manages to bring a refreshing quality to these familiar works without looking for ways to make them different. His performances shine with integrity and good musical sense, and the well-focused recording supports them brilliantly. R.F.

BIZET: Symphony in C Major. RA-VEL: Ma Mère l'Oye; Pavane pour une infante défunte. Scottish Chamber Orchestra, Jukka-Pekka Saraste cond. VIR-GIN © 90744-4, @ 90744-2 (64 min).

Performance: Attractive Recording: Excellent

The manuscript of the Bizet Symphony in C, written in 1855, when Bizet had just turned seventeen, was given by the composer Reynaldo Hahn to the Paris Conservatoire, where it was discovered in the 1930's by an English musicologist who gave it to Felix Weingartner, who gave the first performance. What a delicious discovery it turned out to be. Bizet was just about as precocious as

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ANOS STARKER'S new Delos recording of music by David Popper is labeled "Romantic Cello Favorites." "Favorites" may be a bit of an exaggeration applied to twenty pieces few of us have ever heard of, let alone actually heard, but once I did hear them, in these absolutely magical performances, the title was more than acceptable. This hour-and-a-quarter program is not a mere virtuoso recital but more like a confession of lovefor the cello and its literature, and in particular for the legacy of the instrument's greatest virtuoso prior to Pablo Casals.

Popper (1843-1913) was born in Prague, the son of that city's Kantor. By the age of twenty he was playing joint recitals with the legendary pianist Hans von Bülow. He subsequently held a number of prestigious appointments, toured widely as a virtuoso, and for the last seventeen years of his life was a professor at the Budapest Conservatory. now called the Liszt Academy. He composed some didactic pieces, a few largescale works, cadenzas for a number of popular concertos, some songs and transcriptions, and nearly six dozen brief pieces for cello and piano.

With the single exception of the Requiem for three cellos and orchestra, Popper's big works are all forgotten now, and the Requiem itself is seldom even mentioned and almost never performed. Those dozens of little "character pieces," though, including the ones Starker has recorded, were performed everywhere for nearly a hundred years. There could not be a cello recital without them. They were more than a legacy; they were what kept the Popper legend alive in the most direct sense. In the last few decades, however, these endearing little gems seem to have been slipping into limbo with the rest of Popper's works. In coming to their rescue, Starker notes that his own teacher, Adolf Schiffer, had been pupil, assistant, and eventually successor to Popper at the Liszt Academy, making Starker himself "Popper's so-to-speak cellistic grandson."

As the titles indicate—they are printed below in the mixture of English. German, French, and Italian in which they appear on the Delos label—this is music in which sentiment, humor, color, and directness are more prominent than profundity. Their common denominators are virtuosity (many are a good deal more demanding than the listener might imagine) and charm, and there is an abundance of both qualities, as well as the customary elegance, in Starker's obviously affectionate per-



Janos Starker

formances. He has not made a recording quite like this before; perhaps no one has-expect maybe Fritz Kreisler. with whose violin miniatures Starker compares the Popper pieces. As the friend listening with me remarked before we were very far into the program, "That's a recording a musician makes to be remembered by."

It is certainly one to remember Popper by, and Starker did not make it alone. His long-time piano associate Shigeo Neriki is a most eloquent partner, apparently as enchanted and stimulated by the material as the cellist himself, and he enhances our admiration for Popper's craftsmanship by showing how lovely and imaginative the accompaniments are. The imaginative sequence in which the pieces are presented further reflects the commitment that went into this project, and the sonic focus is as vivid, warm, and well balanced as the musicmaking itself.

Richard Freed

POPPER: Once upon More Beautiful Days (In Memory of My Parents); Gavotte in D Minor; Mazurka; Vito; Fantasie über kleinrussische Themen: Begegnung; Papillon; Herbstblume; Gnomentanz; Spanischer Carneval; Nocturne; Gavotte in D Major; Chanson Villageoise; Wiegenlied; Elfentanz; Serenade; Spinning Song; Feuillet d'album; Menuetto; Tarantelle. Janos Starker (cello); Shigeo Neriki (piano). DELOS @ DE 3065 (74 min).

Mozart or Mendelssohn, and his only symphony is a most charming and highspirited romp.

Although the work has had its share of concert performances, it is probably even better known as the score for George Balanchine's ballet Symphony in C. Similarly. Ravel's Ma Mère l'Ove-originally a children's piece for piano, four hands, later orchestrated by Ravel himself-was turned into a famous ballet. The stories behind the music are not what we would call Mother Goose (the literal translation of the French title) but rather fairy tales of the Sleeping Beauty and Beauty and the Beast variety. Ravel himself extended the original, and what we have here is the complete ballet score-in spite of the additions, still a marvellously compact piece of work and a masterpiece of simplicity and understatement. The Pavane pour une infante défunte, the composer's best-known work after Boléro, was also orchestrated from a piano piece; it is astonishing how little music by this master orchestrator was originally conceived for orchestra.

The Scottish Chamber Orchestra was founded in 1974 and quickly achieved a lot of recognition. Its present conductor, the up-and-coming Jukka-Pekka Saraste, is Finnish, the music is French, the record company is English, and the results of their combined efforts are highly attractive.

CORELLI: Trio Sonatas, Op. 3, Nos. 1-12. Smithsonian Chamber Players. SMITHSONIAN COLLECTION ® ND 035 (75 min). Available by telephone order, 1-800-678-2677.

Performance: Ravishing Recording: Splendid

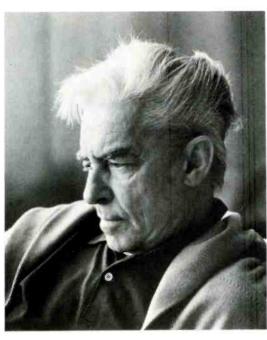
Corelli's trio sonatas exerted a phenomenal influence during the Baroque period, becoming the touchstone for chamber music and inspiring works in their form by every composer in Europe. Like so many works of historic importance, however, they lie neglected today. What a shame! The twelve sonatas of Op. 3 are some of the most sophisticated and exquisite pieces of music ever written.

The Smithsonian Chamber Players include Jaap Schröder and Marilyn McDonald (violin), Kenneth Slowik (cello), Konrad Junghanel (theorbo), and James Weaver (organ). Their elegant and loving performances set the ravishing sound of the two violins against various combinations of the three continuo instruments. The interplay between the violins is beautifully worked out, and the players' ornamentation is a true adornment to Corelli's carefully contoured melodies. Let's hope that the group records all of Corelli's sonatas so that he may be esteemed as highly today as he was in the eighteenth century.

DEBUSSY: Études; Suite bergamasque. Garrick Ohlsson (piano). ARABESQUE ® Z6601 (70 min).

Performance: Marvelous Recording: Excellent

While most of Debussy's works carry titles indicating some sort of descriptive intent, his twelve Etudes, composed in 1915, seem to owe their inspiration to nothing more than his having been involved at that time in editing the works of Chopin, to whose memory he dedicated these pieces. If the *Études* are without programmatic titles, though, they certainly are not without their own element of fantasy, as Garrick Ohlsson makes vividly apparent in these marvelous performances. The late Paul Jacobs left us a very attractive account of the *Études*, and it has been handsomely reissued on a Nonesuch CD, but Ohlsson finds still more in them. The tasteful vitality and exceptional feeling for color in his response might even suggest that this set, still the least performed of Debussy's big piano cycles, could be-



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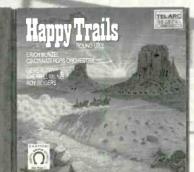
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CIRCLE NO. 84 ON READER SERVICE CARD

come as popular as the Préludes and

Ohlsson also offers here an especially sensitive performance of the Suite bergamasque. Anyone who goes directly for the third movement, the famous Clair de lune, may be distressed to find it stretched out to nearly seven minutes, with momentum barely maintained, but in the context of the preceding sections the approach does work. The labeling is not too tidy, with a typo or two in the list of titles, but there are comprehensive notes by Dennis Rooney, and the beautifully focused recording does full justice to the sound of Ohlsson's Bösendorfer and the exciting colors he draws from it.

DEBUSSY: Violin Sonata in G Minor (see FAURE)

FAURÉ: Violin Sonata No. 1, in A Major, Op. 13. DEBUSSY: Violin Sonata in G Minor. FRANCK: Violin Sonata in A Major. Joshua Bell (violin); Jean-Yves Thibaudet (piano). LONDON © 421 817-4, @ 421 817-2 (65 min).

Performance: Noble, but . . . Recording: Excellent

This is a lovely and generous program of sonatas that make excellent sense together, and the performances are on a consistently high level. The way Joshua Bell and Jean-Yves Thibaudet respond to each other, the sense of impassioned involvement with the music, the uncontrived elegance in the shaping of phrases-these are qualities one appreciates in any chamber-music performance. The one drawback, for me, is Bell's insistently "tight" and occasionally wiry tone. It's a matter of his playing, not the recording itself, which is excellent, and it's quite at odds with the voluptuous writing in the Fauré and Franck sonatas. It clashes with Thibaudet's comfortably assured, warmly expressive playing, too. It may have been Bell's idea to put a dramatic edge on music that can become sugary in careless hands. If that was the case, perhaps he wasn't listening to Thibaudet closely enough, after all; his poetic expansiveness in the piano part does not minimize drive or get in the way of drama. But the musicmaking is on a high level and beautifully recorded, and Bell's wiry tone may not strike every listener as it did me. R.F.

FRANCK: Violin Sonata in A Major (see FAURÉ)

GLASS: Metamorphosis; Mad Rush; Wichita Vortex Sutra. Philip Glass (piano). CBS @ FMT 45576, @ MK 45576

Performance: Authoritative Recording: Very good

These recent piano works present a far more intimate side of Philip Glass than what is projected in his well-publicized



Garrick Ohlsson: vital Debussy

operas and theater pieces. Metamorphosis is actually a sequence of five pieces, derived variously from Glass's incidental music for a dramatization of the Kafka story of that title and from his more recent score for the movie The Thin Blue Line. They form a sort of near-symmetrical arch in which the middle piece is the most energetic and the end ones provide a more quiescent frame

To my ear, there is more variety in the five parts of Metamorphosis, even though they are largely repetitive, than between that work as a whole and the two that follow it in this album, Mad Rush, used for a Lucinda Childs ballet of that name (after having been composed as an organ piece for the Dalai Lama's address at the Cathedral of St. John the Divine in New York in 1981), actually sounds much like a continuation of Metamorphosis, and so, for that matter, does Wichita Vortex Sutra (composed in 1988 for Allen Ginsberg's reading of his poem of that name). The persistent repetitiveness that is part of Glass's style is used here for the most part to establish a frame of intimacy and a ruminative quality, and together with the thoroughly pianistic character of the music, these assure a certain degree of warmth. But the music is repetitive. There are listeners to whom every Strauss waltz or every Vivaldi concerto sounds the same, and there are surely others who will find greater variety among these Glass pieces than I do. They are played with unarguable authority and are very handsomely recorded. The annotation gives a good deal of helpful background information, but the back liner misstates the last title. giving it as Wichita Sutra Vortex. R.F.

HANDEL: Messiah. Emma Kirkby, Emily van Evera (soprano); Margaret Cable (alto); James Bowman (countertenor); Joseph Cornwell (tenor); David Thomas (bass); Taverner Choir; Taverner Players. Andrew Parrott cond. EMI/ANGEL @ CDCB-49801 two CD's (146 min).

> Performance: Tidy Recording: Excellent

In his comprehensive annotation for this set, Clifford Bartlett sensibly observes that "this recording...is just one interpretation, a single event that would, without modern technology, be ephemeral: a Messiah, not the Messiah." Beyond that, we are advised that the performance is "based on the version Handel used in 1753, which is close to the version that was to become the normal one, but with two sopranos, as in the majority of his performances." The chorus in this case comprises twentv-two singers; the orchestra includes horns as well as oboes, bassoons, and trumpets. The performance itself is an agreeable one, I think, without being especially memorable.

The pacing is admirable; there is hardly a number in which the tempo doesn't seem to come naturally from its content, and momentum is well maintained. Intimacy is stressed in the quiet numbers (perhaps excessively in some of them), and the big choruses are gratifyingly robust. What is missing, however, is a sense of tension, the element that goes beyond momentum to provide the music with its pulse, its conviction, its "liveness." I missed the dancing character in "For unto us a Child is born" and the expansive grandeur that is even today still possible in the "Hallelujah" Chorus-while at the same time enjoying immensely the confident unison trills in the latter piece and, indeed, the fine choral singing throughout the performance.

The soloists are less consistently satisfying. Emma Kirkby, James Bowman, and David Thomas, all veterans of other recordings of the work, are as reliable here as before, but Margaret Cable makes a stolid, joyless statement of "O thou that tellest good tidings to Zion." and Joseph Cornwell's opening arias offer little comfort—how one longs for the all-out embracing radiance of a Richard Crooks! On balance, a tidy performance with more assets than liabilities, handsomely recorded and packaged, but it is less likely than several others to demand a second hearing. Trevor Pinnock's version, like Parrott's, is accommodated on just two CD's, and it strikes me as the best buy in a recorded Messiah at present.

HANDEL: Concerti Grossi, Op. 3. Handel & Haydn Society, Christopher Hogwood cond. L'OISEAU-LYRE @ 421 729-2 (60 min).

Performance: Predictable Recording: Fine

Christopher Hogwood, whose recordings often have a musicological purpose, here tries to patch up Handel's already patched-together Op. 3 set of

(Continued on page 156)

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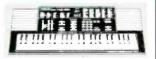
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concerti grossi. At least two of these rather short-breathed pieces, Nos. 3 and 6, were assembled somewhat ineptly from previously existing Handel scores by the publisher John Walsh, and Hogwood's coherent realizations of them here are more than usually balanced and internally consistent. Otherwise his interpretations, though characterized by springy rhythms, graceful, idiomatic phrasing, and sensible tempos, are fairly predictable. This is Hogwood's first recording with the Handel & Haydn Society of Boston, but there seems little difference between its sound and manner of playing and those of Hogwood's London-based Academy of Ancient Music.

The one thing that makes this release particularly attractive is the participation of oboist Stephen Hammer, Many of these pieces are oboe concertos in disguise, and the disc is a wonderful showcase for Hammer's artistry and lyricism, which are a great source of pleasure throughout. D.P.S.

MAHLER: Symphony No. 3, in D Minor. Christa Ludwig (contralto); New York Choral Artists; Brooklyn Boys Chorus; New York Philharmonic. Leonard Bernstein cond. DEUTSCHE GRAMMOPHON @ 427 328-1 two LP's, © 427 328-4 two cassettes, @ 427 328-2 two CD's (106 min).

Performance: Classic Recording: Close up

After finding a considerable measure of interpretive difference between Leonard Bernstein's Mahler of the 1960's on Columbia and that of the 1980's on Deutsche Grammophon, I was pleased (and surprised) to find that his new recording of the composer's Third Symphony has essentially the same tempos as his 1962 recording. The ardor of the conductor and the orchestra, again the New York Philharmonic, are undiminished. Such differences as I found between the earlier recording and the new one, made in concert in November 1987, are in the direction of greater refinement of inner detail and nuance. as well as in the less spacious sonic ambience resulting from a closer microphone pickup.

While the sense of detail is indeed marvelous, I miss the space and warmth of the earlier recording, made in Carnegie Hall. The "mob scene" climax of the vast first movement comes across with more impact on DG than on Columbia, but the distance effects in the third movement, for all the lovely execution of the posthorn solo, don't quite match those in the earlier version. In the fourth movement's great Nietzsche setting for contralto, sung with great feeling by Christa Ludwig. the close-up sound dilutes the sense of profound mystery that the music needs. As before, Bernstein's reading of the twenty-five-minute closing slow movement is in a class by itself, and the Phil-

harmonic gives its all-as it does throughout the preceding five movements. But the close-up miking in the last pages, with the timpani sounding like cosmic bells, again fails to match the impact of the Carnegie Hall recording. All in all, I would say that the new recording serves as a wonderful supplement to the 1962 version but does not replace it.

MARTINU: Piano Music (see Best of the Month, page 126)

MOZART: Horn Concertos: No. 1, in D Major (K. 412); No. 2, in E-flat Major (K. 417); No. 3, in E-flat Major (K. 447); No. 4, in E-flat Major (K. 495). Rondo for Horn and Orchestra in E-flat Major (K. 371). Peter Damm (horn); Academy of St. Martin-in-the-Fields. Neville Marriner cond. Phillips © 422 330-4, © 422 330-2 (61 min).

Performance: Mellow Recording: Nice

Mozart wrote three complete horn concertos for one Ignaz Leutgab, a fellow Salzburger who turned up in Vienna, plus an allegro and rondo (K. 412) that were completed, like the Requiem, after Mozart's death by his pupil Süssmayr. There is also a fairly complete sketch for a playful Rondo in E-flat Major that has been orchestrated by Erik Smith, a nice addition to a slim repertoire.

No heaven-storming here. This is Mozart neatly played in a quiet, mellow style by the East German hornist Peter Damm, with an elegant assist from the world's best non-old-instrument Mozart orchestra and conductor. To tell the truth, I would have liked to hear more of Mozart and Leutgab's storied shenanigans (they were drinking pals, we're told, and a fun-loving pair) reflected in these performances, which are fine but on good behavior. The comic-opera slapstick is there in the music, though people who think Mozart is God never find it.

ROSSINI: L'italiana in Algeri. Agnes Baltsa (mezzo-soprano), Isabella; Ruggero Raimondi (bass), Mustaphà; Frank Lopardo (tenor), Lindoro; Patrizia Pace (soprano), Elvira; Anna Gonda (mezzosoprano), Zulma; Alessandro Corbelli (baritone), Haly; Enzo Dara (baritone), Taddeo. Vienna State Opera Chorus: Vienna Philharmonic, Claudio Abbado cond. DEUTSCHE GRAMMOPHON 427 331-2 two CD's (127 min).

> Performance: Delightful Recording: Excellent

Particular pleasure is afforded when a comic opera is performed by artists who are obviously enjoying themselves. This is such a performance, one in which all the members of the cast are very much "on top" of their assignments vocally and very much involved with making Rossini's bubbly nonsense as ingratiating as possible. It is perhaps Claudio Abbado, however, who deserves the most credit for the spirit and glow that illuminate this recording. His enthusiasm for the score is consistently manifest-in his energizing tempos, dynamic shadings, and caressing touch with Rossini's melodies. The fact that this studio recording was made concurrently with staged performances by the same cast at the Vienna State Opera in 1987 undoubtedly contributes to its overall zest.

The cast is unusually strong. Granted that his voice no longer has the agility it once commanded, Ruggero Raimondi







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brings musical style to his bumptious Mustaphà. As Elvira and Zulma, Patrizia Pace and Anna Gonda sing prettily and with a proper sense of comedy. Frank Lopardo's Lindoro is agile, youthful, and remarkably fluid; he is apparently unbothered by Rossini's high-altitude vocal leaps and sings with real dash. Enzo Dara's Taddeo is suitably avuncular, and Alessandro Corbelli as Haly makes much of his aria on Italian women.

It is, of course, Agnes Baltsa, as the Italian girl, Isabella, who dominates the performance, and of all the people having a good time, she seems to be having the best. Hers is an infectious portrayal, and I found myself smiling or laughing aloud at the sense of fun she brings to the role. She easily meets and dismisses all musical hazards; the unforced flight of her singing—the liquidity, the agility, the focus, and the warmth—are exemplary.

L'italiana in Algeri is delightful nonsense dramatically, but it is far from being absurd musically; it is one of Rossini's most gracious scores, and this fine recording of it, ably engineered, musically polished, and ebulliently alive, is warmly recommended. R.A.

SCHUMANN: Carnaval, Op. 9; Papillons. Op. 2; Faschingsschwank aus Wien, Op. 26. Andrei Gavrilov (piano). EMl/ANGEL © CDC 49235 (65 min).

Performance: Outstanding Recording: Excellent

Alicia de Larrocha's recent recordings of Schumann's Carnaval and Faschingsschwank, both more tidy than stimulating, were coupled with his Allegro in B Minor, Op. 8. Andrei Gavrilov here offers the same two larger works but with Papillons in place of the Allegro. His record is an altogether more winning proposition, not only because Papillons is a far richer, more substantial piece than the Allegro but because all three works come irresistibly to life on their own terms. There is nothing wanting in the way of dazzling fingerwork or interpretive fantasy. Gavrilov understands the Schumannesque essence of this music and responds to it with as much freedom as reverence; he brings plenty of his own personality to his playing but never allows Schumann's to be crowded out. The various individual sections of each work are exquisitely realized, with an apparently instinctive sense of their specific character and emotional range—and of the degree of flexibility appropriate to each one. Along with the sort of spontaneity this music demands, there is an illuminating clarity that is greatly to its benefit. In sum, outstanding performances of all three works, and they're exceptionally well recorded, too. R.F.

R. STRAUSS: Le Bourgeois Gentilhomme (see Best of the Month, page 123)

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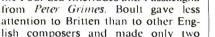
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versions. Filling out the disc now are the Four Sea Interludes and Passacaglia





attention to Britten than to other English composers and made only two

recordings of his music; this one is stunning, a fine companion piece for the Holst.

Charles Munch

Reiner's glorious recordings with the Chicago Symphony, transferred to CD with striking success over the last few years, are now being transferred from RCA Victor's full-price Red Seal label to the mid-price Gold Seal, which can

only make them even more attractive. In the initial batch of five such transfers are the monumental recording of Bar-

tók's Concerto for Orchestra with the Music for Strings, Percussion, and Cel-

Another memorable conductor of

esta (60175-2-RG), the stunning collection of Strauss waltzes (60177-2-RG), and music of Mahler, Debussy, Ravel, Prokofiev, and Glinka.

the Boult-Reiner generation, Charles Munch (1891-1968), was, like Boult, especially identified with the music of his own country, but he was far more widely acknowledged in a more "international" repertoire. Disques Montaigne (distributed by Harmonia Mundi USA) has just issued a CD of concert performances with the ensemble now known as l'Orchestre National de France in music of Beethoven that show Munch at his absolute best (MUN 2061). In the Seventh Symphony and the Consecration of the House Overture, from the inaugural concert in the Maison de la Radio. Paris, in December 1963, you feel every player must have been swept up in Munch's Dionysiac impulse. The performances are fiery without being fierce, flexible yet rhythmically solid; they are exceptional for vitality, color, and spontaneity, and yet even the apparent impetuosity has an elegance about it. The same characteristics, appropriately scaled down to more lyric proportions, are apparent in the Fourth Symphony, recorded the following year in Stockholm. The sound quality is surprisingly good, if a little bass-heavy. I would imagine that anyone who hears this disc is likey to find it irresistible, regardless of any duplications it may

Richard Freed

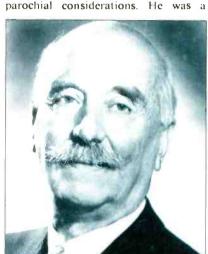
create.

HE centenary of the birth of Sir Adrian Boult last April was generally overlooked hereabouts. but several CD reissues of his recordings that came out then will be around for some time to remind us of what a remarkable conductor he was. While Boult was primarily associated with British music in the minds of American listeners-and justly so, for no English conductor has been a more energetic or more effective champion of

his creative compatriots—his sympa-

thies and enthusiasms were by no

means limited by geographic, ethnic, or



Adrian Boult

NGFL RECORDS

splendid interpreter of a very broad repertoire, and many of his performances of the great German and Russian works of the nineteenth century might serve as norms against which others

should be measured. Boult was a contemporary of Fritz Reiner, whom he outlived by nearly twenty years. (Reiner, born in December 1888, died in November 1963; Boult died in February 1983.) While these two conductors would appear to have been strikingly different in temperament, their recordings show that they had a great deal in common musically. Both, first of all, emphasized security, precision, and clarity as prime essentials, forming a solid base from which flexibility, brilliance, and interpretive fine points could be supported. Both were self-demanding and, in respect to the music, self-effacing, careful not to get in its way, always insuring

that its own character was preserved. Five Boult CD's issued in Angel's midprice Studio series are more than mere souvenirs of a well-loved figure; they are prime examples of the conductor's art at its most illuminating. The performances, mostly recorded in the early Seventies, are in many cases unsur-

passed, and the sound quality is hand-

observance of his ninetieth birthday). was by all means the finest performance, and the sound has been incredibly refreshed in the new transfer (NIXCD



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some enough to make them truly com-

petitive even now. Three are devoted to

Wagner, performed by the three top London orchestras (CDM 63120,

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familiar orchestral extracts are here,

and Volume 3, with the relatively unfamiliar Faust Overture and a generous

helping from Parsifal, is especially per-

suasive. No less so are the two discs of

Russian music with the London Phil-

harmonic. The Tchaikovsky collection

on CDM 63095 comprises a dream per-

formance of the Suite No. 3-the one

with the famous theme-and-variations

finale-and excellent ones of the Ca-

priccio italien, the Marche slave, and

the Gopak from Mazeppa. On CDM

63123 there is more Tchaikovsky, near-

definitive performances of the over-

tures Romeo and Juliet and 1812, along

with an account of Glinka's Russlan

and Ludmilla Overture that may be

compared only with Reiner's and simi-

larly impressive performances of three

showpieces by Rimsky-Korsakov-the

Capriccio espagnol, the "Procession of

the Nobles" from Mlada, and the

"Dances of the Tumblers" from The

have Boult conducting English music,

and here, too, the term "definitive" suggests itself. Nixa, which began reissuing

some of its mono recordings from the

mid-Fifties on CD a few years ago,

recently went back to remaster some of

the material and present it on discs that

not only sound better than the earlier

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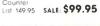
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EQUIPMENT TEST REPORTS (Hirsch-Houck Laboratories)

Amplifiers and Preamplifiers
Denon AVC-2000 (integrated), Sep. 45
Grundig Fine Arts A-903 (integrated), May 59
Hafler XL-600 (power), Apr. 48: IRIS
(preamplifier), Dec. 65
Linn LK1 (preamplifier) and LK280 (power),
Lan 56.

Jan. 36 Luxman TP-117 (tuner/preamplifier). Sep. 64 Rockford Fosgate RF200 (preamplifier) and RF2000 (power). Jun. 50 Sony TA-E1000ESD (preamplifier). Oct. 90

Andio/Video Equipment
Denon AVC-20/00 integrated amplifier. Sep. 45
Kenwood KR-V9010 receiver. Nov. 93
Mitsubishi M-AV1 receiver. Jul. 32
Philips CDV488 combi-player. Oct. 68; CDV487
combi-player (Foster). Dec. 94.
Pioneer CLD-3070 combi-player (Foster).

Yamaha CDV-1600 combi-player (Foster).

Car Stereo (Hirsch and Pohlmann) Blaupunkt New York SCD 08, Nov. 24 Coustic RX-728, Aug. 22 Eclipse ESD-230, Jan. 30

Cassette Decks (Stark) Aiwa AD-F780, Jan. 65 NAD Model 6340, Sep. 56 Pioneer CT-S800, Mar. 41

Compact Disc Players Adcom GCD-575, Jan. 51 Conrad-Johnson DF1 (with preamplifier). Dec. 72 Fisher DAC-Z1 (changer), Sep. 52 Harman Kardon HD7500, Nov. 76 Hitachi DA-C70 (changer), May 52



Marantz CDC-320 (changer), Feb. 42
NEC CD-830DS, May 35
Onkyo DX-7500, Apr. 37
Philips CDV488 (combi), Oct. 68; CDV487
(combi, Foster), Dec. 94
Pioneer PD-71, Aug. 31; CLD-3070 (combi, Foster), Dec. 94
Sansui Vintage CD-X711, Oct. 49
Sherwood CD-1160R, Mar. 46
Sony CDP-608ESD, Jun. 33
Technics SL-P1300, Jul. 23
Yamaha CDX-1120, Nov. 61; CDV-1600
(combi, Foster), Dec. 94

Phono Cartridges Audio-Technica AT-ML170, Jul. 29 Ortofon Model 540, Apr. 42

Carver Model 6250, Mar. 50

JVC RX-801V, Oct. 60 Kenwood KR-V9010, Nov. 93 Misubishi M-AV1, Jul. 32 Nakamichi TA-4A, Nov. 68 Onkyo TX-890, Dec. 57 Sansui RZ-7000, Feb. 37

Signal Processors JVC XP-A1000 digital surround processor. May 38 Pioneer SP-91D digital sound processor, Dec. 82 Proton SD-1000 surround-sound decoder.

Speaker Systems Advent Prodigy Tower, May 47 Allison AL 120, Sep. 47 Altec Lansing Model 511, Nov. 84 Bose 10.2 Series II, Feb. 46 Celestion Model 3, Jun. 42 Celestion Model 3, Jun. 42
Design Acoustics PS-3 Micro-Monitor, Dec. 69
Epicure Model 1, Oct. 78
Jamo Concert II, Jul. 28
Meridian D600, Sep. 108
Mission Cyrus 781, Oct. 53
Mordauni-Short MS35Ti, May 62
Ohm CAM 16, Apr. 39
Paradigm Export Monitor, Jul. 38
Precise Monitor 5, Aug. 39
Thiel CS1.2, Jan. 53
Wharledale Diamond III, Mar. 43
Yamaha NS-1, Feb. 39

Other Equipment AudioSource EQ Ten equalizer/analyzer, Mar. 54 Beyerdynamic IRS 690 headphones, Jun. 57 Dual CT-5040 tuner, Aug. 34 Luxman TP-117 tuner/preamplifier, Sep. 64 Thorens TD280 Mkl1 record player, Aug. 42

THE HIGH END (Hodges)
The (Record) Dust Settles, Jan. 144
Save That Studer, Continued, Feb. 176 The Optical Turntable, Mar. 136
The Ohm/Walsh Driver, Apr. 112
The Black Hole of Bass, May 136
The Impossible Achieved?, Jun. 136 Six-Inch Overachiever, Jul. 104 Work in Progress, Aug. 97 MASH to the Rescue, Sep. 164 The Silver Standard, Oct. 160 DAT: Cons and Pros. Nov. 171 The Yellow Room, Dec. 172

SIGNALS (Pohlmann)
Pursuing DAT, Mar. 32
Sonic Solutions, Apr. 28
Chips Ahoy, May 22
The Numbers Madness, Jun. 24
Dolby S, Aug. 20
The Next Revolution(s), Sep. 28
The Spraker Gap. Oct. 24 The Speaker Gap, Oct. 24 Stereo to Go, Nov. 42 "Just the Facts, Please," Dec. 22

SYSTEMS (Day) Building on the repeat theme, Jan. 84 Updating an entertainment console, Mar. 96 A live-end/dead-end garage, Jun. 82 Out of sight in La-La Land, Jul. 56 Designer audio: Now you see it, now you don't, Aug. 62 Listen while you work, Oct. 100 Bringing down the house, Nov. 112

TECHNICAL TALK (Hirsch) TECHNICAL TALK (Hirsch)
Subjective Evaluations, Jan. 42
Wanted: Car Audio Standards!, Feb. 34
Component Interdependence, Mar. 36
FMX Noise, Apr. 30
Is Polarity Audible?, May 28
System Integration, Jun. 28
Hi-Fi AM Radio, Jul. 20
Remote Controls, Aug. 26
Evolving Test Procedures, Sep. 37 Evolving Test Procedures. Sep. 37 Polarity Revisited, Oct. 48 Real Hi-Fi at the Movies?, Nov. 48 Does It Make a Difference?. Dec. 48

TECHNICAL FEATURES

TECHNICAL FEATURES
American Audio Classics (Smolen). Jun. 68
The Basics (Masters): From Coding to
Recording. Oct. 43; Names and Numbers,
Nov. 27; Magnets and Music. Dec. 39
Best Seat in the House (Livingstone). Apr. 62
Car Stereo—see Hi-Fi: Traveling
CD Players. The New (Masters). Oct. 84; CD
Changers (Masters). Jul. 58. The Making of a
CD Player (Wolfe). Aug. 55
CES Show Stoppers. (Day). Apr. 57. Sep. 95
Combi-Players. Three Top (Foster). Dec. 94
Compatibility (Masters). Nov. 98



DAT: Goes Video (Harrell), Sep. 36; It's a Deal

(Boundas), Oct. 4 Design for Listening (Berger), Dec. 102 Digital Update (Pohlmann), Oct. 95 Distortion, The Audibility of (Masters), Jan. 72 Eastern Standards (Smolen), Jul. 42
Equipment Buying Guide (staft), Feb. 67
European Audio: A Tradition of Excellence (Smolen), Aug. 48
The Explorers: Movers and Shakers in Audio Technology (Berger), Jun. 84
FMX, The Noise About (Warren), Sep. 113
Get the Picture! (Kenny), Apr. 69
Hi-Fi Hits the Road (Wolfe and Smolen). May 80
Hi-Fi VCR Buying Guide (staff). Apr. 74
High-Technology TV—see Get the Picture!
Holiday Gifts (Livingstone). Dec. 113
Japan Audio Fair 1988 (Harrell). Jan. 95: Made in Japan (Harrell). Jul. 49: also see Eastern Standards Listening Tests—see Distortion
Psycho-What? (Pohlmann), Sep. 116
Rodrigues Contest, Jan. 27, Jul. 18
Shure Home Theater Sound—see Best Seat Signal Processors (Simon). Dec. 107 Speakers, How to Buy (Masters), Sep. 100; Speaker Design (Hirsch), Nov. 115; The Making of an American Speaker (Masters), Jun. 75; Speaker of the House (Berger), Mar. 91 Mar. 91 Surround Sound (Pohlmann). Nov. 106 Tape Buying Guide (staft), Mar. 87 Tape Deck Buying Guide (staft). May 89 Tape Recording (Stark), Mar. 82 Traveling: Sound Options from the Car Companies (Pohlmann), May 73 Turntables and Cartridges (Masters), Jan. 79 Upgrading Your System (Hirsch), Feb. 50 Where's the Rot? (Day). Apr. 23

BEST RECORDINGS OF THE MONTH The BoDeans: *Home*. Nov. 124

EDITORIAL INDEX 1989

Case. Peter: The Man with the Blue Postmodern Fragmented Neo-Traditionalist Guitar,

Aug. 71 Costello, Elvis: *Spike*, May 103 Crenshaw, Marshall: *Good Evening*. Sep. 123 Dash Rip Rock: Ace of Clubs, Nov. 123 Harris, Emmylou: Bluehird, Apr. 81 Jason and the Scorchers: Thunder and Fire,

Oct. 107
Lovett, Lyle: And His Large Band, May 104
Madonna: Like a Prayer, Jul. 67
Pere Ubu: Cloudland, Aug. 72
The Pursuit of Happiness: Love Junk, Feb. 143
Raitt, Bonnie: Nick of Time, Jun. 93
Reed, Lou: New York, Apr. 82
Roberts, Marcus: The Truth Is Spoken Here,
Jul. 68

Ronstadt, Linda: Cry Like a Rainstorm, Howl Like the Wind, Dec. 123 Schuur, Diane: Talkin Bout You, Feb. 144 Shocked, Michelle: Short, Sharp, Shocked,

Mar. 104
Siouxsie and the Banshees: Peep Show, Jan. 101
The Thieves: Seduced by Money, Jun. 94
Thompson, Richard: Amnesia, Jan. 102
Townshend, Pete: The Iron Man. Oct. 108 Vaughan, Stevie Ray and Double Trouble: In Step. Dec. 124

Williams, Lucinda, Mar. 103

Tribute to John Coltrane—Live Under the Sky. Sep. 124

Classical

Piano Sonatas Nos. 28-32, Oct. 110; Symphonies Nos. 4, 5, and 7, Egmont and Coriolan Overtures, Nov. 126 Berlioz: Symphonie fantastique, Jul. 68 Debussy: Preludes, Book II, Jul. 70 Hanson: Symphonies Nos. 1 and 2. Elegy in Memory of Serge Koussevitzky. Sep. 126 Haydn: Keyboard Sonatas Nos. 33, 38, 58, and 60. Sep. 123 Liszt: Piano Concertos Nos. 1 and 2. Totentanz.

Mar. 105

Mahler: Symphony No. 9, May 106 Martinů: Piano Music, Dec. 126 Prokofiev: Violin Concertos Nos. 1 and 2, Jun. 96: Violin Concerto No. 2, Nov. 123 Rachmaninoff: Piano Concerto No. 2, Six Etudes-tableaux, Apr. 84: Symphony No. 2,

Jun. 93 Ravel: Piano Concertos, Fanfare for L'Éventail de Jeanne, Menuet antique, Le Tombeau de Couperin, Oct. 108

Rossini: La Cenerentola, Feb. 146 Rossin: La Cenerentola, Feb. 146
Schubert: Symphony No. 9, Feb. 144
Schumann: Symphonies Nos. 1 and 2, Apr. 82
Shostakovich: Violin Concerto No. 1, Nov. 123
Strauss. R.: Also sprach Zarathustra. Don Juan,
Mar. 103; Elektra, Aug. 71; Le Bourgeois
Gentilhomme, Dec. 123
Stravinsky: The Firebird, Scherzo à la russe.

Four Studies for Orchestra, Aug. 73

Norman, Jessye: Song Recital, Jan. 101 Orpheus Chamber Orchestra: Prokofiev, Britten, and Bizet. May 104





GOING ON RECORD/BACKBEAT Recording American (Livingstone), Sep. 32 Tributes (Simels), Oct. 138 Salute to France (Livingstone), Nov. 164

MUSICAL FEATURES

Bach: English Suites (Lincoln), Aug. 87; also see Brass

Baker, Anita: Giving You the Best That I Got (Garland), Mar. 108

Bartók: String Quartets Nos. 1-6 (Freed). Feb. 163

Battle, Kathleen, and Placido Domingo: Live in

Battle, Kathleen, and Placido Dontingo: Live in Tokyo 1988 (Freed), Oct. 141
Batiz, Enrique—see Chavez and Revueltas
Beethoven: Diabelli Variations (Freed), Jul. 89;
Symphonies Nos. 1-9. Overtures (Salzman). Jan. 128; Symphonies Nos. 1-9 (Salzman). May 126

Bernstein, Leonard—see Mahler Billy Hill: I Am Just a Rebel (Nash), Dec. 136 Bogguss, Suzy: Somewhere Between (Nash).

 Brass Music by Bach, Gabrieli, Frescobaldi,
 Monteverdi, et al. (Salzman), Nov. 162
 Browne, Jackson: World in Motion (Givens). Oct. 113

Budget Compact Discs (Livingstone), Jun. 122 Burton, Gary: *Times Like These* (Givens), Mar. 116

Canadian Brass—see Brass Chapman, Tracy: Crossroads (Garland). Dec. 129

Chavez: Sinfonia de Antigona, Sinfonia romántica (Freed), Nov. 158 Clark, Guy: Old Friends (Nash), Jun. 102 Country, Hooked on (Nash), Jan. 86 Empire Brass—see Brass

Encores: CD reissues of recordings by Adrian Boult, Fritz Reiner, and Charles Munch (Freed), Dec. 162

Fairground Attraction: The First of a Million

Kisses (Givens), Mar. 107 Gabrieli, G.—see Brass Gershwin: Porgy and Bess (Salzman), Oct. 148 Haimovitz, Matt: Lalo, Bruch, and Saint-Saëns

(Freed), Oct. 152 Harrison: Elegiac Symphony (Salzman), Nov. 155

Henley, Don: The End of the Innocence

Henley, Don: The End of the Innocence (Puterbaugh), Nov. 132 Holiday Gifts (Livingstone). Dec. 113 Horszowski, Mieczysław: Mozart, Chopin, and Schumann (Freed). Mar. 126 Jazz, The New (Albertson), Mar. 98; Classic Jazz on CD Offer, Oct. 35 Hovhaness: Misterious Mountain, Lousadzak

Hovhaness: Misterious Mountain, Lousadzak (Salzman), Nov. 155
Jarrett, Keith—see Harrison
Keita, Salif: Ko-yan (Givens), Nov. 150
lang, k.d., and the reclines: Absolute Torch and Twang (Nash), Aug. 75
Läubin Brass Ensemble—see Brass
Mahler: Symphony No. 1 (Freed), Sep. 145
Marc V.: Too True (Garland), Jul. 80
Mozart: Short Piano Works (Freed), Jan. 127:
Le nozze di Figaro (Lincoln), May 119

Mutter. Anne-Sophie (Kupferberg), Jul. 63 Newman, Randy: Land of Dreams (Givens), Jan. 113

Jan. 113
Norman, Jessye (Livingstone), Oct. 102
Norrington, Roger (Stearns), Sep. 105
Orbison, Roy: Mystery Girl (Nash), May 114
Oslin, K.T. (Nash), Aug. 67
Petty, Tom: Full Moon Fever (Simels), Jul. 73
The Proclaimers: Sunshine on Leith
(Puterbaugh), Jun. 99
Prokofiev: War and Peace (Salzman), Aug. 93
Record of the Year Awards, Feb. 59

Record of the Year Awards, Feb. 59 Revueltas: Caminos. Música para charlar, L'entanas (Freed), Nov. 158 Richards, Keith: Talk Is Cheap (Simels), Jan. 109

Rock City Angels: Young Man's Blues (Puterbaugh), Feb. 151

The Rolling Stones: Steel Wheels (Simels).
Dec. 132

Schiff, András—see Bach and Mozart

Shostakovich: Symphony No. 11 (Hall),

Jun, 115 Simple Minds (Karr), Nov. 103 Snow, Phoebe: *Something Real* (Nash), Jul, 84

Springsteen, Bruce: Video Anthology/1978-88

(Meredith). Jun. 110 Staples, Mavis: Time Waits for No One (Garland). Oct. 116 Starker, Janos: Romantic Cello Favorites

(Freed), Dec. 147

Stay Awake (Simels). Feb. 160 Strauss, R.: Ariadne auf Naxos (Ackart). Mar. 119

Straw, Syd: Surprise (Givens), Nov. 129 Sullivan, Maxine, and Scott Hamilton Quintet: Swingin' Sweet (Garland), Jan. 124 Summit Brass—see Brass

Tashians, Barry and Holly: Trust in Me (Nash). Oct. 128

Tate. Jeffrey (Kupferberg). May 86 Teel ce Tooms: The Commercials (Simels), Sep. 140



They Might Be Giants: Lincoln (Simels). Mar. 110

Throwing Muses: Hunkpapa (Puterbaugh),

Til Tuesday: Everything's Different Now (Puterbaugh). Apr. 96 Tin Machine (Puterbaugh), Sep. 129 Tom Tom Club (Givens). Dec. 100 Travis, Randy (Reilly), Jun. 90 Upshaw, Dawn: American Vocal Works (Freed), Sep. 152

Villa-Lobos: Bachianas brasileiras, Nos. 1-9 (Freed), Apr. 87 Wagner: Die Walküre (Stearns), Jan. 134

Walker, Jerry Jeff: Live at Gruene Hall (Nash), Sep 136 The Waterboys: Fisherman's Blues

(Puterbaugh), Apr. 95
Will the Circle Be Unbroken, Volume Two
(Nash), Aug. 82 XTC: Oranges and Lemons (Simels), Jun. 108

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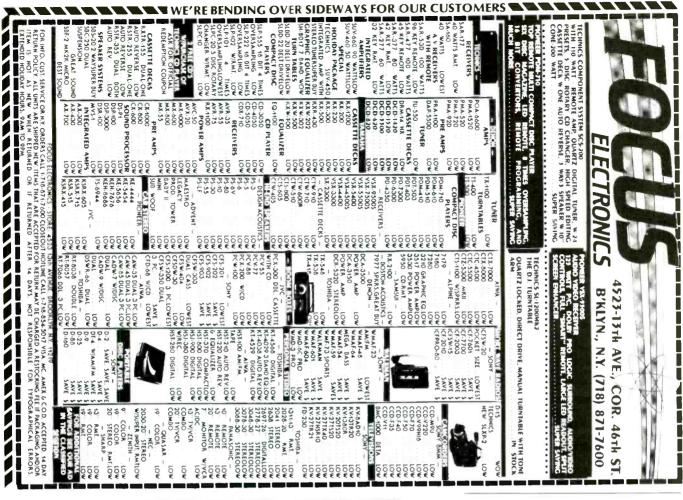
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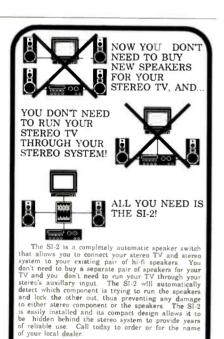
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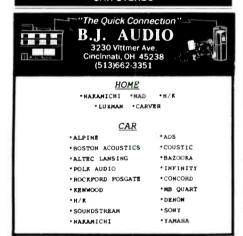
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THE HIGH END

by Ralph Hodges



THE YELLOW ROOM

E call it the yellow room because its wall-to-wall carpeting is the improbable—and dirt-revealing—shade of canary yellow. I find this ludicrous, but money is too short for us to change it right now.

The room occupies a second-floor rear corner of a two-story house just acquired by my wife and me. It is about to become, probably to its surprise, a combination workplace, library, and state-of-the-art (I hope) listening room. It is virtually empty at this writing, however, so I am faced again with the dilemma of anticipating what a room will sound like when no sound has yet been made in it except for that of my fumbling around with cartons. You may be interested to learn how I normally go about this, because the yellow room, if it works out, will loom large in future installments of this column.

First, and very important, is ambient noise level. While no formal measurements have yet been attempted, the room seems quiet except when it rains (there are skylights). I am not worried much about infrasonics from the occa-

sional passing truck as I plan no serious recording work here.

Next I consider resonant modes, which small domestic spaces are prone to develop at very audible frequencies. A listener experienced in this sort of testing can often tell much by setting up a speaker and running pink noise through it. More can be told with pink noise and a spectrum analyzer. When I tried both the above, things sounded generally okay, and the spectrum analyzer showed essentially the reverberant-room response of the loudspeaker, which is a fairly well-known quantity in this case.

You have no pink-noise experience and no spectrum analyzer? Then it's possible to turn to some simple mathematics to predict some—certainly not all—of the modes a room *may* exhibit.

As most readers probably know, the worst possible listening room is a perfectly cubical one, with identical length, width, and height. All the major dimensions in such a room are liable to develop a mode at the same frequency, so that it and its overtones honk or boom at you unmercifully. A much better room is one in which no major dimensions are the same or simple multiples of each other. Modes will then be distributed over a range of different frequencies and will be less likely to reinforce one another. Theoretically, the best possible room has dimensions in the ratios of about 1 to 1.25 to 1.6. These proportions result in the most even distribution of potential modes, with a minimum of clustering.

The yellow room is 16½ feet long and almost 13 feet wide, so one of our calculated ratios (1.27 to 1) is almost right on the money. Now what about the height? Ahem. Yes, the height.

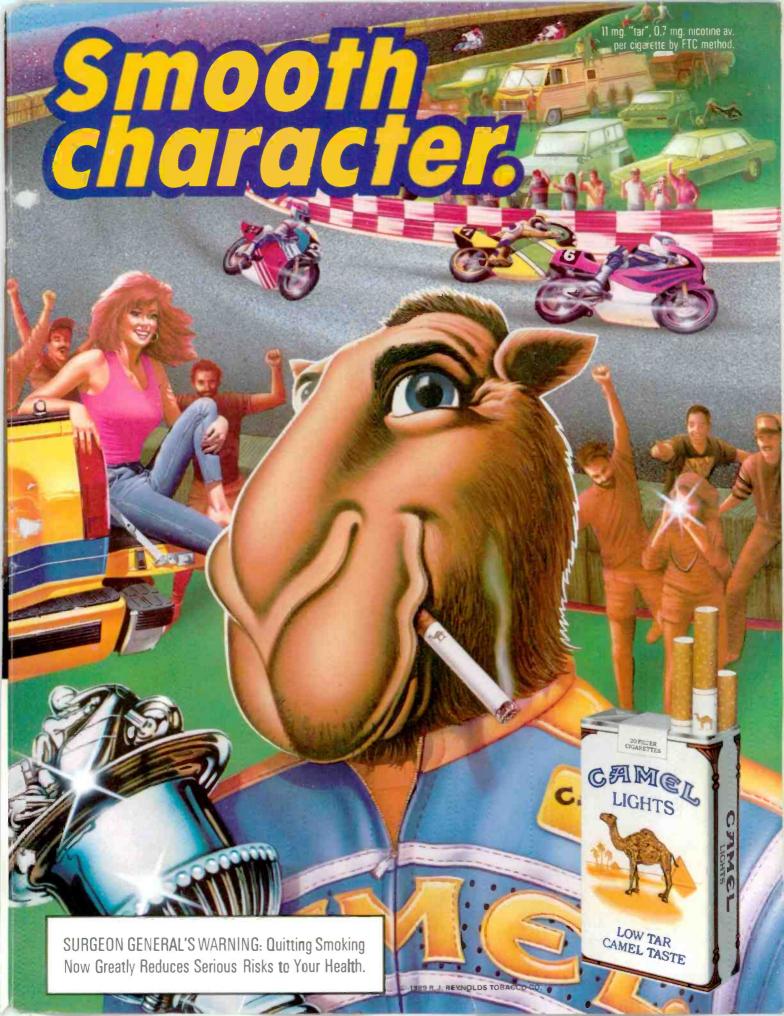
Well, the ceiling looks like this: Way down the length of the room, where the window casement is, it is almost 7 feet up. From that point it angles up steeply for three-quarters of the room's length, to a peak of just over 12 feet. Then it drops 4 feet vertically and levels off at a height of 8 feet for the remainder of the room. Yes, I know. Omigod, what's that going to sound like?

You can see why I consider the

vellow room a rather daring experiment in empirical listening-room acoustics. Most of the ceiling is not parallel to anything else, and nonparallel surfaces defeat the formation of modes (some moneyed audiophiles have actually installed rooms with subtly skewed walls in their homes), so this could be good. Still, a quarter of the ceiling is parallel to the floor, and I suppose there's a chance the space under it might behave something like a separate chamber that interacts bizarrely with the main space. It might provide a huge cavity resonance, or its vertical end might create a vicious slapback. For what it's worth, however, if we consider that quarter of the ceiling the only legitimate one. and relate its 8-foot height to the room width, out pops 1 to 1.625, our final magic number. Clever, eh?

The yellow room has other characteristics that I wonder about. The outside long wall is wallboard over cinderblock. The outside short wall, except for a large window area, is wallboard over wood frame. Undoubtedly the two inner walls are wallboard on studs, except for a large panel of glass brick. Such variety of materials is usually not the best thing for good listening acoustics, but some of it is hard to avoid in most homes. As for the vellow room, there is mild flutter echothe stinging sound you hear right after a handclap in a bare room. I suspect wall treatment will lick it.

Finally, what of our friend the computer? Why not turn our acoustical questions over to some sophisticated program? Thinking there may have been some interesting new work along these lines, I polled some acousticians, acoustical-materials fabricators, and a few knowledgeable equipment manufacturers. and in their collective opinion there is no such animal that makes any sense for small-room purposes. The task is a highly complex one, and even if the computer could detect the existence of a problem, it could not identify its cause. So, like most everyone else, the yellow room and I are stuck with ears, inventive speaker placement, pocket calculator, maybe a few rudimentary test instruments, and dumb luck. Wish us some of that.





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