

Stereo Review

JUNE 1985 \$1.75

AMPLIFIERS

FEATURES FOR FLEXIBILITY

IS YOUR AMPLIFIER READY FOR THE COMPACT DISC?

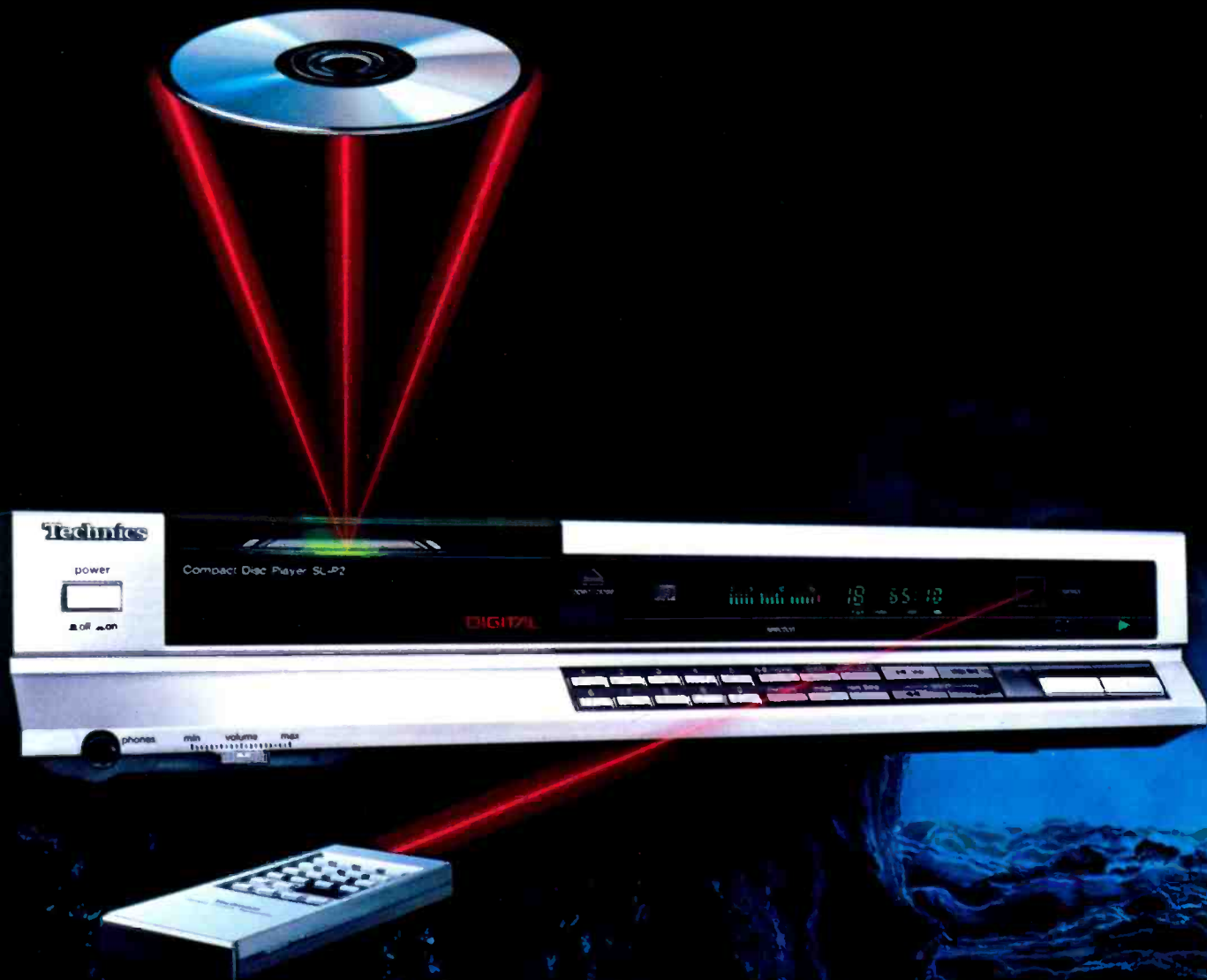
ACOUSTIC RESEARCH'S MAGIC SPEAKER: FIRST LAB TESTS

A BUYER'S GUIDE TO J.S. BACH



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COMPACT
disc
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Technics
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CIRCLE NO. 1 ON READER SERVICE CARD

by Gordon Sell and
Christie Barter

SUMMER CES

The 1986 Summer Consumer Electronics Show will be held in Chicago from June 2 through June 5. Not open to the general public, the show is expected to attract over 100,000 industry representatives, including 8,000 visitors from more than seventy countries. Rumors that the summer show would be moving to New York were dispelled last fall when CES officials announced that the show will continue in Chicago at least through 1987.

DAT UPDATE

Digital audio tape (DAT) has been much discussed in the audio industry lately, but there is little hard news. The battle lines appear to have been drawn between proponents of rotary (VCR-type) heads and fixed multitrack heads. According to some sources, the EIAJ (Electronic Industry Association of Japan) will adopt both standards, but others say the Japanese hi-fi companies would rather forget about DAT and concentrate on the Compact Disc and making a recordable CD available for home use.

TECH NOTES

Pioneer has a new AM/FM/sterereo TV tuner and a \$299 CD player with twenty-seven-track programmability. . . . The Koetsu line of esoteric moving-coil cartridges is now being distributed by Assemblage of Branford, Connecticut. . . . Sony is introducing a portable CD/tape/AM/FM boom box. . . . Cecil Watts record-care products, including the much missed Dust Bug, are returning to the U.S. market courtesy of AKG. . . . Blaupunkt's ARI (Automatic Radio Information) system, which gives traffic information to drivers through car stereo systems, now has full coverage between southern Connecticut and northern Virginia.

KEYBOARD COMPETITION

Thirty-seven young pianists from eighteen countries will slug it out at the Seventh Van Cliburn International Piano Competition in Fort

Worth, Texas, from May 18 to June 2.

Concerts featuring six finalists performing with the Fort Worth Symphony will be broadcast live by the American Public Radio network from May 30 through June 1. A concluding program on June 2 will cover the gala awards ceremony. Television stations in the PBS network will carry this ceremony on tape on June 4. Underwriting funds for radio and TV coverage are provided by Mobil Oil Corporation and Tandy Corporation/Radio Shack, which has headquarters in Fort Worth.



RECORD NOTES

The benefit single *We Are the World*, recorded by forty-five American pop-music stars, went to the No. 1 spot on *Billboard's* sales chart in only four weeks after its release. It's the fastest rise since Elton John's *Island Girl* ten years ago. . . . Other pop stars making records to benefit the world's famine victims include Julio Iglesias, José Feliciano, Sergio Mendes, and other top singers in the Latin-music field. More will be forthcoming from groups of Jamaican reggae singers and American gospel performers. . . . Since it was announced that Prince's April 7 concert in Miami was to be his last live appearance for a number of years, Warner Bros., Prince's record label, has made no comment about his future plans for recording. . . . At press time it was announced that Sade's Epic album "Diamond Life" (reviewed on page 73) had been certified Gold by the RIAA for sales of more than 500,000 copies. . . . French singer/songwriter Gilbert Bécaud has just finished his first North American tour in fifteen years. Bécaud has provided hits for such American singers as Vikki Carr and Frank Sinatra and has collaborated with such American singer/songwriters as Rod McKuen and Neil Diamond. Watch for a new Bécaud album with Steve Wonder.



PRICE BREAK

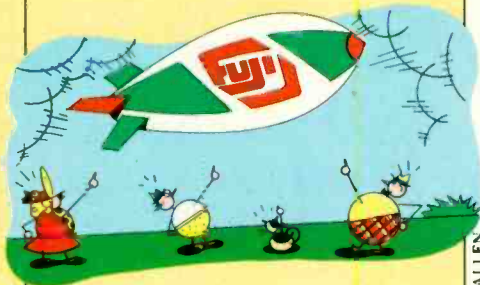
From June 1 to July 31, MGM/UA Home Video is having what amounts to a half-price sale on ten of its musical movie video cassettes. For two months such titles as *High Society*, *Bells Are Ringing*, *Gigi*, and *Singin' in the Rain*, which would normally list for \$59.95 or \$69.95, are being marked down to \$29.95.

RECORDED FIRSTS

The thirty-three organ chorales of J. S. Bach recently discovered at the Yale University Library (by a Harvard man) are being recorded by the American organist Joseph Payne for release by Harmonia Mundi USA. . . . The world première recording of the song *Malven (Mallows)*, Richard Strauss's last composition, is included in an all-Strauss album from CBS Masterworks featuring soprano Eva Marton and the Toronto Symphony conducted by Andrew Davis.

FUJI BLIMP TO CES

Airship Fuji, which was a hit at last year's Olympic Games in Los Angeles, has left its hangar in Elizabeth City, North Carolina, and is now on a six-month tour of twenty-three states east of the Mississippi River. After hovering over Houston, Dallas, Kansas City, St. Louis, and Indianapolis in May, the blimp (which advertises Fuji film on one side and Fuji tape on the other) is scheduled to arrive in Chicago on May 31. It will remain there until the closing of the summer Consumer Electronics Show on June 5. After touring major cities in Ohio and Pennsylvania, it arrives in New York at the end of June and will stay there for Fourth of July celebrations.



TERRY ALLEN

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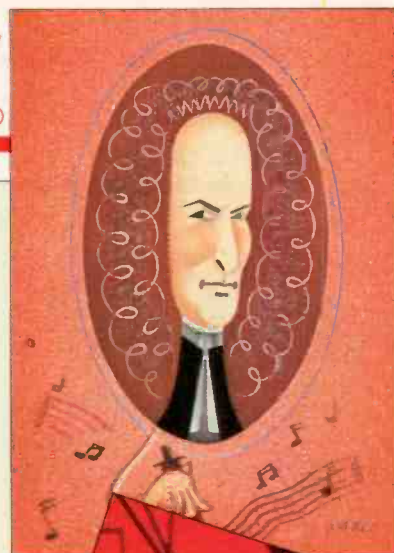
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The Hafler amp and Apt preamp on our cover are tested in this issue, page 32.

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by William Livingstone



Gathering information at a press party for an RIAA awards ceremony

Figures

IN Las Vegas last January attendance at the Consumer Electronics Show exceeded 100,000 for the first time—the official figure was 101,665—and at least that many people are expected in Chicago for the Summer CES from June 2 to June 5. Billed as the nation's largest annual trade show, CES continues to grow. New facilities now under construction in Chicago to accommodate that growth will make 1,000,000 square feet of space available to exhibitors at CES in June 1986.

For the audio press the job of covering such a large show in only a few days has become almost impossible. Consequently, manufacturers of hi-fi equipment now have pre-CES press conferences in New York and elsewhere to be sure their new products get adequate attention from audio writers and to be sure that we see the products when we are not giddy from fatigue or suffering from the information overload that is a common ailment in Las Vegas and Chicago.

These pre-CES events start two months before the show begins, so for me April 1 is not so much April Fool's Day as the first day of open season on audio journalists. I don't mean to sound ungrateful for the opportunity to get advance looks at products that will be introduced at the show; it's just that on April 1 of this year I still had beside my desk a fairly large pile of unfiled, unsorted, undigested, or even unread press material that I had brought back from Las Vegas in January.

Some of it was stuff I'd collected

to bolster my view that audio is not being eclipsed by other categories of home electronic equipment. This included a story from *Sight and Sound Marketing* with a headline that said, "Audio Wears the Pants in Audio-Video Marriage."

Despite a continuing decline in new releases on LP and cassette in this country, there are figures to show that ownership of component audio equipment is paradoxically on the rise. A study underwritten by the Electronic Industries Association's Consumer Electronics Group revealed that ownership of component systems increased from 31 percent of all U.S. households in 1982 to nearly 38 percent in 1984.

The latest figures from the Recording Industry Association of America do show, however, that compared with 1983, new releases on LP in 1984 were down by 24 percent and on cassette by 28 percent. Still, last year there were 1,740 new titles on LP and 1,795 on cassette, which should keep our audio systems busy. And for owners of Compact Disc players there were 1,038 new titles issued on CD, an increase of 70 percent over 1983.

I am intrigued by a couple of CD figures. One is that Deutsche Grammophon has sold 1.5 million CD's of recordings by the conductor Herbert von Karajan, and CD sales of this artist alone are expected to pass the two million mark before the end of the summer. The other is that the Book-of-the-Month Club now sells two-CD sets for \$24.95, the same price as its cassette and LP sets.

The nation's first workshop on Compact Discs in libraries was held recently in Nashua, New Hampshire, where it was revealed that Sony is offering CD players and discs to libraries at a special price. I am not accustomed to looking to Nashua for hot news of the record industry, but cassettes have already replaced LP's in the record collection of the main library in my home town, Asheville, North Carolina. Can CD's be far behind there?

Clearly, as CES flourishes, the ways Americans use audio equipment and consume music are changing. You may not feel you have to keep up with Las Vegas and Chicago, but do you want to lag behind Nashua and Asheville? □

Stereo Review

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ENTER THE NEW STONE AGE.

Every great once in a while a new material is discovered of such significance that it changes the way we live. In the same sense that the Iron Age displaced the original Stone Age, new substances recently have been developed of such importance that they already are being described as "21st Century" materials. The materials, called Fine Ceramics, are not to be confused with Ming vases or rare pottery. Rather, they are a bold new set of materials possessing far greater rigidity, durability, thermal stability, and anti-resonance properties than other materials known to man.

Science has barely begun to reap the potential offered by Fine Ceramics. Diesel engines using high-temperature Fine Ceramics for critical components have yielded 30% greater efficiency. The biological compatibility of ceramics within the body have led to their acceptance by the medical community for orthopedic bone replacements and major dental work. The technology of Fine Ceramics has produced gem-quality sapphires, rubies and emeralds which are identical to natural stones in every way, except that they have no flaws.

It should come as no surprise, then, that Fine Ceramics has been predicted to become the major growth industry of the high technology future. But you may be surprised to learn which Company presently is the world leader in Fine Ceramics. That same Company was selected by a leading Japanese business journal as being the Number One Company in all of Japan in terms of technology, growth potential and profitability. Number One. Over every car, TV or other Japanese manufacturer there is. That Company is Kyocera.

Kyocera, a contraction of Kyoto Ceramics, is a Corporation whose combined digital, electronics and materials technology has produced many industry best-sellers in the fields of computers and communications (which they have built for companies you know well).

Kyocera's latest challenge is the application of its exclusive expertise to the field of high fidelity sound reproduction. Embodied in a totally innovative, strikingly different line of no-compromise components proudly bearing the Company's name, Kyocera will show the high fidelity community just how much a brand new way of thinking can accomplish.

Welcome to The New Stone Age.

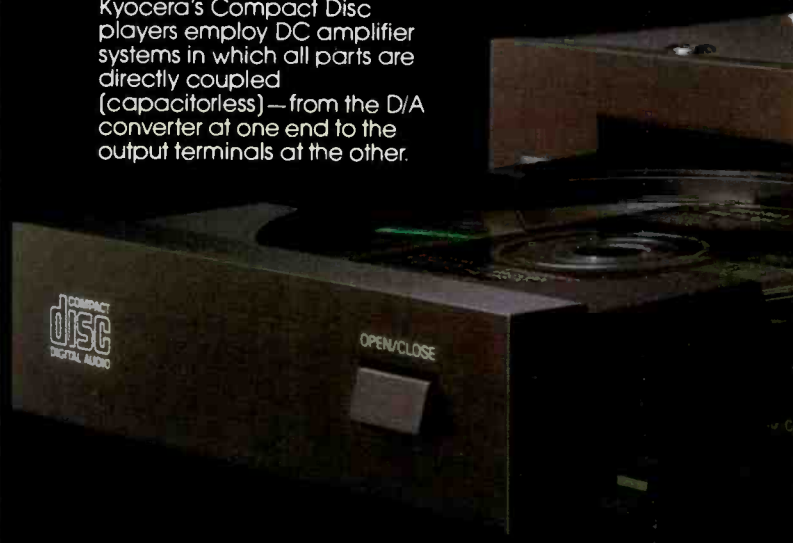
KYOCERA APPLIES TECHNOLOGY TO IMPROVE CD PLAYER PERFORMANCE

Begin with the most advanced digital technology.

To demonstrate to the listening world the importance of Fine Ceramics technology, Kyocera first built a Compact Disc player incorporating all of the most advanced CD technology. For example, Kyocera's Compact Disc players feature separate, independent D/A converters for both the right and left channels to preserve phase coherency and for superior channel separation. They also use a 16-bit microprocessor with quadruple over-sampling and digital filters to optimize phase and group delay characteristics. Then, to prevent digital noise from interfering with the musical signal, Kyocera's Compact Disc players employ independent power circuits for both the digital and analog sections.

Incorporate the most advanced audio technology.

The audio sections of Kyocera's Compact Disc players employ DC amplifier systems in which all parts are directly coupled (capacitorless) — from the D/A converter at one end to the output terminals at the other.



Then, LC (Linear-Crystal) OFC (Oxygen Free Copper) material is used (DA-910) for signal circuit wiring with the smoothest electron flow. Naturally, only the most carefully selected, hi-spec parts are used in Kyocera CD players, and, wherever possible, circuit design has been reduced to a bare minimum. For example, a specially designed shorting type muting relay eliminates "power on" noise, yet remains outside the signal path. And, conventional volume controls have been eliminated in favor of a switchable output to further eliminate possible noise.

Then add Kyocera's Fine Ceramics technology.

In the DA-910, Kyocera's Fine Ceramics engineering has been applied to eliminate a principle impediment to accurate compact disc performance — resonance. With digital tracks spaced only 1.6 microns apart, even the

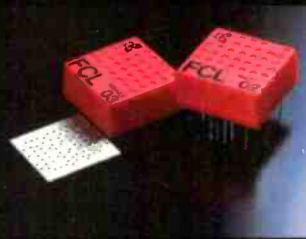
NEW GENERATION DIGITAL COMPACT DISC PLAYER

slightest hint of vibration can create tracking errors, which can significantly degrade sound quality. Thus, Kyocera's Ceramic Compound Resin (CCR) is specified for the chassis base of the DA-910—because of its fast vibration damping characteristics and extremely high rigidity.

The CCR base isolates critical circuitry from harmful external vibrations (mechanical and acoustic feedback) as well as from internal excitations created by the power transformer. Anti-resonance design has become well accepted by the very finest audio manufacturers for sound reasons. Audio circuitry handling very low level signals can actually



Ceramic Compound Resin (CCR) Base Chassis



Fine Ceramic Linear (FCL) Module

module to further isolate it from vibration, to avoid thermal drift and to protect it from pulsive electronic noise created by digital circuitry.

Kyocera's final step in eliminating resonance from Compact Disc players consists of over-sized, adjustable feet to provide further isolation and the firmest support for the players themselves. To minimize vibration, the DA-910 employs a diecast zinc pick-up mechanism.

Kyocera advances sound and user performance.

By combining the latest audio and the most advanced digital technologies with proprietary Fine Ceramics expertise, Kyocera was able to produce Compact Disc players widely regarded as the finest-sounding available—with the clarity, smoothness, inner detail and imaging of the finest audiophile components.

Kyocera's vast digital experience also has enabled the company to pay equal attention to sound quality and operational ease. Thus, programming and play functions are extensive, yet perfectly simple.



convert mechanical vibration or shock into electrical signals of their own. The elimination of this phenomena, known as the 'Microphonic Effect,' is the principle reason for all heavy duty, anti-resonance audio component construction.

The critically important analog circuitry handling the D/A converted signals is directly mounted on the CCR chassis. As an ultimate measure in the DA-910 this circuitry is mounted inside a Fine Ceramic Linear (FCL)

DA-810/910 Compact Disc Players.

Kyocera's DA-810 was not designed as a step-down model in any way; rather the DA-910 is a step-up for those seeking the ultimate in anti-resonance construction and the convenience of remote control operation.

The DA-810 features all of Kyocera's advanced digital circuitry, including dual D/A converters with oversampling and digital filtration plus Kyocera's "purist" audio design, including direct coupling, a DC-servo amplifier, "twin mono" construction, separate digital and analog sections, carefully selected high-spec parts and the simplest possible signal path circuit design.

Kyocera's anti-resonance construction for the DA-810 includes a special alloy transport mechanism, heat sink

and top cover, plus an anti-resonance coating applied to all delicate analog circuitry.

The DA-810 was designed bearing in mind that anyone buying any Kyocera product is unwilling to compromise.

Finer than the finest.

Those who have followed the development of the Compact Disc will remember that Kyocera's DA-01 was one of the most highly acclaimed of all the first generation Compact Disc players. Rather than simply repackage this initial success more cheaply, Kyocera added the benefits of Fine Ceramics technology to produce what realistically can be described as the finest Compact Disc players available today.



KYOCERA DA-910

Specifications

Frequency response:	5Hz-20kHz (\pm 0.5dB)
Signal-to-noise ratio:	More than 95dB (1 kHz)
Dynamic range:	More than 95dB (1 kHz)
Phase response:	20kHz 80 degree
Harmonic distortion:	Less than 0.005% (1 kHz, 0dB)
Wow and flutter:	Unmeasurable (dependent on precision of crystal oscillator)
Channel separation:	More than 90dB (1 kHz)
Output level/Impedance:	5V, 2V, 0.77V (3 points)/1 k ohms
AC power requirement:	AC 120V/60Hz
Power consumption:	33W
Dimensions:	430 (W) x 140 (H) x 330 (D)mm (17" x 5-1/2" x 13")
Weight:	9.5 kg (20 lbs, 15 oz.)



KYOCERA DA-810

Specifications

Frequency response:	5Hz-20kHz (\pm 0.5dB)
Signal-to-noise ratio:	More than 90dB (1 kHz)
Dynamic range:	More than 90dB (1 kHz)
Phase response:	20kHz 80 degree
Harmonic distortion:	Less than 0.005% (1 kHz, 0dB)
Wow and flutter:	Unmeasurable (dependent on precision of crystal oscillator)
Channel separation:	More than 90dB (1 kHz)
Output level/Impedance:	4V, 2V, 0.77V (3 points)/1 k ohms
AC power requirement:	AC 120V/60Hz
Power consumption:	33W
Dimensions:	460 (W) x 145 (H) x 311 (D)mm (18-1/8" x 4-1/2" x 12-5/8")
Weight:	8.5 kg (18 lbs, 12 oz.)



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Gender Benders

Steve Simels's April piece on rock gender benders in the Seventies was one of the highlights of STEREO REVIEW's coverage of the pop-music field. He was correct in his comments on the New York Dolls. I had a chance to witness their show from a speaker platform in front of a temporary stage in a drive-in theater, sometime way back when, and I still consider theirs to be one of the most indisputably fantastic rock-'n'-roll "tours" ever to reach us here in Lansing, Michigan. I, too, felt that the Dolls epitomized what the rock scene had developed into in the early Seventies, even if the group went off the deep edge into oblivion. Their "performance" was what it was all about, their recording wasn't. But, as Mr. Simels said, they did cast a pretty long shadow.

GARY ANDREWS
Lansing, MI

Buyer Beware

Recently I purchased the new Sony portable Compact Disc player at a discount house in the Los Angeles area.

The machine made "blipping" sounds when it hit certain passages on a couple of discs, so I called Sony. When I stated that I was having trouble with my Sony D-50, I was told that I had purchased a model that is not licensed for sale or use in the U.S. and that the company would not honor the warranty. The D-5, not the D-50, is approved by the FCC [as having an acceptable level of radio-frequency emissions].

Fortunately, the discount house exchanged the D-50 for a D-5, but potential buyers should be aware of the difference between the two versions. Unlike the D-5, the Japanese D-50 does not come with an a.c.-to-d.c. converter; you must buy one separately. Adding the price of the converter to that of the D-50 itself results in a price almost the same as that of the D-5, but the buyer has no warranty protection. Beware!

TOM OWENS
Harbor City, CA

Blasting Back

Charles Rodrigues's typically perceptive hi-fi cartoon on page 36 of the March issue recalls a letter I wrote to

the Boston *Phoenix* about three years ago in which I suggested, half seriously, that as long as some people were so inconsiderate as to inflict their preferred music on others in public places, via the ubiquitous "blasters," one response might be for people with different tastes to get their own "boom boxes" and retaliate. Imagine Palestrina, Haydn, Puccini, Penderecki, Louis Armstrong's Hot Five, or Ornette Coleman being purveyed in this way!

We should also consider the rudeness associated with the other end of this spectrum, the "Walkpersons." Would people using those devices kindly remove their headphones when addressing someone or being addressed?

ERIC HUNTER
Cambridge, MA

Wolf Howls

Steve Simels, called a "certified success" by Editor in Chief William Livingstone in the April issue, is a certified "bozo" in my book. His reviews are constantly misleading, unprofessional, and downright incompetent. His calling the single *Will the Wolf Survive?* by Los

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Carver Corporation	x 861
Denon America, Inc.	x 862
Discwasher Inc.	x 863
Fujitsu	x 864
Hitachi	x 865
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LETTERS

Lobos the Most Moving Rock Song of 1985 was the last straw for me. Cancel my subscription.

JIM ALLEN
Huntington, WV

Steve Simels's April review of "How Will the Wolf Survive?" by Los Lobos was right on target. I haven't been as thoroughly entertained by one band's music in ages. It's refreshing to hear jagged Fender guitars and searing tenor saxophones in this synth-pop era we are confined in. It's *also* great to see good musicians finally receive critical acclaim after years of struggle and toil!

One correction: although David Hidalgo is one of the band's vocalists, he does *not* sing on *Don't Worry Baby*; Cesar Rosas is the one who sings this great blues tune.

GREG HOPPE
St. Joseph, MO

Madonna and Her Image

Mark Peel's April review of Madonna's "Like a Virgin" album was the most disgusting piece of garbage that I have ever read in STEREO REVIEW. For

him, her image obviously pre-empted any critical judgment of the music.

It was interesting to note, however, that Mr. Peel did not invoke this kind of moralistic bluster to dismiss Prince and Billy Idol in previous issues or Frankie Goes to Hollywood in the same one. I think "hypocrisy" and "sexism" are the words we're looking for here. So Madonna is "a tough, terrifically sexy graduate of the streets"? You bet! And if Mr. Peel would put aside his prejudices long enough to really listen to her album, he would discover that Madonna has more than just an image going for her.

ROY L. HENRY
Pigeon Forge, TN

High-Output Amps

In the April test report on the Rotel RA/RB-870 amplifier combination, Julian Hirsch stated, "We cannot recall seeing *any* other integrated amplifier that can match [its] distinctly above-average power-output capability." Possibly Mr. Hirsch has overlooked the NAD 3155/2155 combination. Unless I am mistaken, the specifications, including power output, of the NAD compo-

nents compare quite closely with those of the Rotel components. The salient difference between the two is the price: the NAD combination lists for \$696, the Rotel combination for \$850.

BILL BRADLEE
San Jose, CA

Technical Editor Gordon Sell replies: We regret any lack of clarity in Mr. Hirsch's statement, which meant only that Hirsch-Houck Labs had not tested any other integrated amplifier with a comparable power-output capability.

Video Viewpoint

Please!! No more video in STEREO REVIEW.

PHILIP ROSCHAY
Chicago, IL

Would you settle for a little less?

McCartney

Steve Simels's review in March of Paul McCartney's *Give My Regards to Broad Street* was less than fair. Mr. McCartney has brought many years of

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listening pleasure to millions of people around the world. Just because the album didn't produce as many hits as we would like is no reason to give it a review such as this. Mr. McCartney has written or co-written hundreds of great hits over the last twenty years, with and without a little help from his friends. So let's give him some respect and credit.

DAVE HEINDEL
New Orleans, LA

Pop Against Hunger

I enjoyed reading the item in April "Record Makers" about pop artists whose charitable efforts "tend to go relatively unnoticed." It is good to see recognition and credit being given to those who don't seek it—Kenny Rogers, John Denver, and, of course, Herbert Block. However, you "unnoticed" the pioneer of pop artists for world hunger, the late Harry Chapin, who began his work ten years prior to his untimely death in 1981. Some of his notable accomplishments were the creation of World Hunger Year ("Every year is World Hunger Year until no one is hungry anymore"), serving on the Carter

Administration's Committee to Study World Hunger, and ten years of charity concerts to raise money and awareness—and, of course, bringing together people of influence to help fight world hunger, such as Kenny Rogers and John Denver.

TED FLATI
Cypress, CA

Merited Awards

Reader Scott D. Greene (April "Letters")—who thought that Joe Jackson's "Body and Soul" should have received a Record of the Year Award from STEREO REVIEW instead of Tina Turner, Prince, and Cyndi Lauper—has been listening to too much AOR radio. Jackson's album strikes me as watered-down music pioneered by black artists, while Turner, Prince, and Lauper roar with personality. I can see why the latter two have their detractors (though most Prince haters detest his looks or personality more than the music), but Turner's "Private Dancer" mixes some of the same elements (rock, r-&-b, reggae, folk, modern electronics) as Bruce Springsteen's award winner, and she sings cir-

cles around Bruce—and I love Bruce. Tina sounds as wise and gutsy as ever, and she rocks harder on *Steel Claw* than just about any other cut from 1984. Mr. Greene prefers Huey Lewis's processed rock to this?

PAT FORTOY
St. Clair Shores, MI

Hope, Arkansas

The Klipsch name deserves more consideration than was shown by erroneously stating the location of manufacture of the company's fine speakers in the April test report on the kg⁴. Hope, Arkansas (not Arizona), is really quite a pleasant place.

DAVID PARKER
Jacksonville, AR

Correction

A caption on page 66 of the May issue gave some incorrect information on the KEF GT-200 car speaker system. The system has two units, each containing a modified KEF GT-100 two-way speaker as well as a subwoofer. The price of the GT-200 system is \$575.

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NEW PRODUCTS



Pioneer

The two speeds on Pioneer's CT-Z99W dual-transport cassette deck enable cassettes to be dubbed either at normal playing speed or at twice the normal speed. The deck accepts simultaneous inputs from one of its cassette transports, a separate line source, and an external microphone for three-way mixing in the other transport. Dolby B noise reduction is included. A built-in graphic equalizer can be used to adjust the relative balance of seven frequency bands, allowing tapes to be customized for car stereos or portable players. An automatic fader control creates fades when desired, and an auto-record-mute

feature inserts 4-second blanks between selections. To make finding a particular point on a tape easier, the program material is audible in fast forward or rewind. A relay-play feature begins playing the cassette in Deck B when Deck A has finished its cassette side.

The deck's wow-and-flutter rating is 0.04 percent wrms, and its frequency response is 25 to 17,000 Hz with metal tape. The signal-to-noise ratio is 60 dB with Dolby B. Price: \$499.95. Pioneer Electronics, Dept. SR, 5000 Airport Plaza Dr., Long Beach, CA 90801.

Circle 120 on reader service card

the NR-1000B weighs less than 20 pounds and measures 17¼ x 4¾ x 13¾ inches. Price: \$479. Nikko Audio, Dept. SR, 5820 S. Triangle Dr., Commerce, CA 90040.

Circle 122 on reader service card

Carver

The Carver Receiver-2000 is said to combine the best of the company's proprietary technology—a Magnetic Field amplifier, Asymmetrical Charge-Coupled FM stereo detector, and Sonic Holography. The last feature is said to recreate a three-dimensional sound field. The Asymmetrical Charge-Coupled FM stereo detector provides full stereo even under poor reception conditions, and the amplifier is designed to handle high peak-power demands. An infrared remote unit controls power, volume, memory, band selection, tuning, and the Sonic Hologram generator. There are presets for six AM and six FM stations and separate tone controls for bass, midrange, and treble. The preamp section can handle inputs from moving-magnet or moving-coil cartridges.

The Receiver-2000 is rated to deliver



200 watts per channel into 8 ohms from 20 to 20,000 Hz with no more than 0.5 percent distortion. The amplifier's signal-to-noise ratio is 100 dB; the tuner's 50-dB quieting sensitivity is 4.5 microvolts. The receiver weighs 16 pounds and measures 19 inches wide, 5½ inches high, and 18 inches deep. Price: \$1,499. Carver Corp., Dept. SR, P.O. Box 1237, Lynnwood, WA 98036.

Circle 123 on reader service card

Sherwood

The CRD-180 is the first Sherwood car stereo mini-chassis cassette/receiver to combine autoreverse, digital-synthesis tuning, an LCD display, a built-in clock, and preset scan. The receiver can



also decode the C-QUAM format of AM stereo. The FM tuner uses MOS-FET's in the front end, has twelve station presets, a stereo/mono switch, and local/distant switch. The tape section has Dolby B noise reduction, metal-

Sony

Sony's new Trinitron XBR video-monitor/receivers feature a built-in stereo TV/SAP decoder along with two detachable Sony APM (Accurate Pistonic Motion) speakers and new picture circuitry. The Microblack screen is said to reflect less than one-third of the ambient room light, thus improving the picture. The one-gun/one-lens picture tube is joined to a flat, square-cornered screen, reducing vertical distortion. The fine-pitch aperture grille helps deliver a horizontal resolution of 400 lines.

The XBR models come with an infrared remote control that offers direct-access channel selection, up/down channel search, channel enter, bass/treble/balance controls, and volume control. An on-screen display shows channel, input mode, picture level, video

input mode, and audio settings. An optional pedestal stand (\$200) contains foot controls for volume and channel selection. The 25-inch KV-25XBR (shown) has a suggested retail price of \$1,200, and the 20-inch KV-20XBR is \$899. Sony Consumer Products Company, Dept. SR, Sony Dr., Park Ridge, NJ 07656.

Circle 121 on reader service card



Nikko

The tuner section of the Nikko NR-1000B receiver is a quartz-crystal, frequency-synthesis design with a digital readout and presets for six AM and six FM stations. Inputs are provided for phono, tuner, auxiliary, and two tape decks. A switch selects the built-in head amp for moving-coil cartridges. There is a large volume knob, smaller knobs for bass, treble, and balance, and switches for tone defeat, "subsonic" filter, and loudness compensation.

The receiver is rated at 65 watts per channel into 8 ohms from 20 to 20,000 Hz with less than 0.03 percent total harmonic distortion. Usable sensitivity is given as 2.0 microvolts (11.2 dBf), and the signal-to-noise ratio is 102 dB for the tape input. Finished in matte black,



NEW PRODUCTS

tape capability, and a high-beta permalloy head.

The built-in power amplifier is rated at 3.5 watts per channel over the audio band with less than 0.5 percent total harmonic distortion. Preamp outputs are included so that the receiver can be connected to a separate power amp. There are separate bass and treble controls, a front-rear fader, and a balance control. Price: \$299.95. Sherwood, Dept. SR, 13845 Artesia Blvd., Cerritos, CA 90701.

Circle 124 on reader service card



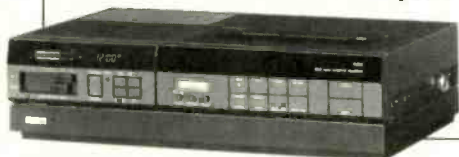
Audio-Technica

The ATH-V7 from Audio-Technica is a standard-sized headphone with an open back and moving-coil drivers. Foam-padded circumaural rings hold the headphones slightly away from the ears while sealing off outside noise. The headband is adjustable. The 2-meter cord has both straight and coiled sections and terminates in a standard 1/4-inch phone plug. Frequency response is rated as 20 to 20,000 Hz. The ATH-V7 weighs approximately six ounces. Price: \$74.95. Audio-Technica, Dept. SR, 1221 Commerce Dr., Stow, OH 44224.

Circle 125 on reader service card

RCA

The VKP950 video-cassette recorder from RCA is a VHS Hi-Fi model that converts from home to portable use to allow high-quality sound and picture recording in the field. The recorder section "docks" with the tuner-timer section for home use and lifts off from their common base to become a port-



able unit that weighs just under 8 pounds with battery. The recorder can operate from house current, its own rechargeable battery, or a 12-volt automobile battery.

With five video heads, the VKP950 offers the following playback effects in the SP and SLP speeds: picture search, stop action, frame advance, variable-speed slow motion, reverse play, and double speed. The 133-channel tuner section works by direct access and memory scanning. An EXPRESS feature provides for automatic recording without needing to preset the programmer memory. Audio dubbing can be done on either the hi-fi or normal linear soundtracks. Elapsed recording time is shown on the LCD window, and the counter has a memory so that the tape can be stopped automatically at any selected point during rewind. Price: \$1,495. RCA Consumer Electronics, Dept. SR, 600 North Sherman Dr., Indianapolis, IN 46201.

Circle 126 on reader service card

Tandberg

The TCD 910 Master Cassette Recorder from Tandberg marks the formation of the company's Professional Products Division. The drive system is a dual-capstan, closed-loop type. There are three heads and four servo-controlled, belt-drive motors. The front panel contains an azimuth-adjustment control. Dolby B and Dolby C noise reduction are included.

The Dyneq headroom-extension system in the TCD 910 monitors the high-frequency record boost and reduces



equalization if the signal approaches overload levels. The Actilinear transconductance amplifier increases headroom by more than 20 dB. With metal tape, total harmonic distortion is given as less than 1.5 percent and signal-to-noise ratio as 73 dB. The deck measures 17 1/8 inches wide, 6 1/16 inches high, and 13 3/4 inches deep, and it weighs 21.8 pounds. Price: \$1,795. Tandberg of America, Dept. SR, 1 Labriola Ct., Armonk, NY 10504.

Circle 127 on reader service card

Design Acoustics

The cylindrical-shaped OS-1 omnidirectional two-way loudspeaker from



Design Acoustics is intended for outdoor use on patios, lawns, etc. The weather-resistant speaker has a frequency range of 90 to 18,000 Hz. It can be mounted at ground level, on a pipe, or suspended in the air, and its black plastic finish can be painted to match the surroundings. Price: \$259.90 per pair. Design Acoustics, Dept. SR, 1221 Commerce Dr., Stow, OH 44224.

Circle 128 on reader service card



MTX

A dual-cone loudspeaker from MTX is designed for use on boats, on patios, and in cars, motorcycles, vans, or tractors as well as in the home. The 6 x 9-inch speaker has a water-resistant polypropylene-cone woofer and a chemically treated inner whizzer cone. A rubber sealing gasket protects against rust and water leakage. Rated frequency response is 80 to 19,000 Hz, and the power-handling capacity is 40 watts. The 4-ohm speaker has a sensitivity level of 90 dB sound-pressure level with a 1-watt input measured at 1 meter. Price: \$99.95 each. A 5 1/4-inch round version is also available. MTX, Dept. SR, One Mitek Plaza, Winslow, IL 61089.

Circle 129 on reader service card

Numark

Numark's top-of-the-line DM-1900 mixer/preamplifier, said to be a "studio-quality console," includes a six-band graphic equalizer with up to 15 dB

REDEFINITION.

THE CARVER RECEIVER

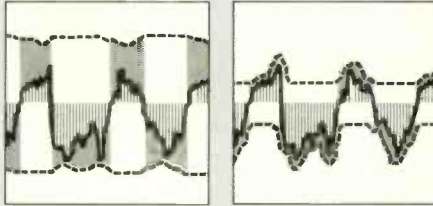
Redefines your expectations of receiver performance with the power you need for Digital Audio Discs plus virtually noise-free stereo FM reception. A receiver with astonishing performance incorporating two highly significant technological breakthroughs: Bob Carver's Magnetic Field Power Amplifier and his Asymmetrical Charge Coupled FM Detector.

ESSENTIAL POWER: Your system needs an abundance of power to reproduce, without distortion, the dynamic range of music on Digital Audio Discs and fine analog recordings.

The Magnetic Field Amplifier in the CARVER Receiver gives you 130 watts per channel* of pure, clean power with superbly defined, high fidelity reproduction.

The Magnetic Field Amplifier produces large amounts of power (absolutely necessary for the accurate reproduction of music at realistic listening levels) without the need for heavy heat sinks, massive transformers, and enormous power capacitors required by conventional amplifier design.

Unlike conventional amplifiers which produce a constant, high voltage level at all times, irrespective of the demands of the ever-changing audio signal (Even when there is no audio signal in the circuit at all!), the Magnetic Field Amplifier's power supply is signal responsive. Highly efficient, it produces exactly and only the power needed to carry the signal with complete accuracy and fidelity.



Solid line: audio output signal. Broken line: power supply voltage. Shaded area: wasted power. Vertical lines: power to speakers.

The 130 watts-per-channel* CARVER Receiver is about the same size and weight of conventional receivers having merely 30 watts per channel!

NOISE-FREE RECEPTION: The AM-FM CARVER Receiver gives you FM stereo performance unmatched by that of any other receiver.

As it is transmitted from the station, the stereo FM signal is extremely vulnerable to distortion, noise, hiss and multipath interference.

However, when you engage CARVER's Asymmetrical Charge Coupled FM Detector circuit, the stereo signal arrives at your ears virtually noise-free. You hear fully separated stereo with space, depth and ambience!



Reflected multi-path signals cause audible distortion.

Asymmetrical Charge Coupled FM Detector gives your ears a true sonic image.

The Asymmetrical Charge Coupled FM Detector was first introduced in CARVER's TX-11 Stereo Tuner, receiving unparalleled critical acclaim:

"A major advance... its noise reduction for stereo reception ranged from appreciable to tremendous. It makes the majority of stereo signals sound virtually as quiet as mono signals, yet it does not dilute the stereo effect."

Julian D. Hirsch, STEREO REVIEW (December, 1982)

"Separation was still there; only the background noise had been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multipath interference."

Leonard Feldman, AUDIO (December, 1982)

"What distinguishes the TX-11 is its ability to pull clean, noise-free sound out of weak or multipath ridden signals that would have you lunging for the mono switch on any other tuner we know of."

HIGH FIDELITY (January, 1983)

"The Carver Receiver is, without question, one of the finest products of its kind I have ever tested and used."

Leonard Feldman, AUDIO (June, 1984)

The CARVER Receiver has been designed for fidelity, accuracy and musicality. You will want to visit your CARVER dealer for a personal audition of this remarkable instrument.

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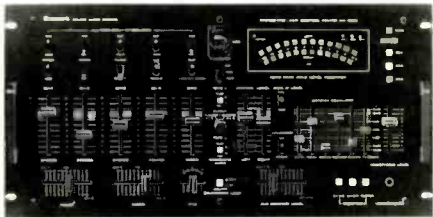
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cut or boost for each band. Center frequencies are at 42, 152, 480, 1,520, 4,800, and 15,360 Hz. The DM-1900 can be used for mixing sound-on-sound recordings or for creating video and movie soundtracks. The console's four stereo inputs can be used with three phono sources and one line-level source or with two phono sources and two tape-recorder sources. An additional mono balanced/unbalanced input accepts a microphone with either a phone plug or XLR connector. The mike input has a professional pan-pot control for exact positioning.



The multicolored twelve-segment peak-reading LED output meter is said to ensure maximum output without overload. There is a built-in preamplifier and a variable output to match different amplifiers. Slide controls adjust the volume of each input, the output volume of each stereo channel, and the six equalizer bands. Fading and cueing controls are professional-quality four-gang slide controls with feather-touch action, fast response, and infinite adjustment sensitivity. The output signal-to-noise ratio varies from 70 dB for phono and mike sources to 73 dB for line and tape. A VU meter and headphone jack are included. A talk-over switch allows recording voice-overs.

The DM-1900 measures about 19 inches wide, 4½ inches high, and 9½ inches deep. Weight is about 12¾ pounds. Price: \$615. Numark Electronics Corp., Dept. SR, 503 Raritan Center, Edison, NJ 08837.

Circle 130 on reader service card



Technics

The RS-B18 cassette deck from Technics is equipped with three noise-reduction systems: Dolby B, Dolby C, and dbx. Switches select correct bias and equalization for normal, chrome, and metal tapes. Input levels are set with two slider controls; one sets overall level while the other balances the levels of the two channels. Microphone inputs and a headphone jack are on the front panel. The soft-touch controls permit

one-touch recording and changing from fast forward to rewind, cue, and review without pressing the stop button. The deck will switch from rewind to play automatically when it reaches the beginning of a cassette. Price: \$180. Technics, Dept. SR, One Panasonic Way, Secaucus, NJ 07094.

Circle 131 on reader service card

Reel

Said to combine the convenience of the cassette with the flexibility of open-reel, the Bikini is a cassette shell loaded with a removable reel of tape. The reel can be removed for splicing and editing, and the tape can be shortened or lengthened to fit the specific needs of the user. Different reels of tape can be used at different times in the same shell, and each reel can be individually labeled. The starter set comes with five reels of chrome tape and one shell with a take-up reel. Each reel contains enough tape for 50 minutes of recording time (25



minutes on each side). Price: \$24.95. Reel Corp., Dept. SR, 21711 W. 10 Mile, Southfield, MI 48075.

Circle 132 on reader service card

Bib

A Compact Disc/video-disc cleaning kit from Bib consists of a 22-milliliter



bottle of cleaning fluid, two contaminant-free wiping cloths, a chamois leather polishing pad, and a storage pouch. Price: \$8.95. Bib Audio/Video Products Ltd., Dept. SR, 1751 Jay Ell Dr., Richardson, TX 75081.

Circle 133 on reader service card



Crown

The Crown FM Three digital tuner is equipped with a defeatable Schotz noise-reduction circuit for clearer reception of stereo FM broadcasts. When the tuner scans the frequency band for listenable stations, the setting of the scan-level control determines the minimal signal strength of the stations it accepts. There are six station presets for AM and six for FM. LED's indicate signal strength, multipath interference, and stereo reception. A toroidal transformer reduces hum and noise, and an extra r.f. section is said to increase AM-band sensitivity.

FM specifications include a signal-to-noise ratio (S/N) of 80 dB at 65 dBf. Stereo separation is rated as 60 dB at 1,000 Hz and 50 dB at 10,000 Hz. Capture ratio is 1.5 dB at 65 dBf. Alternate-channel selectivity is 75 dB at 25 dBf. Total harmonic distortion is 0.05 percent at 65 dBf and 1,000 Hz. For the AM section, S/N is 50 dB and total harmonic distortion 0.22 percent at 30 percent modulation. Price: \$795. Crown International, Dept. SR, 1718 West Mishawaka Rd., Elkhart, IN 46517.

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Warrantech

Extended warranties for home electronic products may be purchased from Warrantech, an independent service company. The warranty, which becomes effective when the factory warranty expires, covers parts and labor on all repairs. Up to three years of coverage can be purchased. All brands that carry an original factory warranty are eligible for the Warrantech program. The company's service centers are located throughout the country. Representative prices for one year of coverage include \$30 for a portable TV set, \$40 for a VCR or component TV, and \$50 for a TV console. In-home service is available for an extra \$10 per year. The warranties are available at retail electronics stores. Warrantech, Dept. SR, 805 Third Ave., New York, NY 10022.

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Stereo Review

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

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by David Ranada



Overscanning

FEW television viewers realize that they rarely get to see the "whole picture." For starters, the video signal from a camera or videotape is rectangular, with sharp corners. But even the new "flat, square" picture tubes round off the corners somewhat, besides still having slightly curved borders. Beyond the basic picture-tube shape, however, is another, less obvious limit on the completeness of the reproduced image. To prevent the edges of the picture from being seen, television sets and video monitors are adjusted so that the displayed image does not show quite all that is contained in the video signal. They *overscan*, meaning that the true edges of the picture are scanned over or outside the borders of the screen.

Overscanning has really only one useful property to the home viewer: it prevents visually distracting faults that occur at the edges of the picture from appearing on the screen. These faults, most prominent with home-VCR recordings, consist of noisy and skewed areas at the top and bottom of the screen and of somewhat ragged side edges of the image. Both faults are caused by instability in the timing of the video signal from a VCR.

To a TV or monitor manufacturer, overscanning is much more use-

ful than it is to the home viewer, even though much of the usable picture area may be thrown away by excessive factory-set overscanning. As a monitor or TV set ages, large amounts of overscan permit the picture-tube circuits to drift considerably from their initial settings without the edges of the image becoming visible. Apparently the manufacturers consider losing part of the picture preferable to seeing "too much" of the image when the set gets old.

Vertical and horizontal size are the two dimensions of overscanning, the former being the one usually more accurately set at the factory. Excessive horizontal size makes objects appear wider than they should. For example, a circle might appear as a flattened ellipse if there is excessive horizontal overscanning or as a squeezed ellipse if the vertical size is proportionately too high.

Different amounts of overscanning are easily visible in side-by-side picture comparisons, but how do you tell if a TV set or monitor has *excessive overscan*? The best way is to view a test pattern (usually transmitted by most non-24-hour TV stations in the early morning, just before the day's programming starts). Two types of test patterns are normally transmitted, an alignment pattern and "color bars."

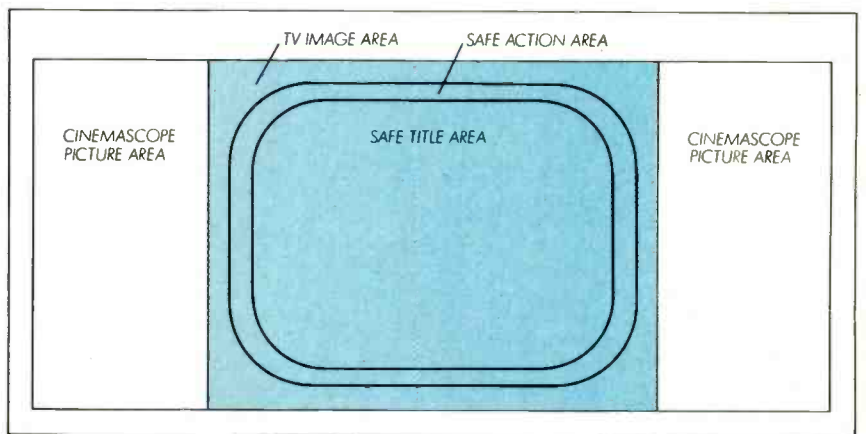
The alignment pattern is picked up by a camera and is dominated by a large circle, one screen-height in diameter, that should be centered on the screen if the camera and other transmitting equipment are aligned properly (which is, of course, the whole purpose of using a

test pattern). It should be a complete, true circle, not an ellipse, and it should not be cut off at the top or bottom of the image area. Measure its diameter in various directions on your screen; it should be constant. If it isn't, and it usually isn't, you're seeing the effects of overscanning. The mathematically ambitious can calculate how much of the picture is being lost by comparing the apparent size of the circle with its true size (the full height of the screen in diameter).

Color bars are a standardized, electronically generated test signal designed to aid the alignment of the color controls in a video system. The rainbow-like signal consists of seven vertical stripes of color (from left to right, 75 percent white, then 100 percent yellow, cyan, green, magenta, red, and blue) across the top of the screen and areas of full black and white on the bottom.

Although it is meant for color adjustments, the color-bar signal can also be used to judge overscanning since its proportions are standardized. For proper horizontal size, the bars should all be a seventh of the width of the picture. More important, most of the white and blue bars at the sides of the screen should be visible. If they are partly cut off, and they usually are, they should be at least truncated equally for a well-centered picture. For proper vertical size, the edge between the color bars and the black and white areas below them is supposed to occur 75 percent of the way down from the top of the image.

The traditional use of overscanning (prevention of underscanning as the circuits age) has had a fasci-



nating effect not only on how much of the video image you get to see but also on what that image contains. The Society of Motion Picture and Television Engineers (SMPTE) long ago promulgated recommendations for how a TV picture should be "composed" to compensate for varying and excessive amounts of overscan. In the accompanying scale drawing, the shaded rectangle represents the complete video-signal image with an aspect ratio (ratio of width to height) of 1.33 to 1. Within that rectangle are two ovaloids. The larger one is the border for what the SMPTE calls the *safe*

Overscanning has had a fascinating effect on how much of the video image you see and on what it contains.

action area, the area of the image "within which all significant action must take place." The inner ovaloid is the SMPTE-specified *safe title area* "within which the more important information must be confined to ensure visibility of the information on the majority of home television receivers." The safe title area is only 61 percent of the full video image and a very small 34 percent of the area of a wide-screen Cinemascope/Panavision picture (in the drawing, this is indicated by the large, wide rectangle with an aspect ratio of 2.35 to 1).

To TV directors and cameramen, the SMPTE recommendations are restricting, to say the least. Objects at the edges of the camera's view may not even show up at home if they fall outside the safe action area. Necessary constraints like these have forced a definite "look" on such productions as commercials, sitcoms, and made-for-TV movies. They also have created problems for makers of blockbuster wide-screen productions who want to show those movies on TV or sell them on video cassettes. The conscientious director will essentially have to re-shoot the film onto video tape, choosing those portions of the wide-screen image that are most important to show on a TV screen. The results are rarely as successful visually as the wide-screen original. □

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by Larry Klein



Spontaneous Erasure: II

Q With reference to your December column discussing the mysterious erasure of tapes: we had a customer with a similar problem. He was convinced that the fault lay in the tape deck we had sold him even though it checked out fine. In truth, some of his tapes did sound pretty bad! We finally determined that his problems occurred when his wife vacuum cleaned the area where the tapes were stored. Apparently the motor of the vacuum cleaner put out a magnetic field that was strong enough to erase his tapes partially. When the tape-storage area was changed, the problem disappeared.

GUINN UNGER
Sheffield Audio, Inc.
Houston, TX

A Thank you, Mr. Unger, for your cautionary tale. Readers should keep in mind that unwanted magnetic fields impinging on a recorded tape don't simply reduce the overall signal level the way erase heads or bulk erasers do. Rather, the highs are usually the first to go, but not necessarily in a uniform way. There may be a loss of highs once every revolution of the tape pack inside the cassette or there may be a thrumming or pulsing sound. The precise effect depends on whether the magnetic field is alternating (as from an a.c. motor or transformer) or from a constant-polarity source like a speaker magnet, whether it is meeting the tape pack edge-on or from another direction, whether it is strong or weak, and whether it is fixed or moving (as from a visiting vacuum cleaner). In any case, your customer's wife proved that a clean tape-storage area is unfortunately not always synonymous with clean-sounding tapes.

Aging Speakers

Q I own a pair of Wharfedale speaker systems that are about twenty years old. How well would you say they compare with some of the better speakers now available?

R. W. LONG
Moore Haven, FL

A In a word, badly. During my early years as technical editor of STEREO REVIEW, twenty-odd years ago, it was my practice to preaudit speaker systems before I sent them up to Hirsch-Houck Labs for review. Believe me, it wasn't because I was eager to pre-empt Hirsch and Houck's listening sessions; it was just that there were so many bad speakers on the market that I could save valuable laboratory test time by eliminating the really rotten ones in advance. After a while, technological developments—and improved taste on the part of the designers (I'm not kidding)—raised the general level of loudspeaker performance sufficiently that preauditioning no longer paid off.

For many of those years, my reference standard was the Acoustic Research AR-3. It had easily the lowest and least boomy bass response, the smoothest (non-honky) midrange, and the most extended treble response of any system I heard in my apartment during those years. Several systems were able to equal it in one area or another, but none managed to match its combination of virtues. Looking back from the perspective of 1985, it's obvious to me that aside from its bass performance, which I still consider good by today's standards, the AR-3 was sadly lacking in midrange and treble output. Even with its level controls full up, I would guess that the AR-3 was about 10 dB down from flat response at 10 kHz.

If the AR-3 was as good as you could get twenty years ago, and it is sadly outmoded by today's better systems, I would suggest that run-of-the-mill systems such as yours be relegated to extension-speaker use—or given to your kids, who will probably appreciate their bass boom even if they complain about the lack of clarity.

Overload Sensitivity

Q My preamplifier does not have a separate input for a digital-disc player. I gather that most CD players will overload the usual auxiliary inputs, which have sensitivities around 150 millivolts. How do I solve this problem?

A. A. LAMBERT
Vancouver, B.C.

A The problem is not as severe as many readers seem to think. An auxiliary input's sensitivity rating of

150 millivolts does not necessarily mean that overload will occur when a much larger signal is applied. The IHF/EIA sensitivity rating simply means that in order to achieve a 0.5-volt reference output with the volume control set on full, a 150-mV, 1,000-Hz input signal must be applied. The purpose of the standard is to determine the gain of the amplifier, not to specify the overload level. Obviously, under normal circumstances a preamplifier is never operated with its volume control full up, and most power amplifiers require more than half a volt of signal to achieve full output.

For a preamp manufacturer to avoid input overload from CD signals, he only needs to make sure that the high-level amplifying stages, if any, that are located before the volume control are able to handle CD-level signal voltages. That is a relatively easy requirement, and most manufacturers have no trouble meeting it. In any case, to determine how much signal your unit can take, you need to have the input-overload data for the auxiliary inputs, not their sensitivity ratings.

VHS Incompatibility

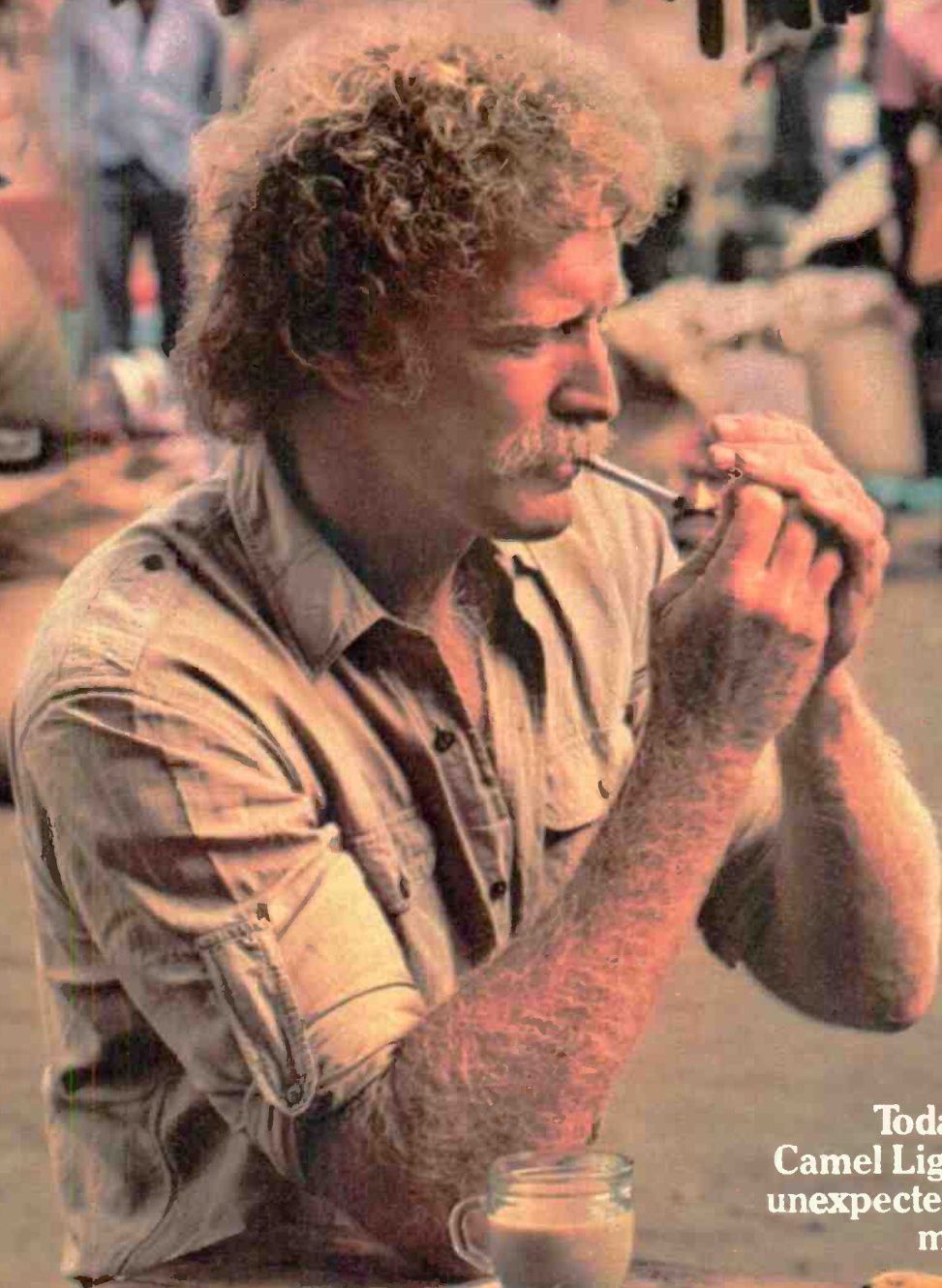
Q I recently ordered a prerecorded VHS Hi-Fi video tape from a company in England. They wrote back to me saying that British VHS is not compatible with VHS in the U.S. I told them to send the tape anyway, thinking that they were confused about something. The tape arrived, and they were right; the picture is blurred and out of sync, and the sound is barely audible. Why aren't VHS and Beta Hi-Fi tapes compatible all over the world?

KENNETH JACKSON
Los Angeles, CA

A Simply because the television signals that VHS and Beta machines are designed to record and play back are not compatible all over the world. In the U.S. we use the NTSC system; in England the PAL system is the TV broadcast standard. And there are other systems in use elsewhere in the world. Before a U.S. TV network can show British video tapes, the signals on them have to undergo a complex electronic conversion process. In short, there is no worldwide compatibility either in TV signals or in the equipment designed to display, record, or play them back. The Beta and VHS Hi-Fi audio signals are recorded as part of the video signal and are therefore also not compatible. There are some VCR's that are capable of playing back both NTSC and PAL tapes, but they have to be fed into separate NTSC and PAL television sets or into one of the relatively rare dual-standard video monitors.

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by Julian Hirsch



How We Test Amplifiers

WHenever it is possible, our amplifier tests conform to the EIA test standard RS-490, which has been almost universally adopted in this country and is widely used by Japanese and European manufacturers. The standard defines test conditions for virtually every measurement one might wish to make on an amplifier, although not all the tests are designated as mandatory for rating a unit. We make all of the tests mentioned below, but we don't publish all of the results, not only because we don't have room for them but because they're not all significant.

Slightly different test conditions apply to power amplifiers and preamplifiers, but both sets of conditions include standard gain settings for the various inputs and standard load impedances across which the output is measured. For example, the gain is set so that a 1,000-Hz, 0.5-volt signal at any high-level input (or 5 millivolts at a moving-magnet phono input) will produce an output of 0.5 volt from a preamplifier or 1 watt into a stand-

ard load from an integrated amplifier. Making the setting is usually a simple matter of turning a volume-control knob. The standard load for a power amplifier or integrated amplifier is the value determined by the manufacturer in the specifications (normally 8 ohms), while a preamplifier or another device having a line-level output is terminated in a 10,000-ohm resistance in parallel with a 1,000-picofarad capacitance. All tests are made on one channel, normally the left, but with both channels being driven by the same test signal. If a measurement looks questionable, we check it on the other channel too.

Frequency response is measured by driving the amplifier with a constant-amplitude sine wave whose frequency is swept automatically through the 20- to 20,000-Hz audio range. We plot the amplifier's output voltage automatically, using the modular UREI 2000 series of instruments, which can produce a printed response plot in only 15 seconds. The initial response measurement is made with all tone controls and filters bypassed or set for an indicated "flat" response, then repeated on the same chart with the controls set at maximum, minimum, and halfway between these limits. The family of curves thus produced shows us the manner in which the tone controls function (whether they shift the turnover frequency or the slope of the boost or cut characteristic, for example) as well as their maximum boost/cut range. We also determine the cutoff frequency of any high or low filter, defined as the point where the response has been reduced by 3 dB,

and the slope of the response beyond the cutoff point.

The loudness-compensation characteristics, if such a control is present, are measured by first plotting the amplifier's frequency response at a maximum volume setting. Then, with the loudness switch turned on, the 1,000-Hz gain is reduced in 10-dB steps and the response is plotted at each interval from 0 to -50 dB.

The accuracy of the *RIAA phono equalization* is measured by passing a 20- to 20,000-Hz sweep through an inverse RIAA pre-equalizer. The pre-equalizer's output simulates the signal from a magnetic phono cartridge and is fed to the amplifier's phono input. In this test, an ideal RIAA-equalized preamplifier should deliver a flat frequency response (as measured at the tape outputs, usually). The *phono-input impedance* is measured by injecting a 1,000-Hz signal with an adjustable resistance in series with the signal source. The resistance is increased until the output from the amplifier drops to half its original amplitude. (In this and other tests we monitor the output level with a spectrum analyzer so that we can see, and exclude, the effects of hum and noise.) At this point, the series resistance is equal to the input impedance of the phono preamplifier.

The same measurement process is repeated at higher audio frequencies up to 20,000 Hz, and the resulting data are analyzed to calculate the shunt *capacitance* of the phono input. (The shunt capacitance causes the impedance to fall at higher frequencies at a calculable rate. Knowing the rate of fall and the input resistance, one can calculate the input capacitance.) The calculated capacitance, of course, includes the capacitance of the connecting cable to the phono input, but this value is known and is subtracted to give the final value. If the impedance variation does not correspond to that of a single resistance and capacitance in parallel, the impedance is simply given as the 1,000-Hz value, with no capacitance specification. The moving-coil (MC) phono-input impedance is measured similarly, except that in this case the capacitance is not significant and a single 1,000-Hz measurement always suffices.

Tested This Month

NEC A-10 MkII
 Integrated Amplifier
 Apt P2 Preamplifier
 Hafler DH-120
 Power Amplifier
 Technics SL-P3
 CD Player
 Sony STR-AV760
 Receiver



FUJITSU TEN
Car Audio

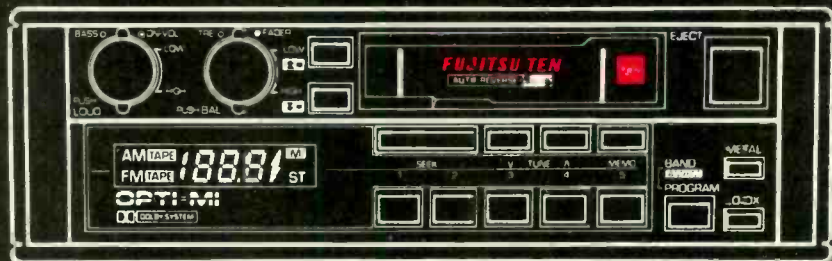
*For those with a
passion for perfection!*

Before measuring *distortion* or *power output*, we operate the amplifier for one hour at one-third rated power into an 8-ohm load at 1,000 Hz. This "preconditioning," which is required by the Federal Trade Commission in arriving at an advertised power rating for an amplifier, usually makes the amplifier very hot, but it should not suffer any permanent damage as a result. However, the maximum available continuous power output (called the "clipping power") is usually lower after preconditioning because of changes in the power-supply voltages or output-transistor operating conditions resulting from the high temperatures.

We measure distortion with a Hewlett-Packard 339A distortion analyzer, which drives the amplifier with an extremely low-distortion sine wave (typically less than 0.001 percent harmonic distortion) and processes the amplifier's output signal by removing its fundamental frequency component and showing the remaining energy, which consists of distortion and noise, as a percentage of the total output. Sometimes it is desirable to measure only the distortion harmonics, excluding noise from the reading. For this we use a Hewlett-Packard 3580A spectrum analyzer that is by itself capable of measuring individual spectral components down to 0.002 percent—and, in conjunction with the H-P 339A, down to 0.0002 percent.

We make two series of distortion measurements. In one series we drive both channels of the amplifier at 1,000 Hz and measure the distortion in the left-channel output at power outputs from under 1 watt up to the clipping-power output with loads of 4 and 8 ohms. We also make this measurement with 2-ohm loads, but it is sometimes modified (such as by driving only one channel) when an amplifier is not capable of driving 2 ohms at a high power level without blowing fuses, tripping a protective relay, or overheating. In the second series we measure the distortion into 8 ohms at rated power, half power, and one-tenth power at selected frequencies between 20 and 20,000 Hz.

Other power measurements are of the 1,000-Hz clipping-power level



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(made by observing the output waveform on an oscilloscope to establish the onset of clipping overload) and of the dynamic power (the clipping level with a 20-millisecond 1,000-Hz tone burst repeated every half-second), both into all three load resistances. These measured powers are used to establish the amplifier's *clipping headroom* and *dynamic headroom* for the output impedances at which a power rating is specified by the manufacturer. A dynamic-headroom rating is the ratio (expressed in decibels) of the measured clipping power with the 20-millisecond tone bursts to the amplifier's rated continuous power at the rated impedance. (Most am-

Even a very small difference in frequency response or level can sometimes enable a critical listener to distinguish between two amplifiers. To me, the one with the flatter response is "better."

plifiers are rated only for 8-ohm operation, but a few carry 4-ohm ratings as well, and in rare instances there is even a 2-ohm rating.)

The *noise level* is measured for a high-level input and for the phono input (including the MC-cartridge mode if that is provided). It is measured with the standardized gain settings and input and output terminations. We measure the output noise voltage with a Sennheiser UPM-550-1 level meter, which is capable of measuring signals of a few microvolts. Noise level is expressed in decibels relative to 1 watt output (2.83 volts across an 8-ohm load) for power and integrated amplifiers and relative to 0.5 volt output for preamplifiers. The result is A-weighted for better correlation with its audible effects.

Sensitivity is also measured for all inputs. This is the 1,000-Hz input level required to produce a reference output (0.5 volt from a preamplifier or 1 watt from a power or integrated amplifier) with all level controls set to maximum. The *phono-preamplifier input-overload*

level is measured by reducing the volume-control setting and increasing the phono-input level until the output waveform clips. This measurement is made at 20, 1,000, and 20,000 Hz, and the readings at the two frequency extremes are corrected for the RIAA equalization to give equivalent 1,000-Hz values.

Additional measurements include *slew factor*, *reactive load factor*, and a stability check with a simulated reactive speaker load. The *slew factor* is measured by driving the amplifier to rated output at 1,000 Hz and increasing the frequency of the input signal while maintaining its level constant. The highest frequency at which the output waveform does not show visible distortion on an oscilloscope, divided by 20,000, is the *slew factor*. It indicates an amplifier's susceptibility to transient-intermodulation distortion and other slew-induced distortion effects, and any result greater than 4 or 5 is satisfactory from that standpoint.

The standard *reactive load* is hooked up to the amplifier's speaker terminals instead of a load resistor in order to simulate the impedance characteristics of a typical loudspeaker near its bass resonance frequency (about 50 Hz). The clipping-power output is then measured at 40 and 63 Hz, and the lower of the two readings (expressed in decibels relative to rated power) is the *reactive-load factor*. This test indicates the ability of the amplifier to supply both voltage and current to a dynamic loudspeaker near its resonant frequency—the higher the number the better.

Finally, our *stability test*—not a part of the standard EIA procedure—replaces the resistive load with a complex load embodying the most "difficult" impedance characteristics of a number of speakers considered to be "hard to drive." A square wave (1,000 or 10,000 Hz) usually shows considerable overshoot and ringing in this test, and the degree of this effect is an indicator of the amplifier's ability to drive such a load. Interpreting this test is a somewhat subjective affair.

None of these measurements tells us anything about how the amplifier "sounds," a characteristic attributed to amplifiers by many people,

though not by me. Obviously, the sound of an amplifier can only be determined by listening to it, using whatever ancillary equipment is deemed suitable. Since no two listening setups (or listeners themselves) can be identical, or even very similar to each other, it is not surprising to find a wide diversity of opinion on this subject. My experience tells me that even the slightest difference in frequency response or level can sometimes enable a critical listener to distinguish between two amplifiers, although such differences hardly justify the claim that one amplifier is "better" than the other. To me, the one with the flatter response is "better," however it sounds, since it is closer to the ideal of neutrality with respect to the source material.

Though not called for by the EIA standard, as part of our evaluation we also connect an amplifier being tested into our regular lab listening system and put it through a period of normal (and sometimes abnormal) use. In doing so we are looking for such things as electrical noise, whether continuous (hum, buzz, hiss) or transient (clicks or pops when the controls are operated), mechanical noise from buzzing transformer laminations or fans in the larger power amplifiers, unclearly or ambiguously marked controls, and any of a number of possible problems that could plague a typical user in the installation or operation of the product. Special features such as ambience synthesizers, unusual tone controls, filters, or signal processors and the like also come in for their share of attention and sometimes specialized measurements.

Assuming that an amplifier works reasonably well on the test bench, we are interested not so much in nit-picking criticism of its supposed sound, which would not apply to any other user's situation and subjective judgment anyway, as in its suitability for the market at which it is aimed. If you want to know what an amplifier sounds like, you'll have to listen to it for yourself. If you want to learn what it actually *does*, independent of the sometimes confusing descriptions in a manufacturer's brochure or advertisement, you will get this information in our test reports. □



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NEC A-10 MKII INTEGRATED AMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories



PHOTOS BY RED AXON

FEATURES

- Heavy, non-resonant construction
- Dual power supplies for improved dynamic regulation
- Power-amplifier section is direct-coupled throughout
- Preamplifier and power amplifier can be separated electronically
- Front-panel controls select phono (MM or MC), tuner, aux 1, aux 2, or CD inputs
- Tape-recording controls allow dubbing between two decks in either direction
- Speaker selector controls two pairs of speaker outputs
- Headphone jack
- Separate power-amplifier level controls for each channel
- Main volume control in preamplifier section
- Gold-plated phono-input jacks
- Three a.c. outlets, one switched

THE NEC A-10 MkII integrated amplifier is unlike any other we have seen. Its special nature extends beyond mere circuit topology and is apparent just from looking at the front panel—or trying to lift the unit. The A-10 MkII is relatively large, measuring 17 x 17 x 6 inches, and heavy (53 pounds), but it has a rather modest power rating of 60 watts per channel into 8 ohms, or 120 watts into 4 ohms, with no more than 0.004 percent total harmonic distortion.

The A-10 MkII can be thought of as two distinct components that are mounted on one chassis, a preamplifier and a power amplifier. They can be electronically separated by a front-panel switch and operated independently. In addition to the primary volume control connected to the preamplifier section, the gains of the two power-amplifier channels are independently adjustable by separate knobs, which eliminates the need for a balance control. The thinking behind this arrangement can be gleaned from the front-panel

marking of the switch connecting the two amplifier sections: SEPARATE (CD). When the A-10 MkII is operated in the separated mode, the power-amp section is direct-coupled from its input back out to the speakers. If a digital Compact Disc player were connected to the amplifier in this mode, there would be a minimum of extraneous circuitry between the player's output and the speakers. In the separated mode the power amp's level knobs serve as both volume and balance controls.

The NEC A-10 MkII has no high or low filters, tone controls, loudness compensation, or other signal-processing functions, though it does have the basic amenities of an integrated amplifier: a phono input switchable to accommodate either a moving-coil or a moving-magnet cartridge, two auxiliary inputs, connections for two tape decks, and a separate CD input. The true novelty of the A-10 MkII actually lies in its unique power supply and "vibration-free" design.

A conventional amplifier's power supply uses large filter capacitors for temporary storage of the energy to be released into the loudspeakers. These capacitors are recharged 120 times per second from a rectifier circuit attached to the power transformer. Sometimes such a power supply suffers a momentary reduction of output voltage because a high-level signal transient calls for current at a greater rate than can be supplied by the capacitors and the power transformer. In extreme cases, this voltage reduction could limit the amplifier's maximum undistorted power output or contribute hum and noise to the signal.

NEC's solution to this power-supply problem (other manufacturers use other approaches) is to build in a second power-supply section, called Reserve II, that operates 90 degrees out of phase with the main supply, enabling each supply to compensate for temporary voltage reductions in the other. The A-10 MkII's two power supplies, with their massive transformers and filter capacitors, are responsible for much of the amplifier's bulk and weight.

NEC also believes that minor vibrations of the metal chassis of an amplifier, and of the parts and wir-

ing within it, can degrade its sound quality. Thus, acoustic excitation from the speaker's output could be responsible for less than ideal amplifier performance (an effect similar to acoustic feedback in analog turntables). Therefore, the A-10 MkII was designed to be vibration free. It is built on a heavy iron chassis that is rigidly cross-braced, and its internal structures such as heat sinks are mounted in a way said to reduce any tendency to vibrate. The amplifier is supported on large, high-density feet, its control knobs are massive, and the phono-preamp section is located in a separate, rugged, sealed enclosure that is also mounted so as to reduce resonance effects.

The NEC designers even went so far as to measure the physical resonance modes of all the amplifier's major parts and then to locate them in the chassis so that their vibrations tend to cancel each other out. The top cover, besides having a screw fastener at its center as well as

The NEC A-10 MkII's moving-coil phono-input noise reading, one of the lowest we have seen, was especially impressive in view of the very high gain.

at the corners, is mounted on rubber damping discs to reduce its tendency to vibrate. As NEC so aptly puts it, the A-10 MkII "sits like a rock, practically immune to vibration." Price: \$599. NEC Home Electronics, Dept. SR, 1401 W. Estes Ave., Elk Grove Village, IL 60007.

Lab Tests

True to NEC's claims for the high current-output capability of the A-10 MkII, the amplifier delivered considerable power into 4- and 2-ohm loads. We were unable to make a full 2-ohm dynamic-power test since what was apparently a slight d.c. imbalance on our tone-burst waveform triggered the amplifier's protection circuit when the output reached 100 watts.

The total harmonic distortion

HIRSCH-HOUCK LAB MEASUREMENTS

1,000-Hz output power at clipping: 93.8 watts into 8 ohms, 14.5 watts into 4 ohms, 200 watts into 2 ohms
Clipping headroom (relative to rated output): 1.94 dB (8 ohms), 0.82 dB (4 ohms)
Dynamic power output: 90 watts into 8 ohms, 180 watts into 4 ohms, 100 watts into 2 ohms (see text)
Dynamic headroom: 1.77 dB (8 ohms), 1.77 dB (4 ohms)
Frequency response: +0, -0.25 dB from 20 to 20,000 Hz
Maximum distortion from 20 to 20,000 Hz, 60 watts output: 0.0037% (into 8 ohms)

Sensitivity (1-watt output): aux, 19.5 mV; phono (MM), 0.29 mV; phono (MC), 0.032 mV

Output noise referred to 1-watt output (A-weighted): aux, -87.7 dB; phono (MM), -83.5 dB; phono (MC), -77 dB

Phono (MM) input overload level: 136 to 170 mV depending on frequency

Phono (MM) input impedance: 47,000 ohms in parallel with 120 pf capacitance

Slew factor: greater than 25

RIAA equalization accuracy: +0, -1 dB from 20 to 20,000 Hz (unaffected by cartridge inductance)

(THD) was well within the 0.004 percent rating at most power outputs and frequencies, even in a measurement of THD + noise that included the amplifier's very low noise levels in the reading. When we measured just the distortion components, the THD was typically only 0.002 to 0.004 percent over the full power and frequency range of the amplifier. The A-10 MkII was stable with the IHF reactive simulated speaker load, though the ringing on the 1,000-Hz square wave used in this test was more prominent than we have seen from many other amplifiers.

The generally excellent results of the preamplifier-section measurements are summarized in the accompanying box. Although the amplifier's specs state that its phono section has a fixed infrasonic filter with a -6-dB-per-octave slope and a -3-dB point of 15 Hz, we found no telltale evidence of such a filter at the 20-Hz measurement limit of our equipment. In fact, the flatness of the phono response right down to 20 Hz was exemplary.

Comments

We doubt that the power-supply limitations of good conventional amplifiers have the undesirable sonic effects sometimes attributed to them, and therefore we doubt that the massive construction and reserve power supply NEC has used in the A-10 MkII have much to do with its excellent performance. Certainly a heftier power supply can't hurt—unless you drop the amplifier! "Vibration-free" design is another matter. We know of no evidence whatever that internal vibration can be of sufficient magnitude

to degrade a solid-state amplifier's sound quality. (Tube equipment *can* have problems associated with vibration-induced "microphonics.") To us, the idea is so far-fetched as to verge on the mystical. But, again, rugged construction won't degrade sound quality either.

It was rather surprising to find that the A-10 MkII's speaker-output terminals are not physically compatible with heavy-duty or exotic speaker cables or connectors. However, they will accept the stripped ends of 14-gauge wires, which are certainly heavy enough for any normal installation.

Whatever one's view of NEC's design approach, or the rationale for it, there is no doubt that the NEC A-10 MkII performs far beyond the norm both electronically and mechanically, even for a "purist" audiophile component. It was outstanding in every aspect of its performance. In addition to the very high current output, its low noise levels were quite noteworthy. The moving-coil phono-input noise reading, in particular, was one of the lowest we have seen, which was especially impressive in view of the very high gain of this stage. We found the amplifier's lack of tone controls and similar features a sizable "plus," since these features usually do little or no good in equipment of this caliber and can degrade the final sound.

We cannot complain about any of the measurements we made on this amplifier, which is certainly at least as good in every significant respect as any we know of. As for its sound, that was delightful. How could it have been otherwise?

Circle 140 on reader service card

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APT P2 PREAMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories



THE original Apt-Holman preamplifier was widely acclaimed for the excellence of its phono preamplifier, which Apt's co-founder Tomlinson Holman designed for accurate equalization, freedom from interaction with cartridge inductance, low noise, and wide dynamic range. In addition, the Apt preamplifier was designed throughout to be free of the interface problems common in hi-fi systems. Its tape-recording outputs were buffered so that the input impedance of a tape deck could not affect the signal characteristics, and its 7-volt output capability and low output impedance enabled it to drive any power amplifier.

The Apt-Holman preamplifier, now known as the Model HP, has been joined in the product line of the recently reorganized Apt Corporation by the Model P2 preamplifier. The P2 is very similar to the HP—their electrical performance specifications are identical—but it sells for substantially less. The main differences are in the area of operating flexibility. For example, unlike the HP, the P2 has no built-in tape-dubbing facility since it has connections for only one tape deck.

The P2 has separate MM and MC

input jacks on its rear apron, with a screwdriver-operated rotary switch next to them. The switch selects between the MC and MM inputs and simultaneously selects either high or low gain for the MC input and a range of input-capacitance values for the MM cartridge input. There is a headphone jack on the front panel, along with a MUTE button that silences the main preamp outputs but not the output to the headphones.

In addition to the usual bass, treble, balance, and volume control knobs, the P2 has an IMAGE control that is a unique feature of Apt products. At the detented center setting, this continuously variable control gives normal stereo performance with full separation between channels. Rotating it counterclockwise, toward the L+R marking, progressively blends the channels, with the sound becoming fully monophonic at the counterclockwise limit. Turning the control in the opposite direction (toward L-R) reverses the phase of one channel before the two are blended. The apparent width of the sound stage, and usually its frequency balance as well, is affected by this control. A mono signal, for example, is virtually eliminated in

the full L-R position, and a stereo program is not only widened in image but tends to become "thinner" sounding because the lower frequencies normally common to both channels are canceled out.

The Apt P2 is a compact, functionally designed unit finished in gray with contrasting dark-gray knobs, white lettering, and black pushbuttons. It measures 16 $\frac{7}{8}$ inches wide, 8 $\frac{1}{4}$ inches deep, and 2 $\frac{3}{8}$ inches high, and it weighs approximately 9 pounds. Price: \$417. Apt Corp., Dept. SR, 176 Walker St., Lowell, MA 01854.

Lab Tests

All measurements were made with the preamplifier driving the IHF standard load of 10,000 ohms in parallel with 1,000 picofarads of capacitance. At the maximum gain setting, an input of 63 millivolts (mV) at the aux terminals produced the reference output level of 0.5 volt. The MM phono sensitivity was 1.1 mV, and the MC sensitivity for the high- and low-gain settings was 0.055 and 0.18 mV, respectively. The maximum input signal that could be accommodated without clipping was 9.2 volts for the aux input and 136 to 148 mV, depending on frequency, for the MM phono input.

The 1,000-Hz output waveform from the P2 clipped at 7.7 volts. The distortion was very low at the standard 0.5-volt output: 0.0022 to 0.0029 percent from 20 to 20,000 Hz. At 1,000 Hz the distortion was 0.002 percent or less from 0.5 to 7 volts output. The noise level of the P2 was unusually low at the standard unity-gain setting, -103 dB (A-weighted) for the aux input. Even the worst case, the MC phono input in its high-gain mode, produced an impressively low -79-dB noise reading. The frequency response was flat through the audio range except for a rise of about 1 dB in the 20- to 60-Hz range, and it was down 1 dB at 15 Hz and 90 kHz. The P2 has a non-defeatable steep-slope infrasonic filter; its -3-dB point is at 13 Hz, and the attenuation is -20 dB at 6.5 Hz. At the high-frequency end, the -3-dB point was 160 kHz.

The RIAA phono equalization of the P2 was ruler-flat except for that

slight low-frequency emphasis, which probably originated in the infrasonic-filter circuit. The phono preamp was absolutely unaffected by the inductance of typical MM cartridges at the phono inputs. The MM phono-input impedance was 47,000 ohms at 1,000 Hz; it could not be modeled as a simple parallel resistor-capacitor combination. The P2's tone controls are designed to have their major effect at the frequency extremes. Therefore, it was no surprise to find that the maximum settings of the bass control boosted or cut the response by about 15 dB at 20 Hz but only 2 dB at 300 Hz, while the treble control's range was ± 10 dB at 20,000 Hz but only ± 2 dB at 3,000 Hz.

Comments

We used the Apt P2 preamplifier with a good power amplifier in a regular music system and with several signal sources including MM and MC cartridges and a CD player. The P2 performed in an ideal manner, with an electrical and acoustical silence and smoothness that complemented the silky, positive feel of its controls. Although we rarely use tone controls, there were times when the P2's controls were helpful, and they are unlikely to produce a seriously unbalanced sound even at extreme settings, mainly because they don't touch the midrange.

We were especially impressed by the low noise of this preamplifier whatever the input. The ultimate noise level of a system including it is likely to be determined by the user's success in fully eliminating ground loops and inductive hum pickup, for the P2's own noise level is at least as low as that of any digital program source as well as the quietest analog records. We were not able, in the limited time available, to "de-hum" the rest of our system down to the level of the P2, but at any usable phono gain setting the background noise was totally inaudible when the pickup was lifted from the record.

In short, the Apt P2 is a fine preamplifier. Unless you need extra input/output flexibility, it provides a reasonable alternative to the justly renowned Apt HP—and for a lot less money.

Circle 141 on reader service card

HAFLER DH-120 POWER AMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories



THE newest Hafler power amplifier, the DH-120, although less powerful than its esteemed predecessors, is designed to match their performance qualities and to be especially suited for use in integrated audio/video systems. To the latter purpose, the DH-120 contains an ambience-recovery system that is essentially the old but effective Hafler method of extracting out-of-phase (L-R) ambience information by hooking up extra speakers in a special fashion. According to Hafler, the system can decode the surround-sound effects on many video discs and prerecorded video tapes.

The Hafler ambience-recovery system requires only two additional surround-sound speakers, which are hooked up to the auxiliary speaker terminals provided on the DH-120's rear panel. These terminals can be switched from the ambience-recovery mode to the auxiliary-speaker mode by a rear-panel

switch. In the auxiliary mode, the connected speakers can be used as always-on extension speakers. In this mode the combined parallel impedance of the main and auxiliary speakers should not fall below 4 ohms.

Rated to deliver 62 watts per channel into 8-ohm loads from 20 to 20,000 Hz with no more than 0.009 percent total harmonic distortion, the DH-120 has a rear-panel switch connecting its two channels for bridged (monophonic) operation with more than double the single-channel stereo power rating. The rear panel also has individual level controls for each channel, making the amplifier especially suitable for use in bi-amplified or tri-amplified systems.

The amplifier circuits use complementary symmetrical push-pull circuits throughout, and the Class AB output stages use MOSFET output devices. Except for a d.c.-blocking capacitor at the input, the amplifier

TEST REPORTS

stages are fully direct-coupled. According to Hafler, the DH-120 has a highly linear drive stage that provides a wide open-loop frequency response with less open-loop gain and less negative feedback than conventional designs. These measures are said to prevent the DH-120 from sounding harsh even when driven to its limits.

Speakers are connected through multi-way binding posts on $\frac{3}{4}$ -inch centers. There are eight terminals in all, two pairs for the main speakers and two pairs for the auxiliary/ambience speakers. A 5-ampere speaker fuse is provided for each channel. Like other Hafler products, the DH-120 is finished in gray with white lettering. It measures $15\frac{1}{8} \times 8\frac{1}{4} \times 3\frac{1}{4}$ inches and weighs $16\frac{1}{2}$ pounds. The amplifier is available in kit form as well as assembled. Prices: assembled, \$320; kit, \$260. David Hafler Co., Dept. SR, 5910 Crescent Blvd., Pennsauken, NJ 08109.

Lab Tests

Despite its modest power rating and considerable heat-sink area, the Hafler DH-120 became quite warm during our tests and the preceding one-hour preconditioning period. While it becomes only slightly warm in normal use, we would not recommend obstructing the ventilation holes in the top cover by placing any other component on top.

With both channels driving 8-ohm loads at 1,000 Hz, the outputs clipped at 78 watts per channel, for a clipping headroom of 1 dB. Into 4-ohm loads the output at clipping was 95 watts, and even 2-ohm loads could be driven to 66 watts before the waveform clipped. When driving 2-ohm loads at high power levels, the amplifier became hot enough to trigger its thermal protection system, which shut it down until the circuitry had cooled to safe temperatures. (The red pilot light in the power switch blinks while the protection system is operating, providing reassurance that the amplifier is alive and well albeit temporarily silenced.) In its mono (bridged) mode, the DH-120 delivered 200 watts into 8 ohms at the clipping point. Short-term output measurements with 20-millisecond tone bursts at 1,000 Hz, repeated



The Hafler DH-120 has extra binding-post terminals to drive ambience speakers.

twice per second, produced a maximum output of 110 watts per channel into 8 ohms (for a dynamic headroom of 2.5 dB), 140 watts into 4 ohms, and 81 watts into 2 ohms.

At the rated output of 62 watts per channel into 8 ohms, the distortion of the DH-120 was a nearly constant 0.005 to 0.007 percent from 20 Hz to beyond 10,000 Hz, and it was just over 0.01 percent at 20,000 Hz. At half power and one-tenth rated power, the distortion was also nearly constant with frequency, typically between 0.002 and 0.004 percent below 10,000 Hz and about 0.01 percent at 20,000 Hz. At 1,000 Hz the 4-ohm distortion was only slightly greater than the 8-ohm readings, and, in fact, the distortion with any of the load impedances we used was well under 0.01 percent up to the clipping-power output at that impedance. Needless to say, all these distortions were inaudible.

With the level controls set to maximum, an input of 145 millivolts drove the amplifier to a reference output of 1 watt into 8 ohms. Setting the controls to give a 1-watt output from a 0.5-volt input (the EIA standard test gain) resulted in an A-weighted noise output of 40 microvolts, which is equivalent to -97 dB referred to 1 watt, or -115 dB below rated output. The latter figure handily surpassed the amplifier's rating of -100 dB relative to 62 watts, which itself represents excellent performance.

The DH-120's frequency response was flat throughout the audio range, dropping to -1 dB at 30,000 Hz and to -3 dB at 55,000 Hz. At our low-frequency measurement limit of 5 Hz, the response had dropped

only 1 dB. The slew factor was 2.5, and the amplifier was stable with reactive simulated speaker loads.

Comments

The unit we tested was factory assembled, and since only a preliminary instruction manual was available, we can only surmise how much would be involved in building one from the kit. Based on experience with earlier Hafler products, we would expect it to be a relatively straightforward process not requiring unusual expertise or test facilities to ensure proper operation of the finished product. And in view of the manner in which the DH-120 withstood the punishment of our test program, it should enjoy a long and trouble-free life in ordinary home music system service.

As our tests confirm, the Hafler DH-120 is a fitting companion for its more powerful brethren. We found its "sound" every bit as good as our measurements suggested—in other words, it had no special sound quality but was sonically neutral. It should have been possible (we think) to drive the amp to clipping in our music system, but even with every level control set to its maximum, we heard none of the obvious harshness usually associated with clipping. Either Hafler's claim that the amplifier's circuit design causes relatively "painless" clipping is valid, or the amp's power reserves are sufficient to cope with such extreme operating conditions (most likely both explanations are true). One thing is certain: the DH-120 can play the *loudest* of any "60-watt" amplifier we have heard!

Circle 142 on reader service card



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CIRCLE NO. 48 ON READER SERVICE CARD

TECHNICS SL-P3 COMPACT DISC PLAYER

*Julian Hirsch,
Hirsch-Houck Laboratories*

ONLY a couple of years after the introduction of the Compact Disc system to the audio world, a third generation of CD players is appearing on the market. Technics's third-generation line, headed by the SL-P3, includes three new models. They are similar in size and appearance, differing mostly in specific operating features and refinements. Common to all three models are newly developed high-speed sixteen-bit digital-to-analog converters and a proprietary error-correction system that is said to make playback relatively insensitive to certain forms of disc damage or defects.

The SL-P3 has the other features normally found in top-of-the-line CD players (track and index cueing, direct entry of track numbers, programmed playback of up to fifteen selections, etc.) as well as several that are not common at all. Apparently as aids to dubbing and other applications where disc cueing is important, the SL-P3 has AUTO PAUSE and AUTO CUE functions, which are switched in with a front-panel slider control. In the AUTO PAUSE mode, the player automatically goes into pause at the end of each recorded track and begins the next track only after the play button is pressed. The AUTO CUE function is similar, but instead of pausing at the end of a selection, the laser pick-up first advances to the start of the music in the following selection rather than at the often-quiet beginning of the track, then stops. In use, the difference between the two modes can be negligible or as much as several seconds, depending on the interval between selections.

For still more assistance in locating a particular track, a MUSIC SCAN



FEATURES

- Motor-driven disc drawer
- Analog output filters
- Disc Prism allows viewing a portion of a loaded and spinning disc
- Cueing by track and index number
- Direct numerical keypad selection and cueing of any track or index number up to 99
- Programmed play of up to fifteen tracks in any sequence
- Music Scan plays 10 seconds of each programmed selection, then proceeds to the next one
- Track or index skip in either direction
- Repeat play of entire disc, any track, or user-selected passage
- Search Scan of disc at high speed with audible program
- Auto Pause and Auto Cue modes switch player into pause at the end of a track or the beginning of music in the next track, respectively
- Timer-controllable unattended playback
- Headphone jack with volume slider
- Separate fixed and variable-level outputs
- Wireless remote control handles cueing, track selection, and volume adjustment
- Display window shows elapsed or remaining time, track and index number, programmed tracks, volume setting, status of operating-mode controls, disc pre-emphasis

feature automatically samples all the tracks on a disc (or all those programmed for sequential playback), playing a few seconds of the beginning of each track before advancing to the next. The default sampling time is 10 seconds, but it can be set to any value from 1 to 99 seconds by using the numeric keys on the front panel.

On the rear apron of the SL-P3 are two sets of audio output jacks, marked VARIABLE and NORMAL. The latter carry a fixed-level output; the level at the VARIABLE jacks is smoothly adjustable by pressing the appropriate OUTPUT LEVEL buttons on the front panel or on the supplied remote-control unit. A line of LED's in the display window indicates the relative level that's been

selected for the variable output.

Finally, in what is not unique but certainly a rare touch, the SL-P3 will indicate whether the track being played was recorded using the high-frequency pre-emphasis allowed in the CD system. When the player's de-emphasis circuit automatically switches in, an indicator labeled EMPHA lights up in the display window.

The SL-P3 is available in silver or black finish and measures 17 x 13 1/8 x 3 1/4 inches. It weighs 11 3/4 pounds. Price: \$600. Technics, Dept. SR, One Panasonic Way, Secaucus, NJ 07094.

Lab Tests

Our test results for the SL-P3 are summarized in the measurements box. A few of them stand out as

Winston. America's Best.

Excellence.
The best live up to it.



16 mg. "tar", 1.2 mg. nicotine av. per cigarette by FTC method.

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

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ordia Turbo Coupe and Mirage Turbo Three-door

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HIRSCH-HOUCK LAB MEASUREMENTS

Maximum output level: 1.9 volts
Total harmonic distortion at 1,000 Hz:
 0.001% referred to 0 dB; 0.0025%
 referred to -10 dB
Signal-to-noise ratio: 103.5 dB
 A-weighted; 102 dB unweighted
Channel separation: 102.5 dB at 1,000
 Hz; 105.5 dB at 10,000 Hz
Frequency response: +0.1, -0.25 dB
 from 20 to 20,000 Hz
Cueing time: 4 seconds
Impact resistance: sides, A; top, B
Cueing accuracy: A
Defect tracking (figures are size of largest
 defect successfully tracked): signal-surface
 damage, 900 micrometers; painted dots,
 800 micrometers; simulated fingerprint, pass

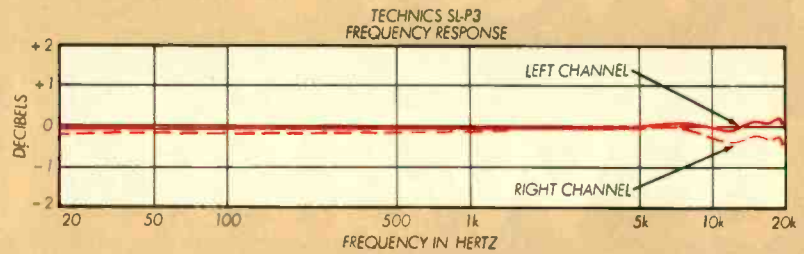
being beyond the already high standards set by other CD players. The frequency response, for one, was flat within 0.1 dB from 20 Hz to about 10,000 Hz. The responses of the two channels diverged slightly at higher frequencies, but even so the response of each channel was flat within ± 0.15 dB from 20 to 20,000 Hz. Stereo separation was also exceptional, especially at 10,000 Hz.

A ringing response to a 1,000-Hz square wave indicated that analog filters are used in the SL-P3. Although only one digital-to-analog converter chip is used, there is apparently an interchannel time-shift correction circuit since the phase shift between channels was only 3.8 degrees at 20,000 Hz. (Players without such circuitry usually have interchannel phase shifts of closer to 90 degrees at 20,000 Hz).

The SL-P3 tracked our Philips standard-defect test disc perfectly at all levels of disc damage, and the cueing transition from one track to another when there was no silent interval separating them was also perfect, with no clipping of the opening of the second track. The cueing time required to reach Track 15 of our Philips test sampler disc from its beginning was only 4 seconds, somewhat faster than most players we have tested. Finally, the SL-P3 had very good immunity to loss of tracking when it was struck on the sides and quite good resistance to impacts on its top cover.

Comments

There are those who have maintained from the beginning that vari-



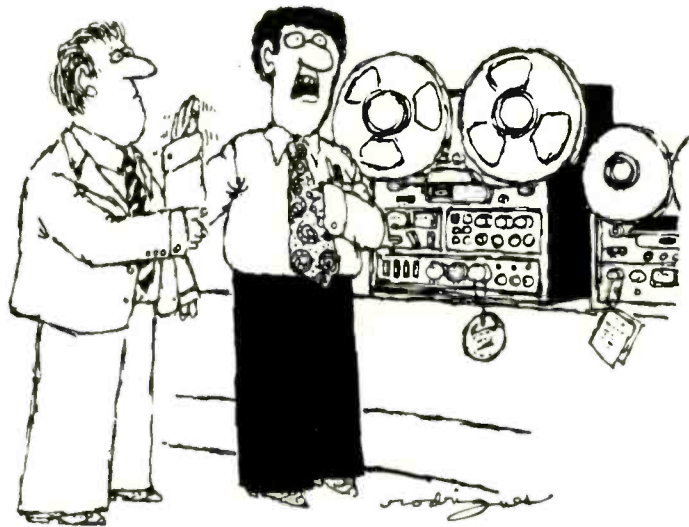
ous CD players have very different sonic properties and, by implication, that those differences are musically significant. I do not belong to that group. Such sonic differences between players as might exist can easily be explained by minor and readily measurable variations in frequency response. Yet it is hard to imagine anything less important in the overall sound of a system than a change in response of a couple of tenths of a decibel at 15 or 20 kHz. Moving your speakers (or your listening position) by a few inches can easily produce far greater effects.

Instead, I have always stressed that the real and significant performance differences among CD players are, first, in their ability to correct for disc flaws and the result-

ing data errors, and, secondarily, in their susceptibility to physical shock and vibration effects. Besides, the overall level of some of the third-generation players is so good that the available "first-generation" test discs can no longer show significant differences in audio performance—assuming they ever could.

The Technics SL-P3's excellent defect tracking and shock resistance, topflight audio performance, wealth of cueing, programming, and remote-control features, and tastefully simple styling place it in the top rank of third-generation CD players. Anyone waiting for CD players to get "better" or less expensive or easier to use need wait no longer.

Circle 143 on reader service card



"... This 751-XT open-reel tape deck features high-torque slotless d.c. reel motors, d.c.-servo capstan motor—please, sir!—permalloy record, sync, and repro heads, logic-operated transport controls, photo-optical—sir, you're going to make me forget!—end-of-tape detector, full frequency response in sync reproduce mode, FET switching in function and output select sections, zero return..."

SONY STR-AV760 RECEIVER

Julian Hirsch, Hirsch-Houck Laboratories



FEATURES

- Digital-synthesis AM/FM stereo receiver
- All-electronic pushbutton tuning, volume, tone, and balance controls
- Memories for ten stations (AM or FM) plus three tone-control settings
- FM station memories incorporate computer-determined i.f. bandwidth and high-frequency stereo blending when required
- Direct Access tuning to any frequency by numerical keypad
- Connections and switching for two audio tape decks and two VCR's, including dubbing functions
- Automatic scan of AM or FM band to locate receivable signals and automatically optimize receiver parameters for each one
- Provision for FM reception from antenna or cable
- Visual display shows received frequency or input selection and all pertinent operating data, including i.f. bandwidth, channel blending, r.f. signal strength, and tone, volume, and balance settings
- Optional wireless remote control of all key receiver functions
- Phono-input gain is switchable for moving-magnet or moving-coil cartridge

IN addition to performing extensive audio functions, the Sony STR-AV760 receiver controls a variety of video sound sources, including TV broadcasts, hi-fi or conventional VCR's, video-disc players, and FM/TV simulcasts received over the air or through a cable system.

Despite a substantial power rating—80 watts per channel into 8-ohm loads from 20 to 20,000 Hz with no more than 0.006 percent THD—and a large number of controls, the STR-AV760 is relatively light and compact. A look inside revealed at least three large-scale integrated circuits, the keys to the receiver's versatility and operational simplicity. The STR-AV760 has no rotary or sliding knobs, but,

unlike some other knobless receivers we have seen, the built-in computers do more than just switch and route signals. The plethora of controls is necessary, among other things, so that the user can override the settings that are normally made automatically by the receiver. A full description of those features and their operation would occupy several pages (as in Sony's comprehensive owner's manual). We can only describe a few of the more unusual ones here.

Perhaps the most unusual feature is the tuner's search function, along with its special display. First the user selects, by pushbutton, either AM or FM and low, medium (MID), or high signal thresholds (which tells the receiver how strong a sta-

tion's broadcast has to be in order to be accepted). Pressing the START SEARCH button then causes the tuner to scan the entire AM or FM band, marking with a short vertical line the position of each received signal on a "slide-rule" frequency scale in the display window. After the scanning, the tuner waits at the lowest acceptable frequency for the user's next command.

The slide-rule scale shows the frequency and relative spacing of each station receivable by the STR-AV760 and provides a graphic display of how crowded a radio band can get. In the New York City area, the tuner found a receivable station at practically every alternate channel (0.4 MHz apart) across the entire FM band—and this was with the high threshold setting!

Pushing the STATION SCAN button causes the tuner to step through all the receivable stations, playing each for a few seconds before proceeding to the next. In each case the display shows the tuned frequency and several other automatically set parameters. These include reception mode (stereo, high-blend, mono) and wide or normal i.f. bandwidth. All these are chosen for optimal reception by a computer analysis of how crowded the radio band is near the received frequency and of how strong the received station and its neighbors are. The information acquired during the scanning process remains in memory until it is superseded by another scan, and during a scan up to ten of the intercepted frequencies can be stored as station presets.

Microprocessors do more than just control the tuner section, however. A computer gets involved with almost every other aspect of this receiver's operation. Computer control, for example, makes possible a muting button that silences the audio instantly but, when pressed again, restores the original volume gradually over a period of several seconds.

The tone controls also have presets, which are controlled by an "Audio Signal Processor" integrated circuit that will memorize up to three settings of the bass and treble controls for instant recall at the touch of the ACOUSTIC button. A separate FLAT button restores uni-



Better Sound Through Research.

What comes out of the Bose® 901® loudspeaker is the direct result of what's behind it.

by Joe Veranth

Vice President of Engineering, Bose Corporation



With over 1,100 models of loudspeakers on the market today, you'd think that there would be considerable variety among them. However, most speakers share two fundamental acoustic traits: they all reproduce music in much the same manner, and they typically sound like speakers, instead of live music.

The primary reason is that speaker designers tend to concentrate on improving one single performance parameter, such as frequency response. However, realism is the result of a number of acoustic parameters interacting with each other. Focusing on only one parameter and expecting accurate sound is like trying to create a lifelike painting by concentrating solely on color. As with visual images, live sound has perspective, clarity, and proportion—and if your speakers can't duplicate them, then your stereo will never sound much like the real thing. *It's that simple.*

THE RESEARCH BEGINS. When Dr. Amar G. Bose from MIT was shopping for

speakers, what he heard didn't sound like the real thing, either. As a musician, he was disappointed. As an engineer, he decided to do something about it. In 1956, he set out to build a better loudspeaker by combining the resources of MIT with a team of acous-

able to reproduce sound with the same directional characteristics. But achieving this necessary directional control with a speaker meant abandoning traditional components such as woofers and tweeters. Even the speaker box shape itself had to go.

The research team built speakers, listened, and rebuilt them. Finally, in 1968, they were ready to introduce a speaker that incorporated all the results of their research.

THE BOSE® 901® LOUDSPEAKER.

This speaker—the Bose 901 Direct/Reflecting® system—became one of the most highly acclaimed and best selling products in audio history. It is a major step toward the ideal loudspeaker, because it sounds less like a loudspeaker and more like music. The Bose 901 speaker accomplishes this

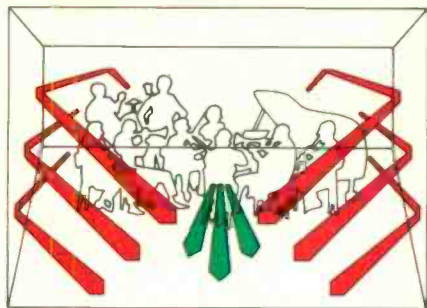


tics experts. They embarked on a program of audio research, and began to learn some interesting facts about sound and sound reproduction.

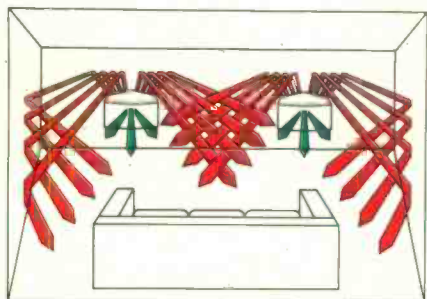
For example, research showed that during a music concert, listeners hear mostly reflected sound, arriving from all around. Therefore, the ideal speaker should be

through several unique innovations.

DIRECT/REFLECTING® The 901 system is designed to reproduce the spatial perspective of a live concert. Only 11 percent of the speaker's total sound is played directly to the listener. The other 89 percent is reflected from the wall behind it, at a precisely determined angle. The Bose 901



Live music.



Bose Direct/Reflecting® reproduction.

loudspeaker produces a realistic stereo image everywhere in the listening room because it correctly reproduces the acoustic cues of a live performance.

FULL-RANGE DESIGN. The individual 901 full-range drivers are the right size to reproduce clear mids and highs. Their multiple use allows the 901 system to generate powerful bass as well. In fact, the nine 4½" drivers combined have a larger cone area than that of the largest woofers found in conventional consumer loudspeakers.

SYNCOM® COMPUTER TESTING. The Bose-developed Syncom® II testing system ensures that every 901 speaker built is virtually the acoustic twin of our laboratory reference system. Each driver's output is measured, allowing all nine of them to be properly matched. In addition, each complete speaker is subjected to rigid quality and performance checks before it leaves Bose.

ACTIVE EQUALIZATION. The active equalizer is an integral part of the Bose 901 speaker. It uses low-distortion electronics to control the system's frequency response, allowing the 901 system to properly reproduce the music spectrum. It also allows the speaker to be adjusted for the listening room itself. The active equalizer can even compensate for the sound quality of different source materials.

AN ENTIRE SYSTEM OF INNOVATIONS. Each 901 system innovation is impressive by itself. However, the real secret of the Bose 901 system's performance is the way that these innovations have been integrated into a complete system. Their combined use makes each innovation exceed its original potential, resulting in a whole that is truly greater than its parts.

This point is easily demonstrated the moment a stereo system with Bose 901



The inside story of the most highly acclaimed speaker.

The Components of the Bose® 901® Series V System

The Active Equalizer (1) uses low-distortion electronics to control the speaker's frequency response, as well as allowing the listener to compensate for room and source variations. The Acoustic Matrix™ enclosure (2) has 14 regions acting as acoustic elements. It isolates the nine full-range drivers and controls air flow, resulting in increased bass output and lower distortion. A specially manufactured helical voice coil forms the heart of the Bose 901 driver (3). This driver, made by Bose from the strongest and lightest materials available, provides the speaker system with wide dynamic range, greater power handling, and higher efficiency.

speakers is turned on.

A PROVEN DESIGN THAT'S CONTINUALLY IMPROVING. The Bose® 901® loudspeaker is currently in its fifth series, with over three hundred improvements. For example, the incorporation of the Acoustic Matrix™ enclosure and the HVC driver (see inset) was a quantum leap in efficiency and power-handling capacity. The technology involved in these two improvements alone required more research and development than most manufacturers have invested in their entire product lines.

But regardless of how many technical improvements are in the Bose 901 system's future, the basic concepts behind the speaker will essentially remain the same—because scientific research and critical acclaim have proven them correct. Dr. Bose, chairman and founder of Bose Corporation, and MIT professor, states it this way: "If the research is right, it provides good results. If the science is correct, you'll get a product which, when you turn it on, is better than the others. If we have done that, people will know it."

THE EXPERTS AGREE.

"... I have never heard a speaker system in my own home which could surpass, or even equal, the Bose 901 for overall "realism" of sound." Julian Hirsch, *Stereo Review* 1968

"... the Bose 901 strikes me as the best-sounding speaker system in its size and price class that I have yet auditioned." Norman Eisenberg, *High Fidelity* 1968

"In terms of musical veracity, the Bose 901 ranks with the finest and is convincing with any type of music." Hans Fantel, *New York Times* 1984

We invite you to audition the Bose 901 Series V Direct/Reflecting® loudspeaker, and judge for yourself. For the name of the nearest authorized Bose dealer and more information on Bose products, please write to Bose Corporation, Department SR, 10 Speen Street, Framingham, MA 01701. ■

Joe Veranth has an M.S. degree in electrical engineering from MIT. He has been with Bose Corporation since 1970.

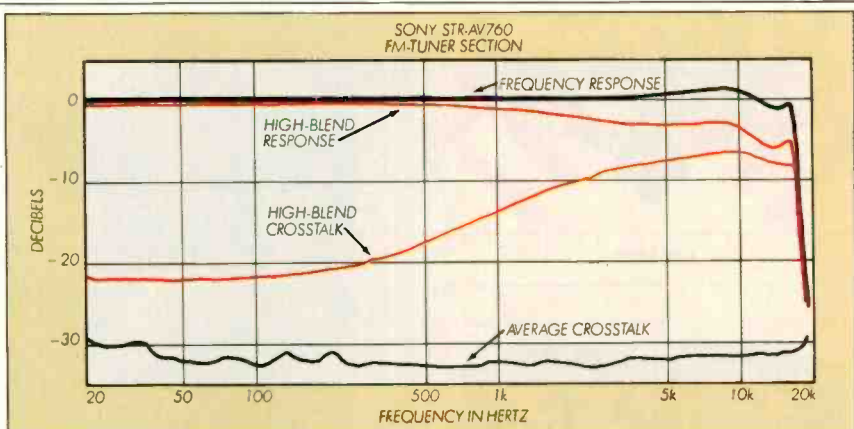
form response. And, finally, a microprocessor is responsible for operating the multifunction display window, which offers one of the most complete yet attractive and easy to use readouts we have seen.

In keeping with its billing as an audio/video control center, the STR-AV760 has a front-panel area labeled EDIT with AUDIO and VIDEO switches that control the signal flow to and from two VCR's, for which the receiver provides both audio and video input and output jacks (phono connectors). The video EDIT function channels the video program from VCR 2 to VCR 1, and with the audio EDIT button it is possible to add sound to a video tape during recording. For instance, the stereo audio channels from an FM/TV simulcast can be recorded on a VCR using these connections.

The rear panel contains twenty-two phono jacks for audio and video connections, push terminals for speaker and AM-antenna connections, and three F-type connectors. The F-connector labeled FM ANT-B is used for hooking up an FM antenna. The main antenna input, FM ANT-A, is designed for CATV (cable) hookup and is provided with an input and an output F connector. The output is connected to a TV set or video tuner, the input jack to the cable service. This arrangement enables the STR-AV760 to tune in the audio portions of cable-fed FM/TV simulcasts. Antenna A or B is selected by a front-panel switch, allowing the use of an FM-only antenna connected to ANT-B if the cable service does not carry the regular FM-band stations.

The STR-AV760 has a MAIN power switch that puts the receiver in standby mode and should be left on at all times if it is used with the optional RM-S760 remote control. The remote unit can turn the SYSTEM power switch on and control preset tuning, input selection, volume, and other functions. It can also control certain compatible Sony turntables, cassette decks, and CD players (there are special connections for these components on the rear panel of the receiver).

The Sony STR-AV760 is finished in black and gray with light-gray and white lettering. It measures 17 x 13 $\frac{3}{8}$ x 4 $\frac{1}{4}$ inches. Weight is 17 $\frac{3}{4}$



HIRSCH-HOUCK LAB MEASUREMENTS

FM Tuner Section

Usable sensitivity (mono): 14.8 dBf (3 μ V)
50-dB quieting sensitivity: normal i.f. bandwidth, 14.7 dBf (3 μ V) in mono, 37 dBf (39 μ V) in stereo; wide i.f. bandwidth, 18.7 dBf (4.7 μ V) in mono, 38 dBf (43.7 μ V) in stereo
Signal-to-noise ratio at 65 dBf: mono, 84.4 dB; stereo, 76 dB (at 8.5 dBf and above, 80.6 dB)
THD + noise at 65 dBf: normal i.f. bandwidth, 0.12% in mono, 0.1% in stereo; wide i.f., 0.033% in mono, 0.094% in stereo
Capture ratio at 65 dBf: normal i.f. bandwidth, 1.4 dB; wide i.f., 0.7 dB
AM rejection at 65 dBf: normal i.f. bandwidth, 70 dB; wide i.f., 76 dB
Image rejection: 70 dB
Alternate-channel selectivity: normal i.f. bandwidth, 78 dB; wide i.f., 32 dB
Adjacent-channel selectivity: normal i.f. bandwidth, 3.5 dB; wide i.f., 2.5 dB
Stereo threshold: 24 dBf (8.7 μ V)
19-kHz leakage: -72 dB
Hum: -78 dB
Stereo channel separation: 100 Hz, 35 dB (normal i.f.) and 45 dB (wide i.f.); 1,000 Hz, 34 dB (normal) and 50 dB (wide); 10,000 Hz, 33 dB (normal) and 43 dB (wide)
High-blend channel separation: see graph
AM frequency response: (-6-dB points): 30

to 2,500 Hz

FM frequency response: see graph

Audio Amplifier

1,000-Hz output power at clipping: 102 watts into 8 ohms, 132 watts into 4 ohms (speaker-impedance switch set to 8-16 ohms); 102 watts into 4 ohms, 112 watts into 2 ohms (speaker-impedance switch set to 4-6 ohms)
Clipping headroom (relative to rated output): 1.05 dB (8 ohms)
Dynamic power output: 148 watts into 8 ohms, 217 watts into 4 ohms, 156 watts into 2 ohms
Dynamic headroom: 2.67 dB (8 ohms)
Harmonic distortion (1,000 Hz, 8 ohms): 1 watt, 0.0028%; 80 watts, 0.0125%
Slew factor: 5.5
Sensitivity (for a 1-watt output): phono (MM), 0.2 mV; phono (MC), 0.022 mV; CD/aux, 14 mV
Phono (MM) input overload: 150 to 160 mV
A-weighted noise (referred to a 1-watt output): phono (MM), -80 dB; phono (MC), -70 dB; CD/aux, -81 dB
Phono input impedance: 47,000 ohms and 150 picofarads (MM); 400 ohms (MC)
RIAA phono equalization error: \pm 0.5 dB from 20 to 20,000 Hz
Tone-control range: 100 Hz, \pm 9.5 dB; 10,000 Hz, \pm 9.5 dB

pounds. Price: \$500; optional RM-S760 remote control, \$40. Sony Corporation of America, Dept. SR, Sony Drive, Park Ridge, NJ 07656.

Lab Tests

Although the Sony STR-AV760 is rated primarily for driving 8-ohm loads, a speaker-impedance switch on its rear panel has settings for loads of 4 to 6 ohms and of 8 to 16 ohms. When two pairs of speakers are driven, they are connected in series to prevent the load impedance from becoming too low. For the most part, our test results are based on the normal 8- to 16-ohm operating mode, although we made

some tests with the other switch setting to determine its effect (see box for results). The speaker-impedance switch apparently changes only the supply voltage to the output transistors, to prevent excessive heat dissipation when driving low-impedance loads, and it had a negligible effect on the amplifier's distortion or overall operation.

Amplifier distortion was well under 0.01 percent at most frequencies and power outputs up to the clipping point. Distortion reached 0.03 to 0.05 percent at the frequency extremes and the rated power output. The amplifier section could not quite deliver its rated continuous output at 20 Hz, although it far

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

exceeded it elsewhere. This occurred at the conclusion of our test sequence, when the amplifier was extremely hot, apparently reducing its power-supply output somewhat. When we tried this measurement again with a cooler amplifier, the full 102-watt clipping output was available at 20 Hz.

Although the two tone controls worked well, at their extreme settings they had an appreciable effect on the midrange level. In all other respects, the audio section of the receiver performed very well. Each push of the volume control produced only a small change (1 dB) even at the low end of the scale, unlike similar controls we have seen whose increments of change at low levels are too large.

The FM tuner section had good though not exceptional sensitivity, with low distortion. The tuner noise level was very low at the usual test-signal level of 65 dBf (1,000 μ V). The stereo noise was even lower at higher signal levels, reaching -80.6 dB at 85 dBf (10,000 μ V).

As usual, the selectivity was a function of the i.f. bandwidth. The adjacent-channel selectivity was affected little by changes in the bandwidth, however, and with either the wide or normal setting it was not sufficient for separation of adjacent-channel signals. Capture ratio, good even at the normal bandwidth, was outstanding with the wide-i.f. setting, which also improved the very good AM rejection substantially.

The signal-threshold levels for the SEARCH mode were exactly as specified, respectively 30, 40, and 50 dBf for the low, medium, and high settings. The calibrations of the numerical FM signal-level indicator were rough approximations of the actual input levels over part of its range (10 to 40 dBf), but it read 0 for all input levels under 9 dBf and reached its maximum reading of 68 to 69 dB at an antenna input of about 75 dBf. Obviously, these readings should be used, like those of an analog signal-strength meter, only to show *relative* changes of signal level as an antenna is rotated.

Comments

The measurements do not begin to tell the whole story of the Sony STR-AV760 receiver. True, the fig-

ures are generally good, and in a few cases exceptional, but someone choosing a product just on the basis of bench-test performance, or even the manufacturer's specifications (generally the *worst* way to make such a selection), might not be too impressed by this receiver.

We reacted more strongly to the unit's unique and fascinating special properties and features. It is just different enough from run-of-the-mill receivers to require some study and practice to make effective use of its unusual capabilities. But, having satisfied that requirement, I can recall testing only one other receiver (the totally computerized Swedish Audio-Pro of several years ago) that was as enjoyable to use.

For FM reception, the STR-AV760 is just about as automated as can be in assessing signal conditions and deciding how to deal with them, yet all the affected parameters are still under the control of any user who considers his judgment better than that of Sony's microprocessors. I must say, however, that I never encountered a situation where overriding the receiver's computer improved the reception in any detectable way.

For example, if the tuner's scan finds several stations spaced at least 800 kHz apart, it will assign the wide-i.f. mode to them for best reception. If another part of the band is more crowded, with some signals much stronger than others, the STR-AV760 may assign wide i.f.-band settings to the stronger

ones but normal bandwidths to the weaker ones. And any time a station is tuned in, whether by SCAN SEARCH or from memory, the appropriate bandwidth is set automatically. Similarly, a stereo signal with appreciable noise or multipath distortion will cause the tuner to go into its high-blend mode.

Because the station memories also hold the band information (AM or FM), it is not necessary to select the appropriate band before selecting a preset station. The only sacrifice required for this very convenient feature is that each button has to be assigned to one station only (unlike those tuners and receivers in which each memory button can be assigned to both an AM and an FM station, and sometimes to more than one FM station). If you can be happy with ten presets, Sony's system is hard to beat for sheer convenience. And if not, you still have the option of Direct Access tuning, in which you can call up any frequency on either band in a few seconds by entering its frequency on the keypad!

To sum up, the Sony STR-AV760 is a very good receiver in all the ways that matter: performance, usability, sound, appearance, versatility, and convenience. Obviously, it is priced very reasonably for what it does. And last, but by no means least, it is the most satisfyingly bug-free and fun-to-use receiver we have seen in many a year. Do we like it? You bet we do!

Circle 144 on reader service card



"I wish to drive my wife berserk. Do you have a 1-minute endless-loop blank cassette on which I can record the ending of Tchaikovsky's 1812 Overture?"

"For me, learning about electronics is the first step to where I want to go in life."

SP4 Rich Parsons, HAWK Missiles

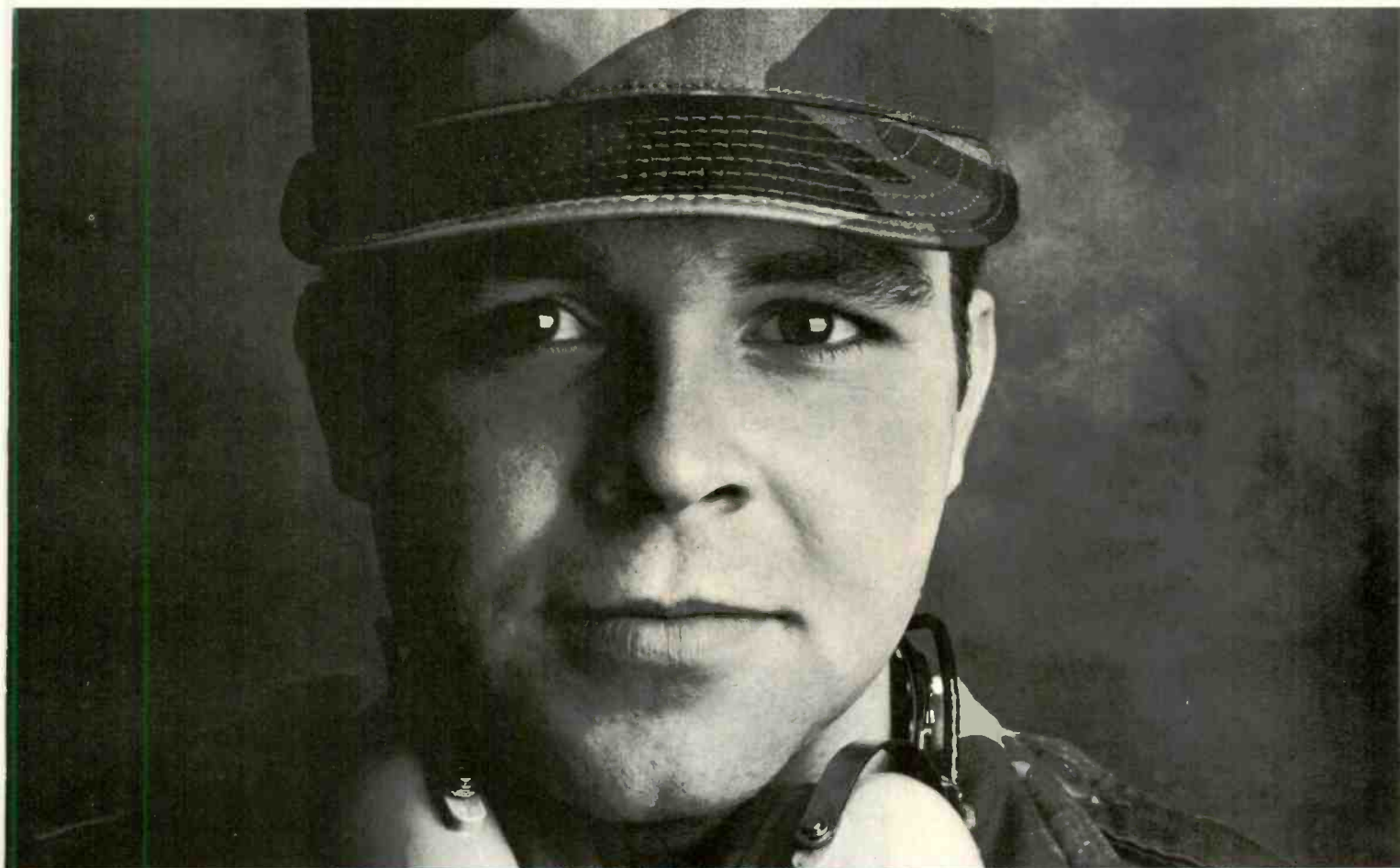
"When I was a little kid, I dreamed about being an astronaut. Or working with space-age technology. Now the Army's preparing me for a future, in high technology. All I have to do is go for it.

"I work on the HAWK high-power radar. Talk about complicated. It's like a puzzle made of circuit boards. It takes a really experienced technician to figure it out, fit the puzzle together and make it work. Since I'm the supervisor, I need to know it. Inside and out.

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AMPLI

by E. Brad Meyer

UNDER ideal circumstances, the first thing you would do when shopping for an integrated amplifier, or for a separate preamp and power amp, is to make a list of all the equipment you either have or plan to buy and of the uses you will make of it. If you knew the exact configuration of the system and precisely how you would expand it in the future, you could narrow your choices to those few units that fit your profile.

Life, however, is not like that. Very few of us know exactly what we want right now, much less six months down the road. Fortunately, hi-fi is a relatively mature industry with a wide selection of products that cover most possible uses quite well. A description of available features should therefore help you decide what's important for you.

First, though, a note on terminology. We'll be using the word "amplifier" to refer either to an integrated amp or to the combination of a preamp and power amp. Until recently we would have had to discuss the two configurations separately for most categories, and it is true that separates still provide the ultimate in performance and features. But some of the latest integrated amplifiers sport controls and functions formerly available on only the most versatile preamplifiers, leaving you free to choose between these two basic system configurations on the basis of other criteria—

things like sound, looks, ergonomics, output power, and price.

As hi-fi equipment has developed over the years there has emerged a fairly consistent group of features that are necessary for a really flexible system: both moving-magnet and moving-coil phono inputs, switchable loading for moving-magnet cartridges, at least two and perhaps three regular high-level inputs, two tape-monitor loops with dubbing connections, a separate source-selector switch for the recording outputs, defeatable tone controls whose action is concentrated at the frequency extremes, switchable audio bandpass filtering with 18-dB-per-octave slopes, scratch and rumble filters, full mode selection, a head-phone output, a muting switch, and an additional external-processor loop.

Low-Level Inputs

Whatever the proponents of the Compact Disc may say, the day of the phonograph record is far from over, so one of the most important parts of an amplifier is the *phono preamp*—a high-gain circuit that takes the very weak output from the cartridge, amounting at most to a few millivolts, or thousandths of a volt, and amplifies it to *line level*, or about 0.1 to 0.5 volt. The phono preamp also compensates for the standardized bass cut and treble boost added during the record-mastering process by applying a complementary frequency-response curve known as *RIAA de-emphasis*.

There are two basic types of cartridges, one of which



F I E R S

An analysis of features that give flexibility to integrated amplifiers and to power amplifier and preamplifier combinations

puts out so much less voltage than the other that it requires a different kind of phono preamp. Almost every amplifier has a phono circuit that can handle a *moving-magnet* (MM) cartridge (similar to moving-iron, moving-flux, etc.), whose maximum output is from 1 to 5 millivolts. The other type, the *moving-coil* (MC) cartridge, may put out between 20 and 200 microvolts, or millionths of a volt. Such a cartridge requires either an external step-up device (a transformer or a high-gain pre-preamplifier) or a special high-gain circuit built into the amplifier itself.

Systems in the low to medium price range almost always come with high-output cartridges, but if an amplifier has a label—either on the program-selector switch or on a separate phono-input switch near it—that includes the letters MC, you'll have the option of trading up later to a moving-coil cartridge without buying extra hardware.

Some high-level (non-MC) cartridges can be audibly affected by the input resistance and capacitance of the phono preamplifier and by the capacitance of the tone arm and its connecting cables. A well-designed amplifier will accordingly have switches with which you can tune the preamp for a given cartridge/tone-arm combination. These switches may be in an inconspicuous position on the front panel or, since they generally have to be set only once for a given system, on the back near the input jacks.

Once in a while you may find a preamp with an input labeled MIC, for microphone. A microphone input is the same as for a high-output cartridge except that it has flat frequency response instead of the RIAA playback compensation.

High-Level Inputs

A *high-level input* accepts a line-level signal from a tuner, CD player, or tape recorder and routes it through the amplifier's volume and tone controls and mode-switching circuits. Since we're not discussing receivers here, one of these stereo inputs will be needed for your separate FM tuner, and it should be so marked.

A CD player requires its own high-level input. Extra high-level inputs used to be labeled AUX (for auxiliary), but now they increasingly bear the designation CD. The two are almost, but not quite, identical; while a typical tuner or tape recorder puts out no more than 0.5 volt, a CD player will put out a maximum of 2 volts on musical peaks. Most high-level inputs will accept such a signal without distortion, but a few may not.

Each piece of video equipment that you connect to your stereo system will also require a high-level audio input. For a TV set, a video tuner, or a video-disc player, an input is all that is needed. A VCR, with its

PHOTOS BY JEFF GLANCZ



record and play functions, requires both an input and an output in the form of a *tape-monitor loop*.

Tape-Monitor Loops

Virtually every amplifier has at least one *tape-monitor loop*, a pair of stereo inputs and outputs with associated switching that allow you to record whatever sound source you have chosen with the selector and listen either to the original source or to the output of the tape deck. If you have two audio tape decks, or an additional video recorder, you will need two *tape-monitor loops*. A separate COPY switch, usually with positions labeled 1→2 and 2→1 to show the direction the signal is flowing, enables you to copy from either recorder to the other while listening to a third source.

Some amplifiers also have a separate selector switch, typically marked RECORD-OUT, for the tape outputs. One of these switches gives you completely independent source selection for recording and listening. Thus you could, for instance, tape an FM broadcast while listening to a record.

Tone Controls and Filters

Some people would have you believe that a good hi-fi system needs no tone controls. On the contrary, the better your system the more you will need to be able to alter its response when you are playing recordings that

were badly engineered or are in poor condition. The usual BASS and TREBLE controls can help a great deal—if they are properly designed so as to affect mostly the lowest bass and the highest treble frequencies without changing the midrange too much. A third control, marked MIDRANGE, is sometimes added, but correct tonal balance in the midrange is such a complex matter that a single knob is not very likely to provide an optimum solution to any given problem.

In place of the normal tone controls some amplifiers have a small *graphic equalizer*: five or more slider-type controls each covering a portion of the full audio frequency range. A five-band equalizer is certainly more versatile than simple bass and treble controls, but reasonably good separate ten-band units now cost so little that you probably shouldn't buy an amplifier just for its built-in equalizer.

The amplifier should also have switchable *audio-passband filters*—infrasonic (often incorrectly labeled SUBSONIC) and ultrasonic attenuators. These keep out spurious signals from record warps and mechanical vibration below the audio band and noise and radio-frequency interference above it. An infrasonic filter is especially important if your speakers have vented or ported cabinets.

To be effective, such filters should have a slope of 18 dB per octave, meaning that they should provide 18 dB of attenuation for every doubling or halving in fre-

The Yamaha A-700 100-watt amplifier shown here and on the preceding pages is designed to appeal to the audio enthusiast. It has the usual selection of inputs and tone controls plus a few that are less common: a variable loudness control that allows the user to optimize the compensation, a record-out selector for taping a source you're not listening to, and Auto Class A—an output circuit that switches the amp's operating mode from Class A to Class AB only when the output exceeds 10 watts. Price: \$450.



Trie, separates still provide the ultimate in performance and features. But, some of the latest integrated amplifiers sport controls and functions that used to be available on only the most versatile preamplifiers, leaving you free to choose between the two system configurations on the basis of other criteria.

quency. Filters with 12-dB-per-octave slopes will do some good, but 6-dB-per-octave filters cannot remove a useful amount of unwanted signal without affecting the music.

In addition to the passband filters, whose action takes place beyond the extreme edges of audibility, an ideally equipped amplifier should have *rumble and scratch filters* to mitigate audible problems near the edges of the audio band. Older records may need a scratch filter, while a rumble filter is particularly valuable for toning down air-conditioner noise, which is often found on CD's made from older analog master tapes. The rumble and scratch filters should also have slopes of 12 or 18 dB per octave to do their job without greatly affecting the frequencies you want to hear.

Many amplifiers also have some form of *loudness contour* that boosts the bass at low listening levels to compensate for the human ear's frequency response at those levels. Loudness controls can be useful, but only if they are continuously adjustable so you can allow for the efficiency of your loudspeaker/listening-room combination.

Signal Paths

Most amplifiers offer a choice of two listening modes, stereo and mono. For the serious listener these are not always enough. Occasionally you will want to

compare the two channels of a recording, or verify the integrity of a connection or component, by switching rapidly between left-only and right-only operation. Classical-music lovers may also want to reverse the channels for the occasional mirror-imaged recording. And some of us still store parallel tracks of old monophonic material on quarter-track open-reel tape.

As for switching functions, it's always possible—especially with the advent of video media with true high-fidelity sound—that your system will expand beyond the capabilities of any single control center. If you're like me, you may wind up with a couple of cassette decks, quarter-track and half-track open-reel tape recorders with outboard noise reduction, VHS Stereo and Beta Hi-Fi video machines, a video-disc player, a couple of equalizers, and a PCM digital audio encoder to use with the video recorders. The only way to cope with such an assortment is to use one or more external switchboxes, which are available from a number of manufacturers.

But while an external switchbox can vastly increase the versatility of any system, you still need a place to connect its inputs and outputs. You can always use one of your amplifier's tape-monitor loops for this, but it can be handy to have another set of jacks, usually called an *external-processor loop (EPL)* or something similar, to give you still more flexibility.

Components like equalizers or image enhancers need



You will need some hands-on experience in the store to make sure that the features you've decided on are properly executed in the component you're considering.

not be located before the volume control in the circuit. With a separate preamp you can always connect these signal processors between the preamp and power amp. The well-equipped integrated amplifier will have a pair of stereo jacks labeled PREAMPOUT/POWER AMP IN that serve the same function; there will be a short length of cable or a pair of jumper wires to connect these jacks when there's no need to insert another component between them.

Output Controls

Having two switchable sets of speaker outputs is obviously important mainly if you plan to put in extension speakers. You will also need a headphone output for private listening. This is one instance where most separates are less convenient than most integrated amplifiers, whose speaker switches usually have an OFF position to allow for headphone-only operation. Some separate preamplifiers have a MUTE button that can serve the same purpose, but in most cases such a button cuts the level to the speakers by only about 20 dB, so you can answer the phone during a loud passage without losing your gain setting.

A.C. Power Switches

The matter of auxiliary a.c. power sockets to plug in other components is trickier than it looks. You might think that one front-panel power switch should control an entire stereo system. With an integrated amp that may be true, but be careful about plugging a separate power amp into a convenience socket on a preamp. Some high-powered separate amplifiers draw enough current to burn out any but special heavy-duty power switches. Also, some components have three-way grounded plugs, and sockets that will accommodate

these take up lots of precious space on the amp's rear panel. If your system will be fairly simple, look for an amplifier with several a.c. convenience sockets on the back. Some amps have none at all, on the assumption that a complicated system will require a separate a.c. power strip with its own switch anyway.

In-Store Tests

Even after you have decided what features are important to you, you will need some hands-on experience in the store to make sure those features are properly executed in the component you are considering.

Try the volume-control knob. Does it feel smooth, and does it offer you fine enough control? With efficient speakers you may find that a detented volume control increases the level in excessively large jumps at low volume levels. And be wary of pushbutton electronic volume controls; I find them harder to use than simple knobs.

Try the tone controls. Do they make an audible difference in the extreme bass and treble without affecting the midrange? Voices should retain their basic character at almost any control setting if the designer has done the job properly. Plug in the headphones you either own or are planning to buy to make sure they play with adequate loudness and good bass.

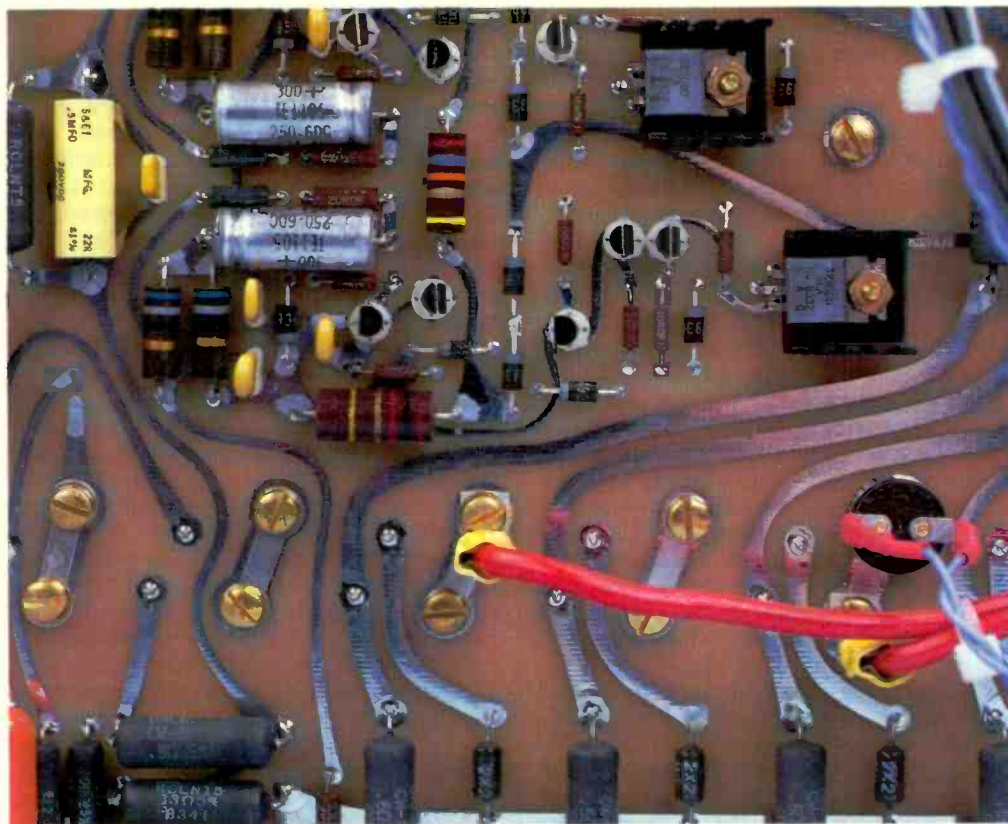
Finally, operate all the signal-switching controls to see if the layout makes sense to you. Try to get a cassette deck connected to the amplifier, then make a short recording on the spot and play it back. The ease and naturalness of doing this will tell you a lot about whether the amplifier's layout is one that you will take to easily and naturally. If it is, you can look forward to years of being able to forget the equipment in order to pay attention to the music. □

An integrated audio and hi-fi video system needs an amplifier with extensive switching facilities, such as the JVC A-X500VB shown here. It has audio inputs for phono MM/MC, CD, and tuner, and two tape loops. It also has two hi-fi video inputs (a video jack teamed with a pair of stereo audio jacks) for a stereo TV tuner, video-disc player, or other source and a hi-fi video tape loop for a VCR. In addition to many other standard amplifier features, this 100-watt-per-channel unit has a seven-band graphic equalizer that can store five settings in memory. Suggested retail price: \$500.



HOW TO SPEAK AMPESE

by Ian G. Masters



D *A guide to the technical vocabulary and terminology an audio buyer needs to understand in choosing an amplifier*

DON'T look now, but your stereo system is crawling with amplifiers. Most of the basic functions of electronic components have something to do with making a signal bigger, even if it's only to compensate for level reductions caused by other processes, so there are tiny amplifiers in your tape deck, FM tuner, preamp, signal processor, . . . in fact, almost everywhere. But this sort of amplification is hidden because it is incidental to whatever the particular component is supposed to be doing.

There is, however, one *big* amplifier: the one that drives your speakers. Ironically, in many ways this one is almost as obscure to most users as all those little amps the signal passes through on the way. In its most obvious form, as a separate component, the power amplifier is basically a "black box" that takes tiny electrical impulses and boosts them to a point where they can drive a pair (or more) of speakers. Anything else

that is included on the chassis, such as level controls or meters, is peripheral to the amplification function itself. But most of us are not even conscious of our power amplifiers because they are buried within receivers or integrated amplifiers.

All this inconspicuousness makes amplifiers hard to sell, and it's even harder for an audiophile to choose between them. Unlike a turntable or cassette deck, a power amplifier has no real convenience features, and except for its power output an amp's measured performance doesn't help much because most amplifiers are so good that the differences between them are inaudible. Even price tends to depend more on the manufacturer's reputation or the styling or peripheral features like meters than on performance.

And yet there are a lot of amplifiers out there, so a manufacturer has to give the prospective buyer *some* reason to choose his model over a competitor's. He is likely

Amplifier (am'ple-fī'er)
n. A device used to change a weak electrical signal into a stronger but otherwise identical signal.

to lean on a unit's specs to some extent, of course, but more than with other components he is apt to talk about an amp's circuit design and construction. Whether circuit design really matters very much to a consumer is debatable, but advertising it has had an important consequence: audio engineers have advanced the state of amplifier design considerably in the past few years largely so they could say they had done so in promotional material. The amps were pretty good to begin with, but you can't sell that. Whatever the motivation, the result has been improvements that, if nothing else, have brought down the average cost of amplifiers and improved their stability and reliability.

What *are* all these improvements? Because developments in amplifier design have been at the far edge of electronic technology, they tend to be described in fairly obscure terms—obscure to the average audio buyer, in any event. But if you are attempting to make an informed selection of an amplifier on the basis of its technical characteristics, you have to understand some of the more common phrases that you will encounter along the way. Then you can decide for yourself which are the important characteristics.

The first thing to understand is an amplifier's *class*, and that requires a little background. An audio signal, whether it be sound traveling through air or its electrical analog in a circuit, has both a positive and a negative component—drawn on a graph, the waveform goes above and below the zero line. But transistors (and tubes before them) can only pass electricity in one direction, which means that if you simply push an audio signal through it "straight," half of it, the negative part, will be missing.

One solution is for the circuit to use enough "bias" (a direct-current signal that switches a transistor "on") to shift the whole works into the positive region. The original positive/negative variations become more-positive/less-positive variations in this configuration, which is called *Class A*. In terms of high fidelity, *Class A* amplification has always been considered ideal because it has the lowest distortion.

But *Class A* has some major disadvantages too. In the first place, in a *Class A* amp there is always current passing through the transistors, so they get very hot, and elaborate measures (which means large, heavy, and expensive measures) have to be used to dissipate the heat. *Class A* amplifiers are very inefficient, which means they *use* a lot of power but don't *produce* a lot of power. Still, some very fine pure *Class A* amps do exist, mainly for those audiophiles willing to put up with

their disadvantages in order to get what is theoretically the finest sound.

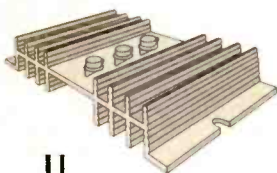
Early on, however, the problems of *Class A* were tackled by audio designers, who came up with *Class B*. In this scheme, the transistors are allowed to switch off during the negative portion of the audio signal. The positive part is amplified normally, exactly as it would have been with a *Class A* circuit but without added bias. The negative portion of the signal is amplified separately by another transistor that thinks the signal is positive, and the two amplified signals are added together (out of phase, of course) to re-create the complete original audio waveform. *Class B* operation is much more efficient than *Class A*, and it also produces a lot less heat because each transistor is off half of the time.

But *Class B* is also not without drawbacks. One of the main ones derives from the fact that transistors are less linear near the zero, or crossover, point, which is where they are operating most of the time in *Class B*. Distortion is therefore greater than with *Class A*, whose bias pushes the signal up to a more linear part of the circuit's operating range.

The answer to the distortion problem has been *Class AB*, which uses a small amount of bias, so that each transistor operates slightly more than half the cycle but still has the benefit of being off for a significant portion of the time. In *Class AB*, each transistor operates in a more linear part of its curve, but it retains most of the efficiency of pure *Class B* operation.

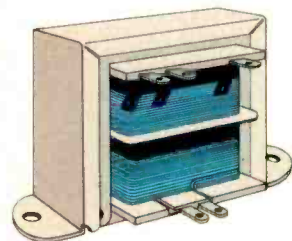
But *Class B* and *Class AB* share one flaw: as the transistors switch on and off, they produce waveform irregularities that can be audible. This effect is called switching or crossover distortion, and it has been a prime area of concern for many audio designers during the past few years. The solution has generally been to use some form of residual or variable bias to make the switching "soft" and therefore less obtrusive. While these designs are still variations on the *Class AB* theme, they go by a variety of proprietary names, many of which manage to imply that they are a form of *Class A*.

Other classes do exist. In *Class C* the transistors deal with *less* than half of the waveform, which produces massive amounts of distortion; *Class C* is unsuitable for audio use but has some radio applications. *Class D* is sometimes used to describe digital, or pulse-width-modulation, output stages, which have appeared from time to time. Other "classes" have tended to be unofficial commercial designations, such as Hitachi's *Class G* of some years back.



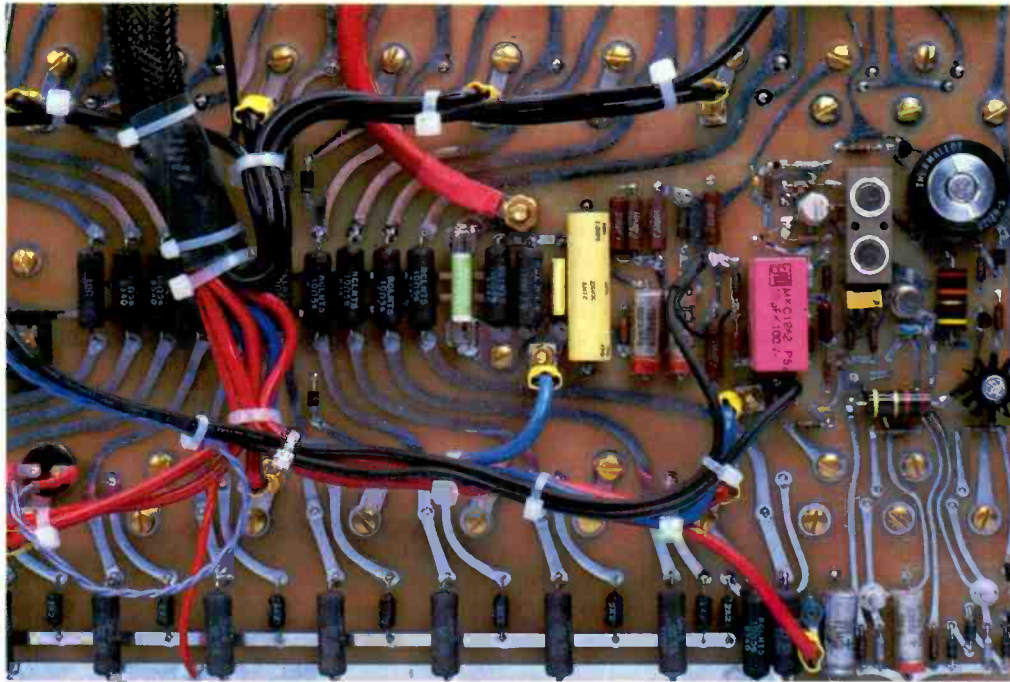
Heat sink (hēt singk) *n.*
A device, generally made of aluminum, used to dissipate heat from circuit components.

Negative feedback (nēg'ə-tiv fēd'bāk) *n.*
Electronics. The process through which part of an amplifier's output is inverted and returned to the input in order to cancel distortion and increase stability.



Transformer (trāns-fōr-mer) *n.* A device used in electrical circuits for magnetically inductive energy transfer without direct electrical contact; a transformer can increase voltage while proportionally decreasing current or increase current while proportionally decreasing voltage.

A M P E S E



The class designations refer to an amp's fundamental circuit design. Engineers have always realized that none of these circuits are perfect, so a number of techniques have been developed to correct flaws as they occur. The most imaginative, and the most widely used, is feedback, in which one part of the signal corrects nonlinearities in another part.

The type of feedback most commonly used in amplifiers is *negative feedback* (NFB), in which a small portion of the amplifier's output is inverted and fed into the input. If the amplifier were perfect, this would simply cause a reduction in overall gain, since the out-of-phase signal would cancel a portion of the main signal—a flat signal would be uniformly attenuated across the audio spectrum. But amps are not perfect; virtually all of them have some distortion-causing nonlinearities. And the more a signal deviates from linearity, the more correction a negative-feedback system applies—it's an automatically self-regulating system.

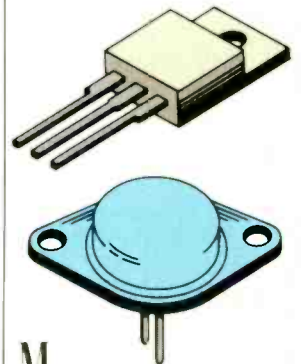
NFB is almost universally used, but that doesn't mean it has no problems. For one thing, improperly applied NFB can cause oscillation in the amplifier. And since negative feedback reduces an amplifier's gain across the board, an amplifier with a greater *open-loop gain*, or gain before feedback, must be built to obtain a given output level.

Another approach to reducing distortion is called *feedforward*, in which a comparator circuit continuously mixes a portion of the input signal with a tiny bit of the output

signal, inverted in phase. The mixing is adjusted so that the two signals cancel each other entirely, leaving only whatever distortion products have arisen. These distortion products are then amplified separately and subtracted from the output, a process that takes very little power because distortion is typically only a tiny fraction of a complete audio signal. In theory, a feedforward system should enable an amplifier to produce its complete open-loop gain, but usually feedforward is used in conjunction with a moderate amount of negative feedback as well.

Another design wrinkle that sometimes appears is when an amplifier is capable of being *bridged* or *strapped* to mono, which is simply a method of joining the outputs from the two halves of a stereo amplifier to produce a single mono feed. This can't be done with just any stereo amplifier; the capability must be designed in so that the two parts are properly balanced to work in a true *push-pull* fashion. One remarkable feature of bridged amps is that they are usually capable of producing more output in mono than the sum of their individual stereo outputs.

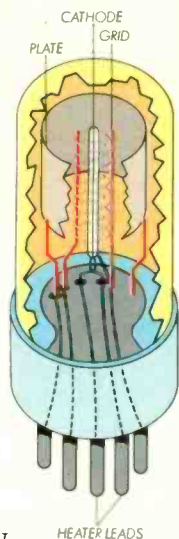
More common is the *direct-coupled* or *DC amplifier*. A DC amplifier has no capacitors in the signal path, particularly in the output stages, so phase shifts and low-end rolloff are minimized. The amplifier can respond down to 0 Hz, a theoretical ideal. It should be noted, however, that this same capacity means that the amp can reproduce the warp frequencies of vinyl records at very high power and thereby



MOSFET (mòs'fèt)
[abbr. metal-oxide semiconductor field-effect transistor] *n.* A semiconductor device used to amplify electrical signals where the output current is proportional to but greater than the input voltage.

Bipolar transistor (bì-pò'ler trán-zis'ter) *n.* A semiconductor device used to amplify electrical signals where the output current is proportional to but much greater than the input current.

A M P E S E



Vacuum tube (vāk'yōō-um tyōōb) *n.* 1. A device to amplify electrical signals where the output voltage is proportional to but greater than the input voltage; used primarily during the first half of the twentieth century. *syn.* electrical valve. 2. An icon revered by small groups of audiophiles and said to be imbued with mystical powers.

damage speakers, which is why most direct-coupled amplifiers include a switchable infrasonic filter and/or an input-coupling capacitor.

Much amplifier terminology revolves around the sort of devices used in the design, rather than the design of the circuits themselves. There are a few rather exotic exceptions, but the great majority of amplifiers today are solid-state—that is, they use transistors. There are various sorts of transistors, and their names have found their way into amplifier terminology as particular characteristics are attributed to them.

The first transistors used in audio amplifiers were *bipolar* devices, which means that the signal is amplified by the controlled flow of two types of charges, negatively charged electrons and positively charged “holes.” Good amplifiers could be made with bipolar transistors, but a lot of compensation for their limitations had to be built into the circuits, especially to prevent them from overheating, and often these compensations resulted in what was known as “transistor sound.” Most of these problems have been solved with present-day amps.

Eventually a unipolar device came along called a *field-effect transistor*, or FET. Compared with bipolar transistors, FET’s more closely approximate the characteristics of a vacuum tube, as well as offering higher switching speeds and a greater degree of temperature stability. Audio designers—many of whom grew up designing tube amps—adopted the FET, which is now widely used. Various versions go by different designations, depending on how they are built, and all vary slightly in performance, though not enough to matter very much in an amplifier. The most common FET is the *metal-oxide semiconductor field-effect transistor*, or MOSFET.

If the actual bits and pieces used inside

an amplifier are really only of interest to the designer, one facet of the design has a direct bearing on the consumer’s interest because it affects an amplifier’s size and cost. This is the *power supply*.

An amplifier has one basic function: to take the power available from your friendly neighborhood electric company and modify it by means of an audio signal so that it can drive the form of motor called a loudspeaker. Much of the discussion about amplifiers has to do with the audio modification, but how an amp deals with the electric utility’s power in the first place is also extremely important.

A power supply does three things: first, it takes (in the U.S.) 60-Hz, 120-volt alternating current and converts it by means of a transformer to a more usable lower voltage; then it rectifies the current, changing it from a.c. to pulsating direct current; finally, it filters out the pulses to produce a constant source of direct current that can then be modified by the audio signals.

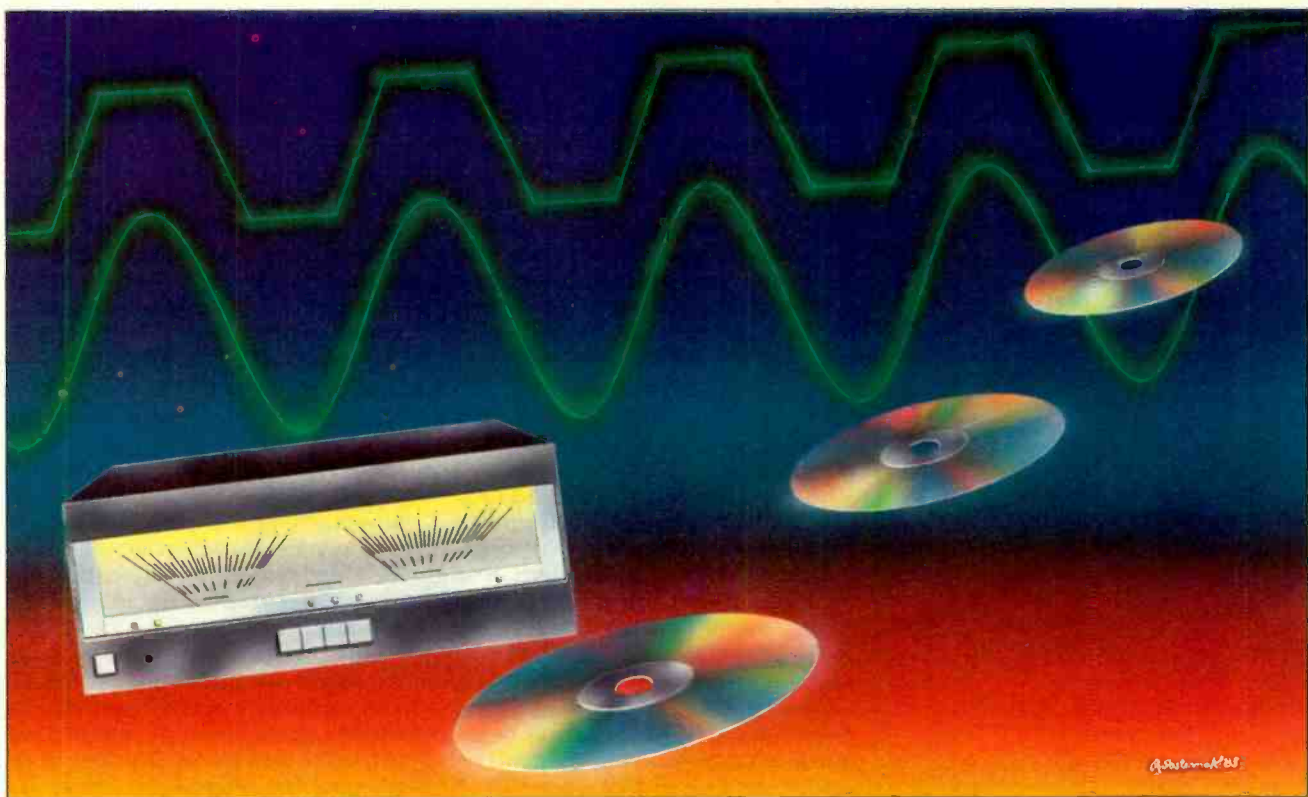
Traditionally, all three jobs have been done by massive components, particularly by monstrous transformers, that contribute most of the weight and size to an amplifier. These components, especially the filter, have to be of very high quality since even the slightest pulsating direct current can creep into the system as hum, and that makes their cost high. In addition, power supplies are usually far larger than necessary most of the time. The reason for such “overkill” is that musical peaks require all the juice an amplifier can muster, even though they occupy only a tiny fraction of the amp’s operating time.

There have been many attempts to get around this situation, although for the time being most manufacturers use massive power supplies. One approach is to use *toroidal transformers*, which are ring-shaped devices that are somewhat more efficient than conventional transformers of the same size. Other approaches include various methods of regulating the power supply according to the input signal, so that high power levels are only produced during the small amount of time they are necessary. So far, these methods have been tried by only a few manufacturers.

Amplifiers, and hence the terms used to describe them, are at the very heart of audio and thus worth understanding. It’s a tribute to amplifier manufacturers that their products are generally good enough for you to be reasonably safe buying one even without knowing any of the jargon. But there’s nothing like knowing the language of a country to make you feel more confident and to enjoy yourself more when you enter the territory. □

Capacitor (ka-pās’a-ter) *n.* An electrical device used in amplifiers for short-term power storage and supply-voltage smoothing; smaller capacitors are used to block direct current while passing alternating current and in filter circuits.





ROBERT PASTERNAK

IS YOUR AMP DIGITAL-READY?

by Julian Hirsch

Can it handle the Compact Disc?

SINCE the emergence of the digital Compact Disc, a great deal has been said and written about the possible (and usually presumed) inadequacy of pre-digital-era amplifiers for reproducing the dynamic range of 90 dB or more potentially afforded by the digital medium. I have been asked about this by a surprising number of people who are in no sense audiophiles, which should tell us something about the effectiveness of the publicity being given to digital sound and its unique properties. Whether all the warnings about amplifier inadequacy are really justified, however, is another matter.

And yet, digital recordings do place special requirements on an audio amplifier.

Let's start with dynamic range, which measures the difference in level between the softest passages (or perhaps the background sound level with the musicians silent) and the very loudest sounds in the program. Obviously, dynamic range is largely a function of the music itself, with figures as high as 80 or 90 dB (or more) often quoted for live orchestral music. The similarity of these figures to the maximum dynamic range of the Compact Disc is not at all coincidental, I suspect.

Most analog LP discs are unable

Overall loudness is set by the average power delivered to the speakers. Peaks are not perceived as being louder.

to accommodate such a wide range of levels (their maximum dynamic range is more likely to be around 50 to 60 dB), and only a few "audiophile" releases have ever come close to coping with such a range. The usual practice in recording has been to limit the dynamic range, either electronically, at the time of recording or when cutting the analog disc master, or by having the musicians restrict their own sound levels while playing—or both.

Digital recording requires no such limiting measures. Many Compact Disc releases, however, were originally recorded for analog discs, and these particular CD's will have little or no more dynamic range than their LP versions aside from the increase afforded by the inherently negligible noise level of a digital disc. The softest passages may be no quieter than before, but they will be less masked by surface noise.

In order to listen to a full-range CD in the home, how much amplifier power is needed? The answer depends to a degree on the speakers used: how sensitive they are (the amount of sound they will put out for a given input power) and how much peak power they can handle without compression, distortion, or damage. There is also the human element to be considered, since listening to many types of music reproduced at the full live level will usually preclude conversation or other intimate social activity, to say nothing of degrading relationships with one's neighbors.



An uncompressed digital recording differs from a typical analog recording largely in its ratio of peak to average power (ignoring flutter, distortion, and noise, which are thousands of times lower in the digital medium). If you monitor the instantaneous power output of an amplifier playing reasonably wide-range music in the home through speakers of average sensitivity, you are likely to find an *average* power level of no more than 1 watt, and often much less. Occasional peaks

may reach as high as 10 watts, although these will be rare.

If this is the case, why are so many home amplifiers rated at 100 watts or more? Can that much power really be needed? Yes. Consider what happens if you wish to play the music louder, perhaps to experience the impact of a showcase recording or simply to show off the abilities of your system. The desired effect may call for a 10-dB increase in average level, resulting in an average power output of 10 watts, with the peaks now reaching 100 watts. The subjective average sound level will not be increased tenfold by a 10-dB change but will seem more like double the volume.

Now, suppose you want to make the sound just a *little* bit louder still. The smallest noticeable change would require about a 3-dB increase in level, which means 20 watts average and 200 watts peak power. At this point, you would be overdriving a 100-watt amplifier and clipping the peaks. It is easier to drive an amp into clipping than many people appreciate. Part of the reason is that the average or overall perceived sound level is set by the average electrical power to the speakers, and the brief, high-level peaks *are not perceived as being louder*. The peaks make a major contribution to the naturalness and "openness" of the sound, but they can be compressed considerably without disastrous side effects. This is one reason why "compressed" analog recordings can still sound so good.

Peak clipping in an amplifier is also often difficult to hear, especially if it occurs only occasionally. The clipped peak may last a millisecond or less and is easily overlooked even if you are listening for it (which is rarely the case). Only sustained "hard" clipping is easily audible, because of the harshness of its sound, and in extreme cases this form of abuse can burn out a tweeter even at fairly low power levels.

Does this mean that a high-powered amplifier is a necessity for playing digital discs? The answer is a rather equivocal "yes and no." Unless you listen at rather low levels, a high *peak-power* capability is necessary. Such capability does not necessarily call for high rated *continuous* amplifier power, since the average power requirement of a dig-

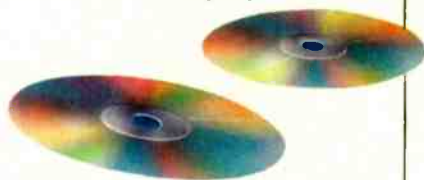
ital disc may be no more than that of any other program source. Nonetheless, there is no harm in using a 100- or 200-watt amplifier even if your average power demand is only a couple of watts. I have preferred to use high-powered amplifiers for years, if for no other reason than that I know I will never (well, almost never) run out of power even under the most extreme conditions I can devise. Such amplifiers tend to be costly, heavy, and large, although some receivers manage to deliver extraordinarily high power outputs from a compact package.

Fortunately, there is another, less costly solution. When selecting an amplifier, look for its *dynamic-headroom* rating. This spec is the ratio between the *actual short-term* power-output capability of the amplifier (measured for peaks lasting 20 milliseconds out of every half second) and its *rated continuous* power output. Many amplifiers have less than 1 dB of dynamic headroom, but there are also quite a few with headrooms of 3 dB or even more; a couple of the latest are claiming 6-dB figures. A "50-watt" amplifier with 3 dB of dynamic headroom can deliver 100 watts for at least 20 milliseconds, and such a peak power output is rarely required for a longer time than that. Our test reports include a dynamic-headroom measurement, and in the digital age this is likely to be a much more important amplifier spec than the highly touted but usually minuscule distortion readings.

Aside from sheer power, what else should you look for in a "digital-ready" amplifier? One weakness I have found in some amplifiers is an audible noise level (either hiss or power-line hum or buzz) when the program is silent or at a very low level. Sometimes a power amplifier will produce a faintly audible hum even when the preamplifier volume control is set to its minimum. Even a minute noise level, which is normally masked by the program, can be very audible during the otherwise total silence between the tracks of a Compact Disc. Therefore, look for a very low measured noise level (figures on noise are a part of all of our amplifier test reports). It is difficult to give specific numbers, since the audibility of noise does not necessarily correlate well with measure-

ments. In general, however, if the A-weighted noise is lower than -80 dB referred to 1 watt, you won't be able to hear it without sticking your ear right next to the speaker drivers, and sometimes not even then.

Aside from noise and dynamic headroom, there are actually very few special criteria for choosing an amplifier for a digital system beyond those that would apply equally to a conventional hi-fi system. Some people are concerned about the behavior of an amplifier when it is driven into clipping even briefly. If it "blocks" (ceases amplifying), oscillates, or takes an appreciable time to recover from clipping, a normally inaudible overload could become only too audible. Fortunately, the easiest solution to this problem, if it occurs, is to turn down the volume slightly. The aver-



age level, and therefore the perceived loudness, will be essentially unchanged, but peak clipping should be eliminated. This solution is especially applicable in the case of Compact Discs, whose absolute maximum level ("0 dB") is standardized and can never be exceeded. If you set your amplifier volume so that the maximum output of a CD player (normally 2 volts) does not drive it into clipping, you can be sure that no CD will ever overdrive your amplifier at that volume setting. (A 0-dB tone from a CD test disc should be used for this purpose.)

In conclusion, don't be too worried about making your present amplifier obsolete if you add a CD player to your system. It would be a mistake to conclude that because your amplifier predates digital program sources, it is not "digital ready." It may well already have adequate average power, a large dynamic headroom, and sufficiently low noise. *Listen* to it playing CD's for an extended period, and if you don't hear any signs of distress, chances are it is perfectly adequate. Only if your amplifier fails this test should you look for a more powerful or quieter replacement. □

Dynamic headroom is likely to be a more important amplifier specification than the distortion readings.

AR'S

MAGIC SPEAKER

The MGC-1 produces bewitching sound

by Julian Hirsch

SINCE its introduction of the first acoustic-suspension speaker system about 30 years ago, Acoustic Research has maintained an ongoing research program. Its latest development, the first in a new high-technology product line called the AR Research Series, is an innovative speaker system, the MGC-1, which AR calls the Magic Speaker. While we detected no otherworldly qualities in the speaker's design or construction, we were bewitched by its sound.

The novelty of the MGC-1 does not lie in any new drivers or the like. Instead, it uses a unique combination of rather conventional parts and construction techniques in an effort to solve some of the fundamental problems of reproducing music in the home. These problems, as seen by the speaker's designer Ken Kantor, stem mainly from the way the ear hears sounds that arrive from a pair of speakers at different times and from different directions.

A sound's location within the stereo "stage" is established by the first millisecond or so of that sound to reach the listen-

er's ears. These "first arrivals" are also responsible for most, but not all, of a speaker's perceived frequency response or tonal quality. The most precise left-right imaging can be achieved with very directional, flat-response loudspeakers aimed directly at the listener. Such speakers avoid reflections from nearby surfaces (principally the speaker enclosure itself and the floor), which can blur or shift the image and create frequency-response irregularities if the reflections arrive too closely behind the direct sound—within what is called the ear's "fusion time." Unfortunately, these speakers also run the risk of sounding unpleasantly "flat" and two-dimensional.

Reflections arriving *after* the fusion time do not change the localization of a sound but, instead, contribute to the sense of "space" or recorded room ambience generated by the loudspeaker. Bringing out

this ambience is most easily done by a speaker that distributes its output all around the listening room, bouncing the sound around in different directions so that substantial acoustic energy is still floating around the listening room after the fusion time. Omnidirectional and dipole radiators fulfill this requirement, but they can fall short on some of the directionality and timing requirements for the most precise left-right imaging.

A Fundamental Dilemma

In fact, it is impossible to reconcile in a single practical loudspeaker the requirement of a narrow directional pattern for the first arrivals (to get the best imaging) with the requirement of a wide directional pattern for the later reflections (to obtain a feeling of space), to say nothing of simultaneously making the frequency response sound accurate. AR's "magic" solution actually

skirts this dilemma, since the MGC-1 is a system that essentially consists of two loudspeaker subsystems in each enclosure. As designer Kantor put it in a paper presented to the Audio Engineering Society, the MGC-1 "radiates direct and ambient





Each enclosure of AR's MGC-1 contains two speaker systems. Six front-firing drivers form the primary subsystems. A control box (opposite page) processes signals for the side-firing ambience subsystems.

LAB MEASUREMENTS

Frequency-response measurements of the AR Magic speaker were both simplified and complicated by its unusual design. The response of the primary system, with the ambience drivers switched off, was much easier to measure than usual because of its very directional output. No detectable reflections of its sound occurred within the normal 5.5-millisecond measurement sampling time of our IQS FFT analyzer. Unlike most speakers we have tested, the primary system's FFT response agreed very closely with its averaged room response, indicating a very consistent directionality over the frequency range, which was a design goal of the MGC-1. The FFT response had a gentle

sound from independent sources. This allows the spatial, temporal, and spectral properties of each to be optimized, and to be varied independently for better subjective performance."

The AR MGC-1's primary subsystem has a flat and wide frequency response, and it radiates a fairly narrow sound pattern directly at the listening area. The design of the speaker confines the sound to certain directions to prevent any significant early reflections from nearby surfaces. This establishes a stereo sound stage with precise and accurate positioning of the phantom sound sources and gives them a perceptually accurate frequency balance.

An ambience subsystem resides in the same enclosure and is aimed toward the side wall nearest the speaker. The signal driving the ambience speaker is delayed by electronic circuits so that its reflection from the wall reaches the listener between 20 and 30 milliseconds after the primary sound. Any sound delayed this long cannot distort the spatial perspectives established by the primary system (delays of longer than 30 milliseconds would tend to be perceived as discrete echoes). In any live listening situation, the reflected sound falling into this time range has a limited frequency range, since much of its high-frequency energy has been absorbed by multiple reflections and the air itself. The ambience speakers therefore do not

downward slope of about 4 dB from 180 Hz (the lower measurement limit of this test) to about 15,000 Hz. Except for a couple of minor "jogs" between 15,000 and 18,000 Hz, the response was extraordinarily smooth (see graph).

In making the composite averaged room response, a close-miked measurement of the output of one of the woofers showed a plateau from 60 to 140 Hz rolling off at 12 dB per octave at lower frequencies, with the crossover system rolling off the woofer response above 150 Hz. This curve spliced easily to the room response to form an unusually smooth composite frequency-response curve that varied only ± 4 dB from 40 to 20,000 Hz. The trace fell smoothly between the 70-Hz maximum response and the 20,000-Hz upper measurement limit.

Room measurements of the ambience system, when it was operating at levels we found optimum for music listening, were understandably irregular because

need the full frequency range of the primary speakers. Their response is equalized to complement the direct sound and to give a natural overall balance at the listening position.

As befits a component taking such a radical approach, the AR MGC-1 presents an unusual and initially somewhat formidable appearance. It is about 52 inches high and has an asymmetrical four-sided cross section. The speakers are sold in mirror-image pairs, as their design criteria require. Each weighs about 150 pounds. The back of the cabinet is 26½ inches wide; it should be placed parallel to the back wall and as close to it as possible. The best

of interference between the direct and delayed signals as "heard" by the microphone (the ear, of course, responds differently). Since it was not possible to operate the ambience speakers without using the primary speakers, we were unable to make a room measurement on the ambience system alone. Close-miked response measurements on its two drivers indicated an effective range of about 400 to 5,800 Hz.

Our FFT pulse-response system allows an analysis of the signal between selected points in time to examine events that cannot be isolated in conventional measurements. In FFT spectral-decay measurements made with the microphone 1 meter from the front of the speaker cabinet with both primary and ambience systems operating, we could see the output of the ambience system appearing roughly 20 milliseconds after the pulse was emitted from the primary speaker. The ambience response as measured in this fashion

placement is for each unit to be about one-quarter of the room width from the closest side wall.

When a pair of MGC-1's is properly set up, sound from the primary (front-firing) subsystem in each enclosure reaches the listener at an angle of about 26 degrees, and the reflection from each ambience speaker comes in at an angle of about 54 degrees. These angles were chosen to give minimum "interaural cross correlation" (IACC), essentially a measure of the similarity of the signals at the two ears. Psychoacoustical experiments have shown that lowering the IACC of a signal is subjectively beneficial not only in stereo reproduction but also in the design of concert halls.

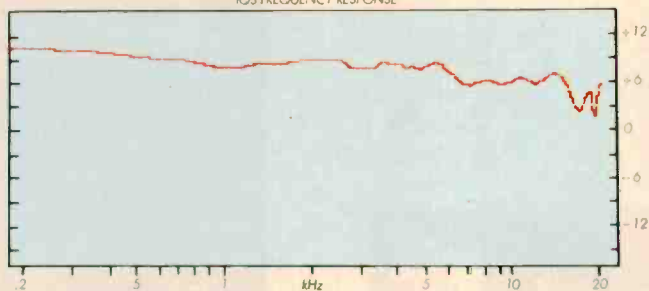
The directivity patterns of the two speaker arrays in each enclosure are controlled by recessing most of the drivers into horn-like structures. They are horns in appearance only, for they are made of sound-absorbing foam. The foam confines the effective coverage of each driver to the vertical and horizontal angles subtended by the openings of the foam. Two large, removable black grille cloths, one for the primary and one for the ambience speakers, conceal the drivers and the absorbent foam.

To cover the frequencies above 1,000 Hz, each primary-speaker subsystem contains a ¾-inch dome tweeter and a 2-inch dome upper-midrange driver placed at about ear height for a seated listener (36

The ambience speakers emit their signals after the primary subsystems so that the side-wall reflections reach the listener well after the direct sound does.



AR MGC-1
IOS FREQUENCY RESPONSE



extended from well below 1,000 Hz up to about 6,000 Hz.

The impedance of the primary speaker system was relatively flat and had a typical value of 4 ohms, although it reached a minimum of 2.7 ohms between 100 and 130 Hz and a maximum of 8.5 ohms at 45 and 800 Hz. Its sensitivity was about average for an acoustic-suspension system, producing an 86-dB sound-pressure level (SPL) at 1 meter

when driven by 2.83 volts of random noise in an octave band centered at 1,000 Hz. Checks with a sound-level meter and musical program material showed that the SPL typically increased by about 1 dB when the ambience speakers were turned on.

Primary-woofer distortion was measured with a drive level of 4.5 volts, corresponding to a 90-dB SPL at 1,000 Hz. The distortion was about 0.6 percent

inches above the floor). The drivers share a common magnetic system that permits them to be placed very close to each other. Acoustically, this makes the two drivers appear as a single radiator with the combined frequency responses of both.

Above and below the two high-frequency drivers are two 4-inch cone-type lower-midrange drivers that operate from 200 to 1,000 Hz. The symmetrical arrangement places their apparent sound output in the same location as that of the higher-frequency drivers. In addition, the spacing between the cones produces nulls in their combined radiation pattern at angles that would otherwise be likely to produce detrimental floor reflections. The bass in the primary subsystem is handled by two 8-inch acoustic-suspension woofers. The ambience system in each enclosure consists of a 1-inch dome tweeter and a 6-inch woofer, both at approximately the height of the primary system's high-frequency drivers (see photo on the facing page).

The enclosures of the MGC-1 speakers are handsomely finished in walnut or rosewood (as in our photos). Their cost depends on the finish: \$3,500 per pair in walnut, \$7,000 per pair in rosewood (on special order). The back of each cabinet has two binding-post terminals and a four-pin socket for connection to the system's supplied control unit.

Although the MGC-1 speakers themselves have no level adjustments, considerably greater sonic control is afforded by the accompanying electronic control unit,

which contains a two-channel bucket-brigade time-delay circuit, level controls, and two specially equalized power amplifiers for the side-firing subsystems. The front of the control unit has individual level controls for the left and right speakers and a master ambience-level control. There is also a SOUND-STAGE switch for the ambience speakers; in its NORM position, it drives each ambience speaker with processed signals from its own channel. The CONT setting contracts the sound stage somewhat by driving both the left and right ambience speakers with a signal derived from the sum of the two channels (L + R, or mono), and the EXP setting expands the stage by sending the channel-difference signal (L - R).

The time delay for the ambience subsystems can be varied in three steps by switches on the front panel. To ensure that the sound from the ambience drivers is delayed by at least 20 but less than 30 milliseconds, the time-delay control accommodates speaker-to-wall distances of from 1½ to 10 feet. On the rear of the controller are input and output jacks for connection to AR's general-purpose Model SRC remote-control unit (\$159), which considerably simplifies making level and balance adjustments on the ambience speakers from the listening position. We used one in our listening tests, though it is not essential for home installation.

The cables connecting the controller to the two enclosures carry signals coming from the main system power amplifier to the control-

from 100 Hz down to 80 Hz, rising very slowly to 2.4 percent at 50 Hz, 3.7 percent at 40 Hz, and 8 percent at 25 Hz. The maximum power-handling ability of the MGC-1 was measured at 100, 1,000, and 10,000 Hz with single-cycle tone bursts, the criterion being the onset of waveform distortion in either the speaker's acoustic output or the amplifier's electrical output. The results, given in watts calculated using the measured impedance at that frequency, are impressive, to say the least. In every case the maximum output of the speakers was limited by amplifier clipping. At 100 Hz our amp gave out at 1,100 watts (into 2.7 ohms), at 730 watts at 1,000 Hz (into 5.8 ohms), and at an incredible 915 watts (into 3.5 ohms) when driven by a single cycle of 10,000 Hz. Full exploitation of the MGC-1's power-handling capacity will require an amplifier with exceptional current-delivering ability—and ears capable of withstanding extremely loud music.

ler's ambience circuits and return the delayed signal from the controller's power-amplifier outputs to the ambience speakers. The main system amplifier can be any component capable of driving the primary speakers alone, and it is hooked up directly to the primary speaker subsystems with any type of cable the user chooses. The controller unit measures 17 x 11 x 4 inches and is powered by house current.

Unique Sound

Measurements on a speaker as unusual as the MGC-1 can do little more than confirm the stated theory of operation and give a rough indication of the capabilities of the system compared with those of more familiar types. Our tests confirmed the basic fine quality of the MGC-1, as evidenced particularly by the very smooth response of its primary subsystem and by the most prodigious power-handling capacity we have yet encountered (see box above). But with this speaker as with any other, the true proof of the pudding is in the listening.

With the ambience drivers switched off from the remote control, the sound from the MGC-1's was very "dry," containing only the reverberation provided in the recording. The narrow directionality of the primary speakers made the sound almost anechoic; we have only heard a similar absence of listening-room effects when listening through well-isolating circumaural headphones! The imaging, however, was outstanding, with phantom
(Continued on page 101)

SYSTEMS



by Gordon Sell

As the cost of owning or renting a decent amount of living space in a desirable city neighborhood becomes more and more prohibitive, many adventurous urbanites are converting old factory lofts into extremely spacious apartments. With their ample floor space and high ceilings, lofts make fantastic hi-fi listening rooms.

The New York City converted loft pictured here is owned by a successful advertising executive who asked us not to give his name, since he doesn't want to advertise his system to the local midnight movers. The focal point of the system is a pair of Quad ESL-63's in the living room (at right) with an Audio-Pro B2-50 powered subwoofer (under the fern in the lower right photo) to augment the deep bass.

The Quads are driven by

a Quad 405.2 power amplifier that is rated at 100 watts per channel. Other components in the system (shown above) include a Quad Model 44 preamplifier, a Quad FM-4 tuner, a Denon DP-75 turntable with a Denon DL-305 moving-coil cartridge, an NEC CD-803 Compact Disc player, and a Denon DR-M44 cassette deck.

The owner uses this system for listening to his extensive collection of classical and jazz CD's and LP's. When the first Beta Hi-Fi VCR's hit the market a couple of years ago, he also bought an NEC video monitor/receiver and an NEC Beta Hi-Fi VCR. Initially he put the VCR with the hi-fi electronics and the monitor/receiver between the speakers. It certainly worked well, but he didn't like the look of a TV tube between the Quads.

The solution was to rear-



range the layout of the apartment—something that is relatively easy to do in a loft—and create a large alcove off the living room to be used for video. His current video system (shown in the lower right photograph) teams the VCR and monitor/receiver with a Denon DRA-400 receiver and KEF 101 speakers for high-sound-quality video without upsetting the aesthetics of his hi-fi listening.

After living with it for a year, the owner is very hap-



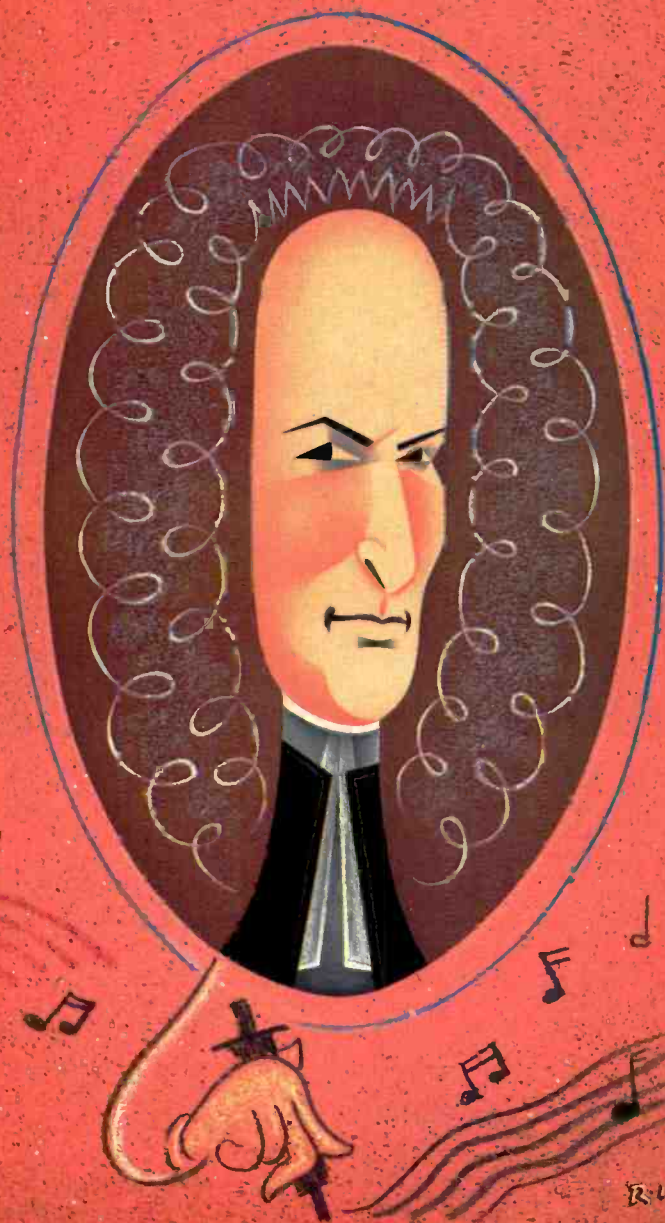
PHOTOS BY LIZZIE HIMMEL



py with the separate audio and video setup. He mostly uses it for watching rented movies, recording concerts on TV, and just normal TV watching. In a few months he plans to buy a stereo-TV adaptor for the monitor/receiver and perhaps a VHS Hi-Fi VCR. After that, he says, he might consider a surround-sound decoder and maybe a video-disc player.

The total suggested retail price of all the equipment shown is roughly \$12,000. □

BASIC BACH



DURING this year's celebrations of the three-hundredth anniversary of the birth of Johann Sebastian Bach you may suddenly be struck by the power and beauty of his music. If you decide to start a basic collection of Bach on records, you will be faced with two obstacles: the staggering amount of music he wrote and the problem of choosing from the many available recordings of each work.

To help you overcome these obstacles I have designed the following discography to guide you through the various types of music that Bach wrote. Under each heading I list first the compositions I consider the most attractive and then move to some of the more obscure ones. I start with the vocal music simply because it was Bach's most typical medium of expression. If your preference is for instrumental music, however, by all means skip to those sections to begin.

Styles for performing Bach have changed radically since World War II. The *romantic* style was universal until the Fifties. Interpretation was subjective, and the performer brought his own personality to the music. With the advent of the *modern* style after the war, performers submerged their individuality and sought to perform Bach's music as it appeared on the printed page. During the last two decades, musicologists have discovered many documents that tell us about early performance practices, like rhythmic alterations and embellishments, that were taken for granted and did not appear in the music as written.

During this same period, there was a growing interest in early instruments such as the harpsichord and recorder. The *authentic* performer plays on original instruments (or reproductions of them) and incorporates stylistic mannerisms employed at the time. He attempts, in other words, to play Bach as Bach would have played.

Bach recordings are available in all three styles. Although all are musically valid, connoisseurs voice strong preferences, and if you can-

ROBERT RISKO

A record buyer's guide to the music of Johann Sebastian Bach

by Stoddard Lincoln

not stand the sound of early instruments, it is essential to know which performance to choose and which to avoid. Performances in all three styles have been included below whenever possible.

The Cantatas

Choosing from some two hundred cantatas is a hit-or-miss proposition. The best plan is to begin with one that includes a familiar movement that is often performed separately, such as the popular "Jesu, Joy of Man's Desiring" from Cantata No. 147, *Herz und Mund und Tat und Leben*. An Angel recording of the whole work (S-36804) has for its soloists Elly Ameling, Janet Baker, Ian Partridge, and John Shirley-Quirk, with David Willcocks conducting the all-male chorus of King's College Chapel, Cambridge. The style is modern, the performance wonderful.

Two other cantatas that fulfill these requirements are No. 80, *Ein feste Burg ist unser Gott*, and No. 140, *Wachet auf*. Both are on Philips (6514 097) with the London Voices and the English Chamber Orchestra conducted in the modern style by Raymond Leppard. The solo vocal quartet is comprised of Elly Ameling, Linda Finnie, Aldo Baldin, and Samuel Ramey, who all contribute rousing performances.

There are two excellent discs containing cantatas for a single voice, both performed in authentic style. One features soprano Judith Nelson in an exquisite rendering of Cantata No. 210, *O holder Tag, erwünschte Zeit* (Nonesuch 1-79013), and the other has the bass Max van Egmond in a moving performance of Cantata No. 56, the *Kreuzstab* Cantata, and No. 82, *Ich habe genug* (Pro Arte PAL-1012).

The Magnificat

Having sampled the cantatas in the modern and authentic styles, the next logical work to tackle is the joyous Magnificat with its festive choruses. A splendid recording in the modern style, which includes a

few of the Christmas interpolations, is the one by the Choir of King's College, Cambridge, and the Academy of St. Martin-in-the-Fields, Philip Ledger conducting (Argo ZRG 854), with Felicity Palmer, Helen Watts, Robert Tear, and Stephen Roberts. An equally spirited reading in the authentic style is played by the Concentus Musicus conducted by Nikolaus Harnoncourt with Hildegard Heichele, Helrun Gardow, Paul Esswood, Kurt Equiluz, and Robert Holl (Teldec T42955).

The Mass in B Minor

Considered by many to be one of the artistic monuments of Western civilization, the Mass in B Minor must occupy a central place in any Bach collection. Herbert von Karajan conducts the Vienna Singverein and Berlin Philharmonic in a grandiose, romantic performance with Gundula Janowitz, Christa Ludwig, Peter Schreier, Robert Kerns, and Karl Ridderbusch (DG 2709 049). In contrast to this sumptuous interpretation is an authentic performance by Joshua Rifkin (Nonesuch 1-79036) with one voice to a part. The Mass is thus reduced to a kind of chamber music in which you can clearly hear the inner working of Bach's counterpoint, albeit at the expense of a lush orchestral and choral sound.

The Passions

The most dramatic of the large choral works are the Passions, which recount the events of Holy Week. Bach's portrayal of these events in the St. Matthew Passion is so powerful that you feel like an eyewitness. Nikolaus Harnoncourt's authentic reading (Teldec T35047) with the Vienna Choir Boys, the King's College Choir of Cambridge, and the Concentus Musicus is beautifully paced.

The St. John Passion is more modest in its forces, and you feel that it was written as a contemplation of past events. In this instance you would do well with Karl Richter's modern performance (Archiv

2710 002) with the full-bodied sound of the Münchener Bach-Chor and Orchestra.

The Christmas Oratorio

Six cantatas Bach composed for the Christmas season are now traditionally performed as a single oratorio recounting the Christmas story. A joyous, authentic performance of this work is the one by the Collegium Aureum conducted by Gerhard Schmidt-Gaden (Pro Arte 2PAL-3003).

Orchestral Music

Probably the most popular type of orchestral music during Bach's time was the concerto, and certainly the most popular concerti grossi ever written are those Bach dedicated to the Margrave of Brandenburg. Recordings of the Brandenburg Concertos are myriad. The most exciting modern and virtuosic performance is conducted by Neville Martin with the Academy of St. Martin-in-the-Fields (Philips 6769 058). Equally thrilling is an authentic performance by the Amsterdam Baroque Orchestra conducted from the harpsichord by Ton Koopman (Erato/RCA NUM 751342).

Bach was also a master of dance music, which is heard in his four Orchestral Suites. The most captivating performance of these is an authentic one conducted by John Eliot Gardiner with the English Baroque Soloists (Erato/RCA NUM 75076).

The most attractive albums of the vigorous concerted music for violin include the Violin Concertos in E Major and A Minor and the Concerto in D Minor for Two Violins. Gidon Kremer, overdubbing in the double concerto, turns in a nervously exciting performance with the Academy of St. Martin-in-the-Fields (Philips 411 108-1), and Sigiswald Kuijken displays the beauties of the Baroque violin in an authentic performance with La Petite Bande (Pro Arte PAD-124).

The most Baroque sounding of the concertos, of course, are those

BASIC BACH

for one, two, three, or four harpsichords. Trevor Pinnock and three fellow harpsichordists bring these works to life in authentic performances with the English Concert (Archiv 2723 077).

Chamber Music

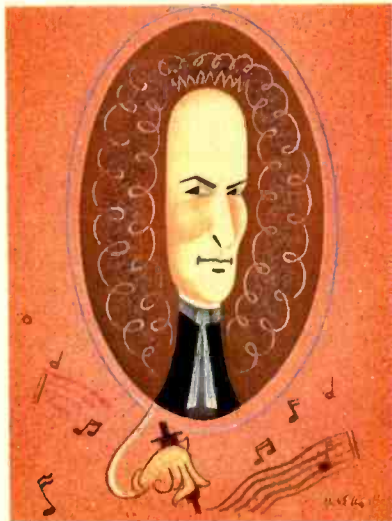
Although Bach wrote comparatively little chamber music, his three sets of sonatas offer a wide range of listening experiences. In order to hear the delicate balance between string instruments and harpsichord, it is essential to get authentic performances on early instruments. The finest set contains the six Sonatas for Violin and Harpsichord in incisive performances by Carol Lieberman and Mark Kroll (Titanic TI-33/34). The three Sonatas for Viola da Gamba and Harpsichord will possibly introduce you to that supple ancestor of the cello, and a pleasant way to make its acquaintance is in an authentic performance by Catherina Meints with Doris Ornstein (Gasparo GS-212).

While the authenticity of some of the flute sonatas may be questionable, they are all splendid and can be had in sparkling modern performances by Maxence Larrieu and Rafael Puyana (Philips 6768 176).

Unique in chamber music is *The Musical Offering*, Bach's treatment of a theme given to him by Frederick the Great. This series of canons, ricercars, and a trio sonata is abstruse but hypnotic. The best modern version is by Neville Marriner with the Academy of St. Martin-in-the-Fields (Philips 9500 585).

Keyboard Music

Bach was best known during his lifetime as an organist, and the best way to become familiar with his organ repertoire, which does not fall into any neat categories, is to purchase a collection of varied works such as the album by Marie-Claire Alain (Erato/RCA NUM 75053). It contains modern performances of the Toccata and Fugue in D Minor, the Passacaglia and Fugue in G Minor, the "Little" Fugue in G Minor,



and the Concerto in A Minor after Vivaldi. If you like Alain's clean-cut, straightforward playing, also get her collection of the *Schubler* Chorales and excerpts from the *Orgelbüchlein* (Erato/RCA NUM 75064). If you wish to sample the colossal machinery of the theater organ, there are two volumes covering some of the same repertoire in spectacular romantic performances by Michael Murray (Telarc DG-10049 and DG-10088).

The same anthology approach is also a very good way to become familiar with the harpsichord literature. Most anthology albums include the Chromatic Fantasy and Fugue in D Minor, the Italian Concerto, and a French suite or partita. Robert Edward Smith offers such a collection (Towerhill T-1005) in the romantic style, and Igor Kipnis's anthology in the modern style is excellent (Angel RL-32126).

Bach is equally effective and beautiful when played on the modern piano. Obedience must certainly be made to pianist Rosalyn Tureck, the "High Priestess" of Bach, whose claim to that lofty title is demonstrated in her collection for CBS Masterworks (M 35822). Also in the modern style is Alicia de Larrocha's lovely collection on London (CS 6748).

After these samplings, if you prefer your Bach played on the harpsichord, continue with Christopher

Hogwood's authentic recording of the French Suites (L'Oiseau-Lyre 411 811-1), Trevor Pinnock's exuberant, authentic Goldberg Variations (Archiv 2533 425), and Gustav Leonhardt's austere authentic recording of the stately English Suites (Pro Arte 3PAL-3004). If you feel more comfortable with Bach on the piano (and don't be afraid to admit it—many collectors do), try Glenn Gould's fabled recording of the Goldberg Variations (CBS IM 37779) or his flamboyant reading of the Partitas (CBS D3S 754).

Unaccompanied Strings

With the rising popularity of the guitar, many guitarists are turning to Bach's lute music and playing it effectively on their modern instruments. John Williams, for instance, brings his artistry to bear on these wonderful works in a modern performance on CBS (M2 33510).

Music for unaccompanied string instruments is an acquired taste, but one well worth acquiring. The best plan is to begin with the lower sonorities of the cello, preferably the Baroque cello with its clear, focused tone. The six Suites for Unaccompanied Cello are especially delightful in an authentic recording by Anner Bylsma (Pro Arte PAL-3001), but don't overlook Yo Yo Ma's energetic performances on the modern cello (CBS 13M 37867).

Last but not least come the Partitas and Sonatas for Unaccompanied Violin. The best recording, bar none, is an authentic one by Sigiswald Kuijken (Harmonia Mundi, Germany, 1C 3LP 157).

I hope this discography has guided you through the most important of Bach's works—that it will help you develop preferences for authentic or modern performances of his music by giving you some alternatives in the recorded literature by which to nurture those tastes. Much has been left out, but if you follow these suggestions (and survive financially), you will be well qualified to search out the rest and make choices commensurate with your hard-won knowledge. □

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YAMAHA

CIRCLE NO. 2 ON READER SERVICE CARD



by Christie Barter
& Steve Simels

IF you're wondering what Paul McCartney is doing here with the great actor the late Sir Ralph Richardson, you're not alone. You're probably one of the millions of people who stayed away from McCartney's movie *Give My Regards to Broad Street*, a musical fantasy in which Sir Ralph made one of his final screen appearances. Widely regarded as the *Heaven's Gate* of rock musicals, the film was an utter box-office disaster despite the hit single it spawned (*No More Lonely Nights*) and the presence of the irrepressible Ringo Starr. (Interestingly, the only place where the film made any money was Great Britain.)

Just how bad is *Broad Street*, really? Well, now you can find out in the privacy of your living room. CBS/Fox has just released it on video



Burton as Wagner

cassette (VHS and Beta Hi-Fi) for a piddling \$29.95, with a LaserDisc version promised in the near future. □

SPEAKING of final film appearances, one of the late Richard Burton's last was in the role of Richard Wagner in a nine-hour epic based on the composer's life. Titled simply *Wagner*, the film will be shown in the U.S. for the first time this month. The American premiere takes place June 1 at Lincoln Center's Alice Tully Hall under



Richardson and McCartney: *Broad Street* blues?

the sponsorship of the Wagner Society of New York and *Opera News*, the Metropolitan Opera Guild publication.

The second screening of *Wagner* is scheduled for June 9 at the Baird Auditorium in Washington, D.C., to benefit the Smithsonian Institution, and the third will be presented on June 22 by the San Francisco Opera. A shorter-than-nine-hour version will go into general U.S. release later this year.

Co-starred with Burton is Vanessa Redgrave, who plays the composer's second wife, Cosima, while Britain's three great actor-knights—Sir Laurence Olivier, Sir John Gielgud, and Sir Ralph Richardson—appear in lesser roles in their first film together. Cameo performances are also turned in by the late composer Sir William Walton, soprano Gwyneth Jones, and tenor Peter Hofmann.

Sir Georg Solti conducts the London Philharmonic, the Vienna Philharmonic, and the Budapest Symphony on the soundtrack of the film. London Records has compiled an album of music used in the picture from its recordings of the Vienna Philharmonic conducted by Solti. □

EVERY year the New York Philharmonic digs into its archives for a historic recording to offer contributors to the annual WQXR Radiothon, which benefits the orchestra's general fund. This year's is a two-record (or

two-cassette) set titled "Great Conductors as Soloists with the New York Philharmonic." The performances were broadcast between 1936 and 1975 and have never before been released. They include Leonard Bernstein as pianist and conductor, with John Corigliano, violin, and Laszlo Varga, cello, in Beethoven's 1st triple Concerto and Dimitri Mitropoulos as pianist and conductor in Prokofiev's Third Piano Concerto. There's also a track featuring Bruno Walter on piano accompanying Kirsten Flagstad in Wagner's *Wesendonck Songs*. The price is \$20, from Radiothon, 132 West 65th Street, New York, NY 10023. □

MOZART'S three most popular operas and Beethoven's only one have been released on home video tape by Video Arts International in performances taped

Von Stade as Cherubino



live at Britain's Glyndebourne Festival. The three by Mozart are *The Magic Flute*, in a production designed by David Hockney, with a cast headed by Benjamin Luxon and Felicity Lott under Bernard Haitink's direction; *The Marriage of Figaro*, with three world-class sopranos—Ileana Cotrubas, Frederica von Stade, and Dame Kiri Te Kanawa; and a *Don Giovanni* with Luxon in the title role. Beethoven's *Fidelio* features Elisabeth Söderström as Leonora with Haitink conducting. The London Philharmonic plays in all four productions, and all four are subtitled in English.

To sample a bit of Glyndebourne as it has been known to British audiences for over half a century, tune in to the Arts & Entertainment Network on June 6 for a ninety-



Te Kanawa and Carreras

minute video documentary titled *Glyndebourne, A Celebration of Fifty Years*. Filmed last summer, for the most part, it offers glimpses of how Glyndebourne works—on both sides of the footlights. Included are scenes from the 1973 *Figaro*, cited above, with Von Stade, Te Kanawa, and Cotrubas. □

IN his new recording of *West Side Story* for Deutsche Grammophon, Leonard Bernstein conducts the music from his 1957 hit musical, and he's assembled an all-star trio of opera singers to fill the major roles: Kiri Te Kanawa as Maria, the Puerto Rican Juliet of the piece, José Carreras as her Anglo Romeo, and Tatiana Troyanos as the street-smart



Anita (see review on page 88). But note the two names credited with the few lines of dialogue spoken by the star-crossed Maria and Tony—Nina and Alexander Bernstein. They are the younger two of the composer's three children, who are making their recording debuts with this album. □

POLICE, where is thy Sting? Well, as a matter of fact, everybody's favorite Aryan hunx can be seen here fronting his very own new band at a recent show at the Ritz, the Manhattan rock club. Apparently deadly seri-

records—with an impressive number of impressive conductors.

Just released on CBS is the orchestra's performance in Rossini's newly re-edited *La Donna del Lago*, with pianist Maurizio Pollini conducting. Awaiting release in the next few months are Mozart's Symphonies Nos. 40 and 41, conducted by Sir Georg Solti for London Records, and another Rossini opera, *Viaggio a Reims*, conducted by Claudio Abbado for DG. □

WANT to see a "mouse" in action? Want to learn how to "paint" on a computer? Or how one of America's leading contemporary painters does it after taking three months off to learn the technique himself? Then look into a new laser-read video disc produced by Interactive Media Corporation called *Philip Pearlstein Draws the Artist's Model*.

The disc serves in part as a catalog of Pearlstein's well-known bleached nudes and other paintings and in part as a documentary of the artist in his studio, in his classes, and at the opening of one of his retrospective shows. But its main interest to a lot of viewers will be what he creates on the little screen with a computer-graphics "tablet" and a variety of electronic pens and markers, one of them called a mouse.

Pearlstein is thus in the forefront among painters in doing what many musicians have been doing for some time: that is, using advanced digital and computer technologies as tools in the service of their art. □

Pearlstein's "Female Model on Platform Rocker" (1982)



BROOKLYN MUSEUM



Petersen: on camera

NO, that's not one of *Playboy* magazine's Girls of the Ivy League, but you're close—it's one of *Playboy* Video's *Girls of Rock & Roll*. The premise of the tape, distributed by CBS/Fox, is simplicity itself: take a bunch of totally unknown but amply endowed young rock sou-brettes, including the never-to-be-forgotten Michelle Rohl and (pictured here) Dagmar Petersen, make expensive-looking videos with them that are quite blatant, soft-core porn, and then tie the whole package up with backstage, behind-the-scenes interviews, the aural equivalents of the fact sheets *Playboy* thoughtfully provides with its Bunny pictorials.

As rock-and-roll, all this may be somewhat, er, un-authentic (though it's not that far removed from most of what's on MTV), but if you're the type who can find something simultaneously exploi-

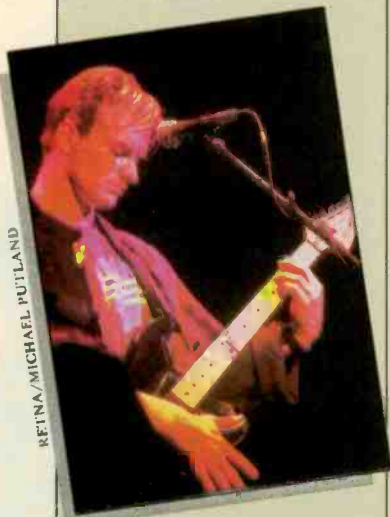
tative and hilarious, you'll probably agree that this is the greatest unintentional comedy video since Pioneer unleashed the Men of Chippendales in *Muscle Motion* on LaserDisc. □

HEAVY-METAL mavens will doubtless recognize the chummy-looking duo pictured here as Kevin DuBrow and Carlos Cavzo of Quiet Riot. But what are these two notorious rowdies doing in the sedate, respectable pages of America's largest-selling music and equipment magazine? Well, it has come to our attention that they have achieved a Historic First. At the close of their recent, wildly successful tour of the Far East, Quiet Riot became the first heavy-metal band to play a major stadium show in Guam, where they were personally introduced to a riotous sold-out audience by the island's governor, the honorable Ricardo J. Bordallo. The thanks of a grateful nation go to all parties connected with this epochal event. □



DuBrow and Cavzo: on Guam

GRACE NOTES: Headbangers everywhere will be delighted to hear that Facts on File has just published the first-ever (to our knowledge) *International Encyclopedia of Hard Rock and Heavy Metal*, a 400-page tome that goes from A (Accept) to Z (Z. Z. Top). . . Warner Brothers' video division is planning a posthumous tape tribute to Peter Ivers, the singer/songwriter and host of Night Flight's *New Wave Theater*, who was murdered two years ago under mysterious circumstances. . . Coming up soon from Kartes Video: newly edited home versions of nearly 190 hours of country-music footage from the Fifties. □



REINA/MICHAEL PUTLAND

Sting: on his own

ous about a solo career without his bandmates in the Police, Sting (né Gordon Sumner) is currently working with a group of young jazz heavyweights including Branford Marsalis and Weather Report drummer Omar Hakim. The ensemble's first album is brand new on A&M, and a live album and tour are already scheduled for the fall. Future Police plans, meanwhile, are very much up in the air. □

THE Chamber Orchestra of Europe, which completed its first U.S. tour earlier this year, made its formal debut in London four years ago. None of the orchestra's members admit to being over thirty years old, but it is a cosmopolitan group that has spent a good deal of its time and youthful energy making

CBS/FOX VIDEO

Stereo Review's critics choose the outstanding current releases

SADE SOUNDS AS GOOD AS SHE LOOKS

THE latest musical import is a British group led by a twenty-four-year-old woman who is as classy as a Rolls Royce but whose music is as contemporary as the current fashions. Her name is Sade (pronounced Shah-DAY) Adu, and she and her three instrumentalists just call themselves Sade. She possesses a model's statuesque beauty, with a sculptured face that has graced the covers of seventeen British magazines in the past year. More to the point, she sounds just as good as she looks, and she shows signs of being a talented songwriter as well.

Sade's album "Diamond Life," which has already sold more than a million copies overseas, was recently released in the U.S. on Portrait. It has a sophisticated pop sound, with traces of jazz in the instrumentals and Caribbean and African influences in the rhythms and textures. It took two years to complete, and the care taken by everyone involved shows. The use of rhythm is tasteful and imaginative, the melodies are carefully crafted and easy to remember, and the lyrics have real substance. All these elements reflect the many influences on the making of Sade Adu as an artist.

Sade Adu was born in Nigeria of an African father and a British mother, who returned to England with her daughter and a son when the marriage was dissolved. Growing up in a bourgeois backwater that had a total black population of three, Sade fell in love with American music, particularly the sounds of such soul singers as Marvin Gaye, Al Green, Nina Simone, and Billie Holiday. After studying fashion design at St. Martin's College in London and launching a career in



Sade: carefully crafted, sophisticated pop with a jazz flavor

that field, she turned to music and joined a British jazz-funk group called Pride.

Now Sade has her own group, and a good one it is. She co-wrote all but one of the songs with Stuart Matthewman, who plays saxophone and guitar, providing a firm musical foundation for the group. Andrew Hale, on keyboards, contributes to the jazz flavor that elevates the group's music above the ordinary, and Paul S. Denman is an unobtrusive but effective bassist. Sade herself delivers the songs with a cool, almost detached style that is strangely effective. They go down easily, but passion, anguish, and a

subdued kind of social commentary are woven into them.

"Diamond Life" is not an album to knock you off your feet or overwhelm you with sheer power, but it will yield greater satisfaction each time you listen to it. *Phyl Garland*

SADE: *Diamond Life*. Sade (vocals); Stuart Matthewman (saxophone, guitar); Andrew Hale (keyboards); Paul S. Denman (bass). *Smooth Operator*; *Your Love Is King*; *Hang On to Your Love*; *Frankie's First Affair*; *When Am I Going to Make a Living*; *Cherry Pie*; *Sally*; *I Will Be Your Friend*; *Why Can't We Live Together*. PORTRAIT BFR 39581, © BFT 39581, © RK 39581, no list price.

VERY SPECIAL MOZART FROM SERKIN, ABBADO

RUDOLF SERKIN'S new recording of Mozart piano concertos, in his continuing series with Claudio Abbado and the London Symphony Orchestra on Deutsche Grammophon, brackets the last of the concertos, No. 27, in B-flat Major (K. 595), with No. 8, in C Major (K. 246). This appears to be Serkin's

third recording of K. 595 but his first of the earlier work.

Serkin is a good deal more leisurely in his new reading of the great B-flat Concerto than he was in his early recordings of it with Alexander Schneider and the late Eugene Ormandy—leisurely, but by no means underanimated. If he lingers over the familiar phrases now, he does so in a way that brings out their individual beauty without in any way impeding the flow of the music or robbing it of its natural momentum. The contrasts in tempo from one movement to the next may be a little blunted in this approach, and in

providing so thoroughgoing a partnership Abbado has had to sacrifice a degree of crispness in favor of a mellower and somewhat "rounder" orchestral presence than some listeners may consider ideal in this music. But the partnership is exceptional, almost as exceptional as Serkin's playing of the solo part. Nor has long familiarity with the concerto in any way dulled the pianist's regard for textural authenticity as illumined by the latest scholarship. In short, this recording is in a very special class. You can treasure it for its own sake, not just because it is "better than" or even "different from" some other versions.

In the earlier and admittedly slighter concerto, Serkin's approach is, appropriately, somewhat crisper and more energetic. But again you sense his deep affection for the music in his every phrase and in the response he draws from Abbado and the orchestra. The quality of the recording itself, in both works, ensures that all the vividness of their music making, as well as its affectionate character, comes through with the fullest impact, especially on CD.

Richard Freed

MOZART: Piano Concerto No. 8, in C Major (K. 246); Piano Concerto No. 27, in B-flat Major (K. 595). Rudolf Serkin (piano); London Symphony, Claudio Abbado cond. DEUTSCHE GRAMMOPHON © 410 035-1 \$10.98, © 410 035-4 \$10.98, © 410 035-2 no list price.

Serkin: in a special class



CHRISTIAN STEINER



POLYGRAM RECORDS

VAN MORRISON: A CONVINCING MYSTICISM

*It is an easy thing to triumph in the summer's sun
And in the vintage and to sing on the
waggon loaded with corn. . . .
It is an easy thing to rejoice in the
tents of prosperity:
Thus could I sing and thus rejoice; but
it is not so with me.*

William Blake

WHEN Warner Brothers severed its sixteen-year association with Van Morrison last year, most people who work in or around the music industry were shocked and saddened. But not worried. Happily, Morrison is back. "A Sense of Wonder," his first album for Mercury (and the fifteenth of his solo career) may suffer from a dreadful jacket, but it works where it counts—in the music.

Like most of Van Morrison's work, "A Sense of Wonder" is part rhythm-and-blues, part gospel, part folk music, and part poetry. More than any other popular-music artist, Morrison has the power to make you stop, disengage from the killing pace of life, and consider for a moment the overlooked world—a fallen leaf, a well-traveled road, a simple sentiment—without being mawkish about it. "A Sense of Wonder" makes you stop and take stock. The title track, for example, is an imaginary walk in an Irish village, sunlit and autumn colored.

This is also a deeply spiritual album, though with no particular religious axe to grind. Rather, Morrison conveys an overarching spiritual presence, a mystical force for good. The theme is treated explicitly, almost devotionally, in *Ancient of Days* and *The Master's Eyes*, but even in *A New Kind of Man* and *A Sense of Wonder* the presence of some watchful being is implicit. Morrison's mysticism is never forced or affected; in fact, it's strangely convincing (strange for a flinty empiricist like me, anyway) largely because of his humanity and optimism.

Perhaps nowhere is this mysticism more in evidence than in *Let the Slave*, an arrangement of verses from William Blake's *Songs of Innocence and Experience*. First in husky, soulful song and then in sharply spoken monologue, Morrison delivers Blake's chastening reproach to the self-satisfied and self-righteous, that "everything that lives is holy." As I listened, I felt as though I'd been slapped in the face. If this were the only song on the album, I would still urge you to pay whatever you had to pay to get it.

The compositions and arrangements on "A Sense of Wonder" represent a retreat from the experiments with synthesizer on Morrison's two last Warner albums, "Inarticulate Speech of the Heart" and "Beautiful Vision." "Wonder" is really much closer to "Astral Weeks" or "Tupelo Honey"—acoustic, moderately paced, intimate. The classic Van Morrison signatures—female gospel chorus, bluesy sax, and that wonderfully

soulful growl—are all here. The back-up personnel are essentially the same as Morrison has used for his last three albums, probably the finest group he's worked with, and the performances are, as you'd expect, perfectly attuned to his singular vision. All of which makes one wonder what Warner Brothers was thinking about—and makes one rejoice that this great artist would not be silenced. *Mark Peel*

VAN MORRISON: *A Sense of Wonder*. Van Morrison (vocals, guitar); vocal and instrumental accompaniment. *Tore Down à la Rimbaud; Ancient of Days; Evening Meditation; The Master's Eyes; What Would I Do Without You; A Sense of Wonder; Boffyflow and Spike; If You Only Knew; Let the Slave (The Price of Experience); A New Kind of Man.* MERCURY 822 895-1 \$8.98, © 822 895-4 \$8.98, © 822 895-2 no list price.

A WARM, RICH, AND LOVELY MAHLER FOURTH

AND still they come—yet more new recordings of the most endearing of Mahler's symphonies, the Fourth, with its closing evocation of a peasant child's vision of life in the hereafter. Bernard Haitink's new one on Philips, the twentieth in the current Schwann, is the sixth digital recording and the fifth available on Compact Disc. Haitink is, of course, a seasoned Mahler interpreter, and

Haitink: seasoned



Alexander: visions of innocence

his Concertgebouw Orchestra has a tradition of Mahler performance that goes back to concerts led by the composer himself.

Warmth and a fine sense of flow characterize Haitink's new reading, and the sonics—at least on CD, which is the version I listened to—are rich and transparent almost to a fault. The sonic clarity is particularly effective in the quietly satanic second movement with its swipes of the deliberately mistuned second violin and the eerie dry pizzicati. While Haitink's slow movement may not achieve quite the rapt quality of Szell's and Karajan's or the intensity of Tennstedt's, his timing of the great climax, with its timpani, cymbals, and bass drum, is well-nigh perfect.

Of special interest in the present recording is the contribution of the gifted American soprano Roberta Alexander, whose recent Etcetera record of Ives songs has won wide attention. Giving voice to the child's view of heavenly life in the finale, she adopts a less naïve and mystical stance than some others have done. For me, her interpretation very convincingly suggests a child in the fresh bloom of adolescence recalling visions of a more innocent time. Her delivery is warm, her enunciation flawless. It is for her performance especially, as well as the lovely recorded sound, that I would recommend this release. *David Hall*

MAHLER: *Symphony No. 4, in G Major*. Roberta Alexander (soprano); Concertgebouw Orchestra, Bernard Haitink cond. PHILIPS 412 119-1 \$10.98, © 412 119-4 \$10.98, © 412 119-2 no list price.

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

AUBER: *Fra Diavolo*. Nicolai Gedda (tenor), *Fra Diavolo*; Mady Mesplé (soprano), Zerlina; Remi Corazza (tenor), Lord Cockburn; Jane Berbié (mezzo-soprano), Lady Pamela; Thierry Dran (tenor), Lorenzo; Michel Trempont (baritone), Giacomo; Michel Hamel (tenor), Beppo; others. Jean Laforge Choral Ensemble; Philharmonic Orchestra of Monte-Carlo, Marc Soustrot cond. EMI/PATHÉ MARCONI 2700683 two discs \$25.96 (from International Book and Record Distributors, 40-11 24th St., Long Island City, NY 11101).

Performance: *Ebullient*
Recording: *Excellent*

Daniel-François Auber's one opera to survive the turn of the century without loss from public view was the rollicking story of *Fra Diavolo*, a latter-day Robin Hood, set in sunny Italy at a country inn. Naturally, the innkeeper's daughter is the heroine of the piece; her fiancé is a brigadier in the local constabulary who is dedicated to capturing Diavolo. There is a cardboard-cutout English couple stopping over at the inn. There are Giacomo and Beppo, bungling henchmen of the protagonist. And there is Diavolo himself, often in disguise, of course, robbing the rich and at the same time flirting with their wives. It's all there, a completely unbelievable and very funny plot.

Come to this dramatic romp with happy and willing suspension of disbelief, and you will have a very good time. That is what the performers here must have done, and the result is a delightful and irresistible musical charade.

Nicolai Gedda brings to the part of Diavolo swashbuckling verve, courtliness, and singing that is always beautifully styled and not infrequently graced with a lovely purity of tone. Like Alfredo Kraus, he is a paragon of tasteful musicality and well-trained, disciplined vocalism—two areas wherein younger singers might look to their example.

Mady Mesplé, also no longer a newcomer to the French operatic scene, sings with infectious warmth, gracious

THE SONGS OF SIBELIUS



Soprano Söderström and piano accompanist Ashkenazy: magical

CONSIDERING that the genius of Finland's Jean Sibelius was primarily manifested in his symphonies and orchestral tone poems, Argo's new complete recording of his songs comes as something of a surprise—but a welcome and most fascinating collection it is. The five-disc set offers performances of uniformly high distinction by the eminent artists Tom Krause and Elisabeth Söderström, with Irwin Gage and Vladimir Ashkenazy providing top-drawer keyboard collaborations and Carlos Bonnell playing lovely guitar accompaniments for the Swedish-language versions of two Shakespeare songs. All ninety-three songs, at least a third of them apparently new to discs, were recorded between December 1978 and November 1981 in the warm acoustic surround of London's Kingsway Hall.

Only ten of the songs are sung by Söderström, but a conspicuous highlight among them is her performance of the extraordinary *Jubal*, Op. 35, No. 1, set to a highly symbolic text by the Swedish painter-poet Ernst Josephson. The freeflowing, at first unaccompanied vocal line is later punctuated by a sparse but wholly telling piano accompaniment; it all adds up to an entirely magical creation. Equally lovely is Söderström's delivery of *A Dragon-fly*, Op. 17, No. 5, with its delicate touches of high coloratura.

Krause is blessed with a voice of great beauty, and he is a past master at using it to the finest artistic effect. The famous *Svarta Rosor*, which opens the set, is done to perfection, with a flawless gradation of expressive intensity and darkening of color as Josephson's words reach a final climax on the refrain "for sorrow's roses are black as night."

The dozen or so other favorite Sibelius songs—chiefly from Opp. 17, 36, and 37—fare beautifully in both singers' interpretations here, but for me the

truly great Sibelius songs are the ones that break away from the popular romances, or romance, style best known in the songs of Tchaikovsky. Among these are *On a Veranda by the Sea*, Op. 38, No. 2, with its bold chromatic texture; the magnificent *Höstkväll (Autumn Evening)*, of which Kirsten Flagstad made a great recording with orchestral accompaniment; and *Teodora*, the companion piece to *Jubal* in Op. 35, which is as creepy as anything in Richard Strauss's *Salome* or *Elektra*. These are all pieces of startling originality and power in which Sibelius seems to have been in the grip of a sort of creative demon over which he had no conscious control.

Then there is the incomparably poignant setting of *Come away, Death* from *Twelfth Night*. It is fascinating to compare Krause's guitar-accompanied performance here (it's his second recording of it) with the several versions with piano—and with the arrangement for string orchestra and harp that Sibelius put to paper in the last year of his life and that was included in the famous Flagstad LP (currently available in France on the Decca label).

Space does not permit further enumeration of the other gem-like miniatures that turn up in this complete survey. I should note, though, that the album includes an elaborate forty-eight-page book with excellent notes by the Sibelius authority Robert Layton and complete texts in the original language and translations. Altogether, this release represents a major contribution to the recorded art-song literature, and it is a must for lovers of Sibelius. *David Hall*

SIBELIUS: *Complete Songs*. Elisabeth Söderström (soprano); Tom Krause (baritone); Vladimir Ashkenazy, Irwin Gage (piano); Carlos Bonnell (guitar). ARGO/POLYGRAM SPECIAL IMPORTS 411 739-1 five discs \$44.90.

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humor, and style; she manifestly enjoys what she is up to, and her feelings are communicated to the listener. As the English couple, Jane Berbié and Remi Corazza are delightfully stuffy and proper, while Giacomo and Beppo are straight out of Laurel and Hardy (indeed, those two actors played these same parts in a 1933 film). As the love-smitten Lorenzo, Thierry Dran is ardent and unreasonable and sounds very good indeed.

Supporting all of this heartwarming nonsense is Auber's score—energetic, lilting, melodious, and filled with *joie de vivre*. It is not deep music; it is probably not even first-rate music. But it teems with life, good humor, and a sure sense of theater. And it is given a mettlesome performance by Marc Soustrot and the forces assembled under his direction. *R.A.*

BACH: *Badinerie* (see MOZART)

BACH: *Mass in B Minor*. Arleen Augér (soprano); Julia Hamari (soprano and alto); Adalbert Kraus (tenor); Wolfgang Schöne (baritone); Siegmund Nimsgern (bass); Gächinger Kantorei Stuttgart; Bach Collegium Stuttgart, Helmut Rilling cond. CBS M3 39233 three discs, no list price.

Performance: *Very good*
Recording: *Excellent*

In general, this is a fine performance of the B Minor Mass. Helmut Rilling's approach is straightforward, his pacing dignified. The soloists are excellent, especially Arleen Augér and Siegmund Nimsgern, and they are skilled in ensemble singing with their fellow soloists and instrumentalists. The choral sound is strong, clear, and well articulated, and the instrumental sound is opulent and impressive.

The chorus, however, contributes most of the excitement in this performance. Listen, for instance, to the incred-

ible explosion they make of the "*et resurrexit*" after the almost inaudible "*sepultus est*." But in addition to their dramatic exposition of the text, their drive and rhythmic energy create many moments of exquisite exaltation. And the fine trumpeters who add festive brilliance to these moments deserve praise as well.

Although there are some curious stylistic discrepancies in performance practice—missapplied French rhythmic alterations in some of the flute playing and a few unwanted slides by the violinists—the style is basically modern and serves this sturdy masterpiece well. The recorded sound is superb. *S.L.*

BARTÓK: *String Quartets Nos. 1-6*. Takács Quartet. HUNGAROTON ● SLPD 12502/04 three discs \$38.94.

Performance: *Promising*
Recording: *Powerful*

The four young members of the Takács Quartet formed the ensemble ten years ago, when they were still students at the Liszt Academy in Budapest, and now, having won several international competitions, they are in the midst of a four-year residency at the University of Colorado. You'd expect them to bring a sure sense of authority to the Bartók quartets, but I found their performances here more "promising" than really fulfilling, suggesting that for all their impressive technical equipment and intensity of approach they have simply not digested the works sufficiently.

The performances are impressive technically. There is a great deal of stunning playing and, indeed, very little that is below the highest level, but I found myself admiring the *players'* sound more than I was drawn into Bartók's own sound world. What struck me in Quartet No. 1 was the coincidence that Schoenberg and Bartók both assigned the opus number 7 to their respective first quartets and how smoothly and

rather anonymously the music unfolded—especially in the fast movements. While the aforementioned intensity is beautifully sustained in the slow movements, it explodes in such passages as the ends of the Third and Fifth Quartets, where excessive speed produces an impression of frenzy that shatters one's attention instead of holding it. All too infrequently in the fast sections—in the penultimate movement of the Sixth Quartet, for example (the *Burletta*)—does Bartók's personality come through wholly and unmistakably.

The sound itself seems to emphasize power more than transparency, but it is generally good and well balanced. János Kárpáti's annotation is exceptionally comprehensive and informative. *R.F.*

BEETHOVEN: *Symphony No. 9, in D Minor, Op. 125 ("Choral")*. Janet Perry (soprano); Agnes Baltza (contralto); Vinson Cole (tenor); José van Dam (baritone); Wiener Singverein; Berlin Philharmonic Orchestra, Herbert von Karajan cond. DEUTSCHE GRAMMOPHON © 410 987-2 no list price.

Performance: *Solid*
Recording: *Occasionally harsh*

Karajan's fifth recording of the Beethoven Ninth, his first digitally recorded one, is to serve as the soundtrack of a Telemondial television production; this means, I believe, that at least parts of it came from live takes. It has the same alto, baritone, and chorus as his fourth version, released in 1977 as part of his second stereo package of all the Beethoven symphonies. That performance is still circulating in the big box and also separately, in a two-disc set with No. 8, while Karajan's 1962 recording is available now on a single LP in DG's Privilege series.

On balance, the 1977 version stands up best, I think, and this newest one is really for those who simply must have a Karajan Ninth on CD. As a perform-

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ance, it is a bit more expansive, less taut, than his earlier ones (most noticeably in the opening movement), but it is characteristically Karajan in its solidity, its reliability, its all-round integrity: truly noble Beethoven, even if not a first choice. Again, as before, the repeat in the scherzo is omitted, and the sonic focus tends to make the chorus sound less than lustrous.

The two replacements in the solo quartet may represent the weakest points in the new performance. Janet Perry is unimpressive here, especially in comparison with Anna Tomowa-Sintow in the 1977 version. Vinson Cole actually does quite well in his march episode, even managing a certain Patzakian sweetness, but Peter Schreier, in the 1977 recording, is on an altogether higher level.

This new performance is packaged with the Fifth Symphony on LP and cassette, in which forms I have yet to hear it or the new Fifth. The sound is, to my ear, not the huge improvement over its last analog predecessor one might have expected. Though it is smoother than many other recordings made in the Philharmonie, it's still a bit hard and tends occasionally toward a harshness severe enough to make listening uncomfortable. For a Ninth on CD—perhaps not an only version, but to alternate with a favored LP recording—my choice would be Otmar Suitner's on Denon. It is a strong, warmhearted performance, the repeats are taken, the chorus is more in the picture, and the sound, as is characteristic for Denon, is a prime demonstration of the capacities of the new medium at its smooth and stunning best. R.F.

BRUCH: Violin Concerto No. 1 (see MENDELSSOHN)

CHABRIER: Le Roi malgré lui. Barbara Hendricks (soprano), Minka; Isabel Garcisanz (soprano), Alexina; Gino Quilico (baritone), Henri de Valois; Peter Jeffes (tenor), Nangis; Jean-Philippe Lafont (bass), Fritelli; Chris de Moor (bass), Lasky; others. Chorus and New Philharmonic Orchestra of Radio France, Charles Dutoit cond. ERATO/RCA ● NUM 751623 three discs \$21.98, © MCE 751623 two cassettes \$21.98.

Performance: *Admirable*
Recording: *Well-balanced, clear*

Based upon a fact of history—the brief and reluctant kingship of France's Henri III in Poland—the story of Chabrier's *Le Roi malgré lui* suffered at the hands of various librettists only to be finished by the composer himself. The result is an appalling, virtually incomprehensible mishmash of hidden identities, court intrigues, and ill-starred love affairs. That the final curtain descends on a resolved situation is miraculous.

But let's forget the book; it is the music that sweeps us along. And beautiful music it is—elegant, lyrical, written with a sure sense of dramatic purpose.

We all know the famous polonaise that opens Act II, and it is undeniably a show stopper, but the entire score teems with music of the first order (a helpful musical analysis is part of this set's excellent notes on Chabrier and accompanying libretto). The recording has, wisely, been stripped of the spoken dialogue; instead, there are descriptions of the action taking place between the set pieces. The musical sections, as varied as the action they depict, are conducted by Charles Dutoit with uncommon feeling for Chabrier's many moods. They are also played and sung handsomely.

Barbara Hendricks sings very appealingly as Minka, the slave girl, while Isabel Garcisanz, as Alexina, brings a fine sense of drama to her part. Of the men, Gino Quilico distinguishes himself as Henri, singing with a warm, smooth, well-placed baritone, and Peter Jeffes, as Nangis, uses his clear, expressive voice to portray his role affectingly. The two basses execute their music with rich sonority. In short, the opera is well cast with very competent singers.

Because of the difficulties inherent in the libretto, my advice is to forget what is going on and just listen. In doing so, you will be handsomely rewarded, for as a composer Chabrier had few contemporary equals. R.A.

DEBUSSY: Chansons de jeunesse; Fêtes galantes I; Trois mélodies de Verlaine; Deux romances. Anne-Marie Rodde (soprano); Noël Lee (piano). ETCETERA ● 1026 \$12.98, © XTC 1026 \$12.98.

DEBUSSY: Trois chansons de Bilitis; Trois chansons de France; Fêtes galantes II. ENESCO: *Sept chansons de Clément Marot.* ROUSSEL: *Light, Op. 19, No. 1; Deux mélodies, Op. 20; Deux poèmes chinois, Op. 35; Jazz dans la nuit, Op. 38.* Sarah Walker (mezzo-soprano); Roger Vignoles (piano). UNICORN-KANCHANA ● DKP 9035 \$11.98, © DKC 9035 \$11.98, © DKP(CD) 9035 \$17.

Performances: *Superior*
Recordings: *Very good*

Both of these recordings offer cultivated performances that share several points of excellence. Both singers are involved in and identify with the music at hand and they use the French language as a part of each song, articulating it beautifully and pronouncing it with exceptional clarity. Both create from each individual song an arresting vignette that is complete and whole unto itself, so that each collection is like pictures hung side by side in a museum. And both singers are meticulous in their attention to the composer's musical desires. On occasion I found myself saying, "Ah, so that's what this song is all about!"

Under these circumstances, is there any basis to choose between the two records? The Enesco-Roussel-Debussy album by Sarah Walker obviously offers greater musical variety, while Anne-

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Marie Rodde's all-Debussy program provides a broad sampling of that composer's art. If I had to select one, I think my vote would go to Walker, whose warm, full, easily produced mezzo-soprano is at times luminous in its expressivity and, thanks to its middle range, makes the poetry particularly understandable. Rodde sings with sure knowledge of her material, but there is a bit of French nasality in her voice. Even so, she displays less of this quality than do most singers of French *chansons*.

Which should you buy? Why not both?
R.A.

DEBUSSY: Piano Trio in G Major. DVORÁK: Trio in F Minor, Op. 65. Western Arts Trio. LAUREL LR-127 \$9.98.

Performance: *Fluent*
Recording: *Close up*

In the fall of 1880, while in Italy with Tchaikovsky's patron Nadezhda von Meck and her children, Debussy made his only effort ever to compose a trio for piano, violin, and cello. As David Tomatz, the Western Arts Trio's cellist, advises in his comprehensive and exemplary annotation for this première

recording, the music was presumed lost for nearly a hundred years, till parts of it turned up at an auction in Paris and were eventually given to the Pierpont Morgan Library in New York.

The ten-minute piece is by an obviously gifted and obviously French composer who had yet to begin formal composition studies and to become the Claude Debussy known to us. If we don't insist on listening for the familiar characteristics, the music offers considerable enjoyment, though it is in no way exceptional or particularly memorable. I think it would take real determination to discover strong hints of the mature Debussy here. It is played with fluency and conviction, however, and it does make an interesting filler for the Dvořák Trio in F Minor, which often takes up two whole sides by itself (the Debussy is very sensibly placed first on the disc).

The Dvořák, too, receives a very competent performance, though not one to displace my affection for the recordings of it by the Suk Trio and the Beaux Arts Trio. The sound is vividly clear, but, to my ear, the extremely close focus tends to give a raw edge to what might have sounded silky smooth in an aural perspective related more to the audience than to the players. Aside from that, Laurel's usual production care is in evidence.
R.F.

ENESCO: Sept chansons de Clément Marot (see DEBUSSY)

MAHLER: Symphony No. 4 (see Best of the Month, page 75)

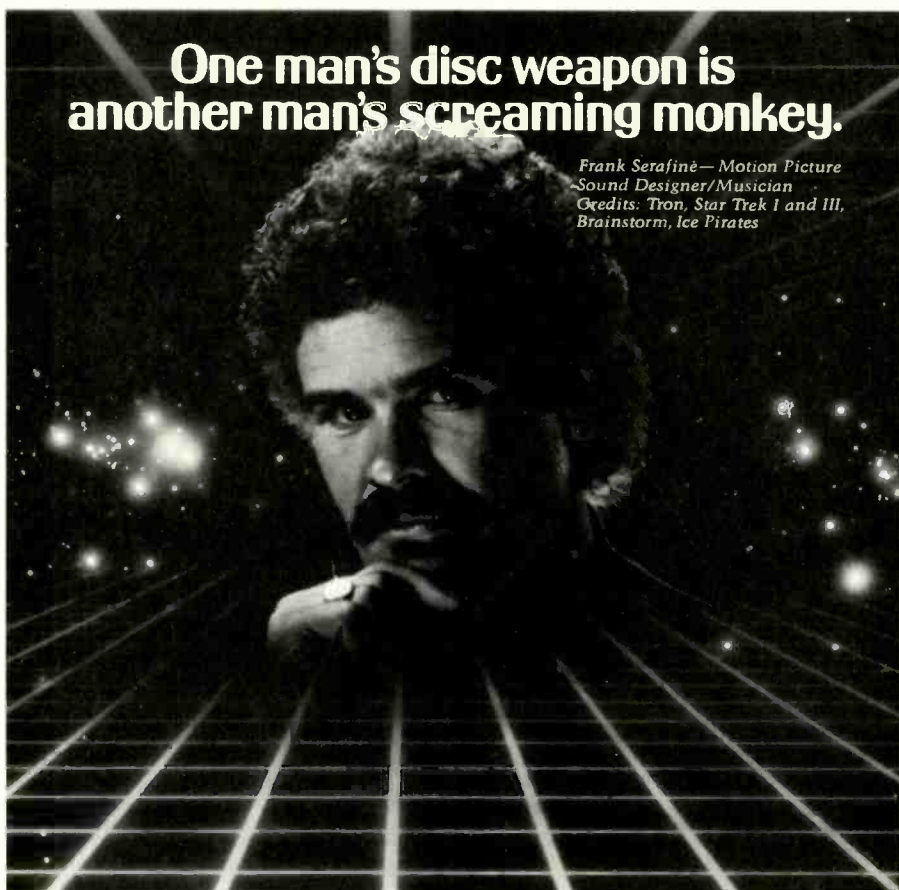
MENDELSSOHN: Violin Concerto in E Minor; Octet in E-flat Major. Pinchas Zukerman (violin, in concerto); Saint Paul Chamber Orchestra, Pinchas Zukerman cond. PHILIPS 412 212-1 \$10.98, 412 212-4 \$10.98, 412 212-2 no list price.

Performance: *Underanimated*
Recording: *Very good*

MENDELSSOHN: Violin Concerto in E Minor. BRUCH: Violin Concerto No. 1, in G Minor. Itzhak Perlman (violin); Concertgebouw Orchestra, Bernard Haitink cond. ANGEL DS-38150 \$11.98, 4DS-38150 \$11.98, CDC 47074-2 no list price.

Performance: *Matter-of-fact*
Recording: *Excellent*

No one need be told that Pinchas Zukerman is one of the supreme masters of the violin, that he probably could not produce an ugly sound if he tried, but in his remake of the Mendelssohn concerto his conductor lets him down. For all the beautiful sounds, the performance simply lacks animation. It is not merely a matter of slow tempos. Cho-Liang Lin actually takes a bit longer to perform the concerto on CBS, but with Michael Tilson Thomas conducting, that performance (paired with Saint-Saëns's Third Concerto) exudes a magical vitality while Zukerman's merely



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seems cautious. In his overside account of the octet the impression is much the same except in the famous scherzo, which comes to such glowing life as to make its companion movements seem especially dull.

Itzhak Perlman, in his remake of the now classic Bruch/Mendelssohn coupling, is a good deal more animated than Zukerman and has superb partners in Bernard Haitink and his great orchestra. But, for all Perlman's unarguably beautiful fiddling, these new performances strike me as somehow rather matter-of-fact, lacking the irresistible conviction of his earlier ones with André Previn. Still, there is much enjoyment to be had from the new recording, and particularly from the stunning Compact Disc version. *R.F.*

MOZART: Flute Concerto No. 1, in G Major (K. 313). QUANTZ: Flute Concerto in G Major. BACH: Badinerie. Simion Stanciu (panpipes); Chamber Orchestra of Lausanne, Armin Jordan cond. ERATO/RCA NUM 75187 \$10.98, © MCE 75187 \$10.98, © ECD 88104 no list price.

Performance: *Stunning*
Recording: *Very good*

Yes, panpipes! The sound is clear, sweet, and penetrating, the articulation sharp and precise. Simion Stanciu presents this remarkable device not as a gimmick but as a serious musical instrument, and his initial presentation, the *Badinerie* from Bach's Suite in B Minor for Flute and Strings, shows he is a true virtuoso. Having proved his virtuosity, however, Stanciu demonstrates the true musical qualities of the panpipes with brilliant performances of the two flute concertos. Although the instrument's inherently crisp articulation is better for the Baroque figurations of the Quantz concerto, the Mozart comes off very well too, and the slow movement is surprisingly effective.

Considering how fiercely difficult the panpipes must be to play and how gimmicky this recording could have become, I think Stanciu should be congratulated for stressing the instrument's musical side in his fine performances and choice of repertoire here. You wonder what the early-music crowd will think. Reviving an instrument from classical antiquity is certainly a supreme act of one-upmanship. *S.L.*

MOZART: Piano Concertos Nos. 8 and 27 (see Best of the Month, page 74)

RACHMANINOFF: Piano Concerto No. 2, in C Minor, Op. 18; Rhapsody on a Theme of Paganini, Op. 43. Cécile Ousset (piano); City of Birmingham Symphony Orchestra, Simon Rattle cond. ANGEL ◊ DS-38087 \$11.98, © 4DS-38087 \$11.98.

Performance: *Sweepingly lyrical*
Recording: *Splendid*

The coupling of Rachmaninoff's two most popular works has become quite

standard since the Second Concerto was first made to fit on a single LP side. Most of the versions available now, from the bargain-priced analog recording by Earl Wild and Jascha Horenstein on Quintessence to the still older one by Rubinstein and Reiner, which RCA recently transferred to CD, are eminently satisfying. But after living with this new one for a couple of weeks, I'm inclined to judge it the most satisfying of all in terms of both performance and sonics. Soloist Cécile Ousset, conductor Simon Rattle, and the Birmingham orchestra all do Rachmaninoff proud, and

so do the engineers. There is nothing the least bit unconsidered here in the meshing of the solo and orchestral parts, and yet in both works there is a sweeping sense of spontaneity as well as sheer relish of the music, of its lyric qualities in particular. How remarkably fresh it all is, and how vividly the splendid recording (enhanced by Direct Metal Mastering) projects it. If you're going to pay full price for these titles, I think this recording has to be the choice. *R.F.*

ROUSSEL: Mélodies (see DEBUSSY)



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Discs and tapes reviewed by
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BRYAN ADAMS: *Reckless.* Bryan Adams (guitar, vocals); vocal and instrumental accompaniment. *One Night Love Affair; She's Only Happy When She's Dancin'; Run to You; Heaven; Somebody;* and five others. A&M SP 5013 \$8.98, © CS 5013 \$8.98, © CD 5013 no list price.

Performance: *Winning*
 Recording: *Great*

A good friend whose judgment I usually trust warned me I'd like this record. Nonsense, I thought. Bryan Adams is the epitome of Brand X rock, a blond, black-leather MTV version of generic canned beans. Well, my friend was right. It may be the supersonic production or Adams's 2,000,000-volt, turbine-driven power chords, or it just may be the album's ten solid, hard-rocking songs about life's simple pleasures and pains—dancing, sex, heart-break, alimony, and rock-and-roll. But one thing is clear: "Reckless" puts the pedal to the metal. Adams won't win any awards for originality—this really is generic rock—but he carries it off with confidence and energy. Best cut: *Kids Wanna Rock.* M.P.

ALABAMA: *40 Hour Week.* Alabama (vocals and instrumentals); instrumental accompaniment. *Forty Hour Week (For a Livin'); Can't Keep a Good Man Down; There's No Way; Down on Longboat Key;* and six others. RCA AHL1-5339 \$8.98, © AHK1-5339 \$8.98, © PCD1-5339 no list price.

Performance: *Familiar territory*
 Recording: *Good*

Three songs into the new Alabama album, you realize you've heard this one before. Well, not *exactly*, mind you, but it's patterned rather closely on the formula of the group's last album, "Roll On." Just as that one opened with a tribute to the brave men who drive the eighteen-wheelers, "40 Hour Week" starts out with a sentimental salute to our hard-toiling American factory workers. (Nothing like pandering to your fans.) After that the Alabama boys hit pretty much the same nails they hammered before—a quiet, "sensitive" song about one woman's pain, another "sensitive" song on the order of *When We Make Love* (with a sort of "If we're

MISSED CONNECTIONS, HIDDEN HEARTS

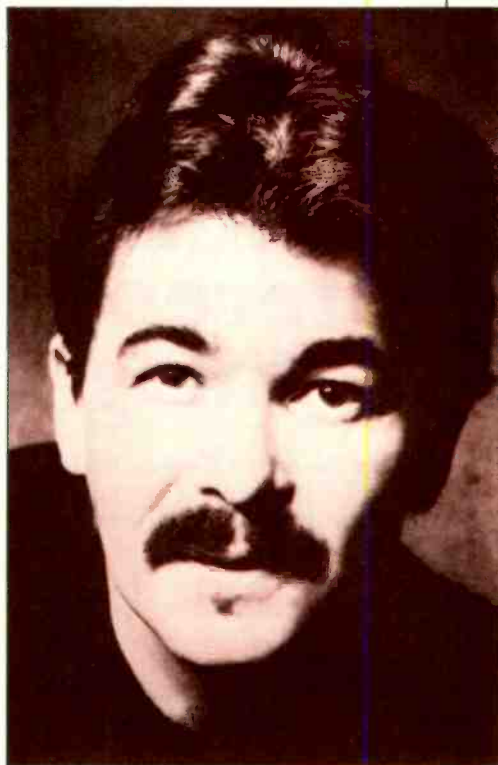
IN the Seventies, singer/songwriter John Prine and his friend the late Steve Goodman carved out a niche in American popular music that few other artists, in or out of the country/folk milieu, attempted to fill—that of illuminating the glories and foibles of everyday life with gentle wit, occasional cynicism, and soft-eyed but right-hearted sentiment. At least three of Prine's songs—*Sam Stone*, about the disenfranchisement of the Vietnam vet; *Hello In There*, concerning the neglect of the elderly; and *Paradise*, about the ravages of strip mining—also established him as one of the Seventies' most lyrical socially conscious critics.

Prine's work grew erratic in the mid to late Seventies, and then, in 1980, after recording seven albums for two major labels, he disappeared altogether. Now he is back with a strong and engaging album on his own label, Oh Boy Records.

Produced by Prine and Jim Rooney, "Aimless Love" takes a leaner, simpler production approach than Prine's last commercial album, "Storm Windows," and with the exception of one track, *People Puttin' People Down*, which was produced by Steve Goodman, the arrangements don't seem quite as inspired as those on "Bruised Orange," the Goodman-produced album of 1978 that is generally considered Prine's masterpiece.

Nonetheless, "Aimless Love" is a glorious album, full of songs about love in all its incarnations and stages—missed connections, hidden hearts, blushing romance, one-sided affairs, and special friendships—and the consequences that come when it's given and when it's taken away. Never sappy, sometimes complex, and always terse in Prine's trademark way, some of the songs were written by Prine alone and others in collaboration with such writers as Donnie Fritts, Roger Cook, Bobby Braddock, and Shel Silverstein.

For all the seriousness of his theme, the wry, whimsical quality of some of Prine's best lyrics is still very much in evidence here, particularly on *The Bottomless Lake*, the story of a family that goes out for a drive and ends up floating in a you-know-what, and *Maureen, Maureen*, one of Prine's finest and most haunting pieces of comic tragedy. Add-



John Prine: wry, whimsical, poignant

ing to the effect is Prine's dry-throated, irony-laced delivery, always so reminiscent of Dylan but stronger here than on past records.

As poignant as much of this album is, it's even sadder that artists of Prine's stature have to go to independent labels to ensure the quality of both their work and the product itself—or simply to be heard at all. The fact that Prine has prevailed makes "Aimless Love" a cause for double celebration. *Alanna Nash*

JOHN PRINE: *Aimless Love.* John Prine (vocals, rhythm guitar); instrumental accompaniment. *Be My Friend Tonight; Aimless Love; Me, Myself and I; The Oldest Baby in the World; Slow Boat to China; Bottomless Lake; Maureen, Maureen; Somewhere Someone's Falling in Love; People Puttin' People Down; Unwed Fathers; Only Love.* OH BOY 002 \$9 (from Oh Boy Records, P.O. Box 67800-5333, Los Angeles, CA 90067).

going to do it, I want to make sure I know your first name" theme), and another of those dreary, flag-waving, there's-no-place-like-Dixie ditties. With "40 Hour Week" it's fairly obvious that the only cause these Rebels have is their own. God knows it isn't music. *A.N.*

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BRYAN BOWERS: *By Heart*. Bryan Bowers (vocals, autoharp); vocal and instrumental accompaniment. *Hot Buttered Rum*; *Dog*; *I'll Fly Away*; *Zen Gospel Singing*; *Black Heart*; *Ezekiel*; *Rickett's Hornpipe*; and five others. FLYING FISH FF 313 \$8.98, © 90313 \$8.98.

Performance: *Sweet serenity*
Recording: *Very good*

When Bryan Bowers leaves the concert stage, audiences often walk out of the hall thinking they can levitate, paint colors in the air, and maybe even see Jesus. It's something about the autoharp, I think. Audiences never expect much from it, remembering it from grade school as a funny little pushbutton instrument that even the class dunce could play. In Bowers's hands however, it becomes capable of producing not only exalted tones but anything from fiddle tunes to multifaceted adaptations of pop, folk, gospel, and even classical compositions.

In "By Heart" Bowers's third album for Flying Fish, several selections qualify as sterling examples, especially *Zen Gospel Singing*. The tune, written by Mark Graham, is as funny a send-up of hippie culture as you are ever likely to hear. Bowers and members of the Seldom Scene lay out the saga of a Baptist who becomes a Buddhist, singing of the wonders of Zen in four-part gospel harmony. Humor aside, there are songs here too, like the rendition of *Ezekiel* by Bowers, banjoist Stephen Wade, and two members of New Grass Revival, that will have you up and jumping in fervent gospel joy. A charmer. *A.N.*

BILLY BRAGG: *Brewing Up with Billy Bragg*. Billy Bragg (vocals, guitar); other musicians. *It Says Here*; *Love Gets Dangerous*; *The Myth of Trust*; *From a Vauxhall Velox*; *A Lover Sings*; and six others. CD PRESENTS LTD. CD 207 \$6.98, © CD 029 \$6.98 (plus \$2.50 postage and handling from CD Presents Ltd., 1230 Grant St., Suite 531, San Francisco, CA 94133).

Performance: *Puckish*
Recording: *Okay*

Billy Bragg, England's post-punk, electric-guitar-carrying answer to the current Bob Dylan shortage, returns here with another low-budget recording of his witty, perceptive, and terribly English ruminations on the state of the world and his love life. Basically a sort of one-man Clash with a flair for Ray Davies-style wordplay, Bragg rambles on here in slightly slicker fashion than when last heard from (that is, occasionally he overdubs an acoustic guitar or an organ accompaniment). As before, he held my interest even though his world view might be considered perhaps a bit too parochial for American listeners (I'm not sure his stuff really travels well). *A Lover Sings*, however, is a romantic, well-written, and sharply observed look at the course of an affair, and the album overall is worth the effort it takes to get into it. *S.S.*

LADY PANK: *Drop Everything*. Lady Pank (vocals and instrumentals). *Minus Zero*; *Hustler*; *Hero*; *The Zoo Without a Keeper*; and six others. MCA MCA-5558 \$8.98, © MCA-5558 \$8.98.

Performance: *Nothing special*
Recording: *Good*

I am informed that Lady Pank (pronounced "punk") is the most popular rock group in Poland, as well as the first band from behind the Iron Curtain to secure a major American record deal. I am delighted, of course, that the spirit of détente still lives, and since the West did give Poland Iron Maiden, this kind of cultural free trade is probably only fair. Still, the spirit of international cooperation aside, what we get on this debut album is fairly standard New Wave hack stuff, something like a cross between Men at Work and a decent local club band from Milwaukee. It all goes down easily enough, I suppose, and the group's English is no worse than, say, Abba's, but as Polish imports go, this one is about as scintillating overall as a kielbasa. *S.S.*

JULIAN LENNON: *Valotte*. Julian Lennon (vocals, keyboards, guitar); other musicians. *Valotte*; *O.K. for You*; *On the Phone*; *Space*; and six others. ATLANTIC 80184-1 \$8.98, © 80184-4 \$8.98, © 80184-2 no list price.

Performance: *No subtext*
Recording: *Nice*

Julian Lennon is pretty spectacular proof of the notion that talent can be inherited. He sounds so much like his father at times, especially when he switches into falsetto, that it's positively eerie. What his debut album doesn't prove, however, is whether artistic vision can be inherited. The music here, to be sure, is all very pleasant—understated, reflective stuff that clearly bespeaks a lifetime of listening to his father's albums *circa* "Walls and Bridges" (which was not, of course, the senior Lennon's most fertile period). But once the hooks sink in, and once you get over the initial irony of hearing a very young man making what is essentially middle-aged music, you realize that there's really not much on "Valotte" with any depth to it. Mostly, what Lennon is offering here are what his father's former partner Paul McCartney used to call Silly Love Songs. It will be interesting to see whether he can come up with anything more substantial as he matures. *S.S.*

TEENA MARIE: *Starchild*. Teena Marie (vocals, guitars, piano, percussion, synthesizer); instrumental accompaniment. *Lovergirl*; *Youngblood*; *Out on a Limb*; *Alibi*; *Starchild*; *We've Got to Stop*; and three others. EPIC FE 39528, © FET 39528, no list price.

Performance: *Aerobic testifying*
Recording: *Hopped up*

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to steam up your windows all by itself. It's also a strange bundle of contradictions. Teena Marie is a woman who has herself together enough to write, arrange, and produce an album, sing the lead vocals, and chip in on guitar, piano, synthesizer, and percussion—and all she seems to want to do is moan over some guy's cosmic kisses and whine about his drug habit. One minute she's reciting the New Testament to this freak, and the next she's fainted away in his arms. One wonders why a woman who quotes St. Paul would put up with a cokehead. One also wonders how long the *Flashdance* set, at whom this record is squarely aimed, will sit still for Galatians, Chapter Four.

On the other hand, after twenty minutes of aerobic terpsichorean torture, you probably can't make out what Teena Marie is saying anyway. All you hear is that teeny little vibrato fluttering on a satiny cushion of synth. A pleasant enough sound if you're at the point of total exhaustion, although listeners at more normal levels of awareness might argue the point. *M.P.*

VAN MORRISON: *A Sense of Wonder* (see Best of the Month, page 74)

OILY RAGS. Oily Rags (vocals and instrumentals). *Come Up and See Me Anytime; Boiled Beef and Carrots; Time to Kill; Holy Cow;* and six others. SIGNATURE FW 39524, © FWT 39524, no list price.

Performance: *Veddy charming*
Recording: *Good*

Oily Rags is a fairly indescribable British foursome led by Chas Hodges and Dave Peacock on vocals, piano, guitars, and bass. Think of a combination of the old Steeleye Span, Fairport Convention, the Band, early Leon Russell, Dr. John, Kris Kristofferson, and maybe even the late Steve Goodman, and you'll have an inkling of what the group sounds like. Their forte is country-blues laced with an occasional melancholy folk feel, and they serve it up with a warmth, insouciance, and quiet sense of humor that I, for one, find impossible to resist. Now that I've dropped all those big names, I feel I should explain that this is a "little" album, devoid of fancy production and glitz. But if you're looking for a nice little record to hoist a pint over, this one is certainly worth your money. *A.N.*

DOLLY PARTON: *Real Love*. Dolly Parton (vocals); instrumental accompaniment. *Think About Love; We Got Too Much; It's Such a Heartache; Don't Call It Love; Real Love;* and five others. RCA AHL1-5414 \$8.98, © AHK1-5414 \$8.98.

Performance: *Valiant effort*
Recording: *Good*

When Dolly Parton hits her full vocal stride, it is readily apparent that she is one of the most expressive singers of our generation, and a bone-chilling per-

former as well. There are several such moments in her new album, "Real Love," but on the whole it's about as shallow a record as you'll find anywhere. It's also uneven—so uneven, in fact, that you'd think there were several producers involved instead of just one, David Malloy, known primarily for his work with Eddie Rabbitt.

Most of the material is pop, which is fine, but only a few of the songs (*Don't Call It Love, It's Such a Heartache, Once in a Very Blue Moon*) were worth doing. The title tune, a duet with Kenny Rogers, sounds like a quick attempt to ride their *Islands in the Stream* tidal wave, and the original songs Parton contributed sound like either leftovers from her Porter and Dolly days or cock-eyed attempts to pull an Elvis. In short, there's no focus or cohesion here at all. Of course, if you're a Parton freak (as I am), you'll probably enjoy it anyway, especially when she hits those gorgeous strides. *A.N.*



Smith and Orzabal of Tears for Fears

ROMAN HOLLIDAY: *Fire Me Up*. Roman Holliday (vocals); instrumental accompaniment. *One Foot Back in Your Door; Fire Me Up; Hear It in the Night; Keep the Night Away; Runaway; I'll Wait;* and five others. JIVE/ARISTA J18-8252 \$8.98, © JC8-8252 \$8.98.

Performance: *Hot romance*
Recording: *Crackling*

While the group's name conjures images of leather-jacketed rude boys out to get some kicks hoovering Bolivian baking soda and terrorizing bespectacled public-school boys, from what I can gather of "Fire Me Up," Roman Holliday is really a bunch of nice young men with a fondness for rockabilly and romance. Their only fault is that they weren't born Duran Duran.

"Fire Me Up" is a collection of power-packed pop tunes, very English, whose roiling guitars and New Romantic sentiments fall somewhere between the Stray Cats and Spandau Ballet. Enlightening? Not really. Essential? Hardly. A worthy release for fans of music with a hot beat and a British accent? Definitely. *M.P.*

SADE: *Diamond Life* (see Best of the Month, page 73)

TEARS FOR FEARS: *Songs from the Big Chair*. Tears for Fears (vocals and instrumentals); instrumental accompaniment. *Shout; The Working Hour; Everybody Wants to Rule the World; Mothers Talk;* and four others. MERCURY 824 300-1 \$8.98, © 824 300-4 \$8.98, © 824 300-2 no list price.

Performance: *Resolute*
Recording: *Excellent*

It's been nearly a year and a half since the first Tears for Fears album, "The Hurting," was released in this country. A deeply melancholy work, it nonetheless exhibited a confident, sophisticated, and musical approach to the use of synthesizers. "Songs from the Big Chair" should succeed where "The Hurting" failed in securing an American audience for Tears for Fears. Songwriters Curt Smith and Roland Orzabal have largely discarded the lachrymose tone that weighed down "Hurting" and show a more assertive attitude.

Take the first British single from the new album, *Shout*. Where once they considered the possible merits of suicide, Smith and Orzabal now advocate rebellion and defiance: "Shout it out: these are the things I can do without." The new album also benefits from more fleshed-out arrangements. The band now includes full-time piano, occasional saxophone, and some feisty, steel-edged rhythm-guitar work (particularly on the first U.S. single, *Everybody Wants to Rule the World*). Most important is that Tears achieves an enhanced commercial potential without sacrificing the emotional content that made "The Hurting" such a powerful record. Smith and Orzabal's vocals are especially gutwrenching.

Ranging in tone and tempo from the gliding, Steely Dan-like shuffle of *Everybody Wants to Rule the World* to the haunting melody of *Listen*, repeated over and over on guitar and keyboard against an agitated backdrop of reverberating footsteps and closing doors, "Songs from the Big Chair" evokes a strong response with memorable melody writing, purposeful arrangements, and a resolute performance. *M.P.*

TOTO: *Isolation*. Toto (vocals and instrumentals); other musicians. *Carmen; Angel Don't Cry; Isolation; Stranger in Town; Holyanna;* and five others. COLUMBIA QC 38262, © QCT 38262, no list price.

Performance: *Slickness unto death*
Recording: *Very good*

No news here. Toto continues to grind out its imitable branch of high-tech radio pop, inhabiting that surprisingly broad spectrum between Barry Manilow and Foreigner and still saying absolutely nothing. Of course, I would be the last to criticize any band affluent enough to hire the London Symphony Orchestra to play its string arrangements, as Toto does here on *How Does It Feel*, and to be fair, one song, *Stranger in Town*, actually evokes a kind of

POLYGRAM RECORDS

film noir misterioso quality that is genuinely appealing. Mostly, though, the stuff on "Isolation" is pretty close to Muzak. S.S.

VANGELIS: Soil Festivities. Vangelis (synthesizers). *Movements 1-6*. POLYDOR 823 396-1 \$8.98, © 823 396-4 \$8.98, © 823 396-2 no list price.

Performance: *Organic*
Recording: *Excellent*

Although best known for the music for *Chariots of Fire*, Vangelis's non-sound-track albums tend to have a less anthemic, more programmatic quality. His seventh solo album, "Soil Festivities," is no exception. These "Festivities" were inspired by life processes at the earth's surface. The slow, wandering melodies and pulsating counter-rhythms are as deliberate as a colony of ants on the march and as unhurried as a budding flower. Side one is a bit muted, even comatose, while the vital signs on side two are more vigorous. It's all pretty intriguing and altogether just the right accompaniment to an afternoon's benchwork at the microscope or a leisurely browse through *Scientific American*. I don't recommend this album as background music with dinner, though; it's apt to get you thinking a little too much about the tiny organisms you may not have steamed away. M.P.

THE WHO: Who's Last. The Who (vocals and instrumentals). *My Generation; I Can't Explain; Substitute; Behind Blue Eyes; Baba O'Reilly; Boris the Spider*; and ten others. MCA MCA2-8018 two discs \$10.98, © MCAC2-8018 one cassette \$10.98, © MCAD2-8018 two CD's no list price.

Performance: *Dismal*
Recording: *Dank*

Anybody who saw the Who on their final American tour saw a pretty depressing spectacle—a tired, dispirited band only too obviously going through the motions. "Who's Last," a live document of that unhappy tour, should never have been released. The performances are lethargic and unexpectedly (and unlikely) ragged, and the recording is barely of bootleg quality. Even the bonus of a rave-up version of *Twist and Shout* fails to dispel the atmosphere of funereal gloom that clings to the album like shrink wrap. As a final testament to what was once called the World's Most Fabulous Pop Group, "Who's Last" is a rather shoddy affair. S.S.

Collection

GARAGE SALE. The Mosquitos: *Darn Well*. The Vipers: *Who Dat?* The Gravedigger V: *She Got*. The Trip: *Never Too Late for Linda*. Boys from

Nowhere: *Beg*. And fourteen others. ROIR © A-135 \$9.98 (plus \$1.25 postage and handling from ROIR, 611 Broadway, Suite 725, New York, NY 10012).

Performance: *Like, wow, man*
Recording: *Mostly good*

Subtitled "19 Wyld and Savage Bands," this typically entertaining package from the unpredictable folks at ROIR (Reach Out International Records) collects the work of various groups in the current psychedelic underground. That is, the ensembles affect (to varying degrees) the sounds and attitudes of the one-hit-wonder American regional bands of the middle Sixties, such never-to-be-forgotten noise-makers as the Count Five, the Shadows of Night, the Cryan Shames, and, of course, the immortal stars of *Riot on Sunset Strip*, the Chocolate Watch Band.

Whether the stuff here is merely camp is, I suppose, open to question, but most of these bands, particularly the Mosquitos and the Vipers, have their psychedelic schticks down pat. Taken on its own determinedly grungy terms, a lot of the music is legitimately compelling—even, you should pardon the expression, far out. Pick to click: the Fuzztones' *Cinderella*, a remake of an obscure Sonics number. Retro or not, it's a hot a rock-and-roll track. S.S.

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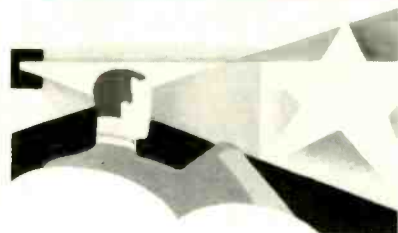
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FILM & THEATER



CHESS (Benny Andersson-Tim Rice-Björn Ulvaeus). Elaine Paige, Murray Head, Tommy Korberg, Barbara Dickson, Denis Quilley, Björn Skifs (vocals); Ambrosian Singers; London Symphony Orchestra, Anders Eljas cond. RCA CPL2-5340 two discs \$12.98, © CPK2-5340 two cassettes \$12.98, © PCD2-5340 two CD's no list price.

Performance: *Overdirected*
Recording: *Monumental*

Tim Rice, who collaborated with Andrew Lloyd Webber on such megahits as *Evita* and *Jesus Christ Superstar*, joined with Benny Andersson and Björn Ulvaeus of Abba to create this ponderous and more than slightly silly, yet-to-be-staged theater piece. It's supposedly all about a championship chess match, and it purports to be "an adventurous musical story blending romance, political intrigue, psychological tensions, and East/West confrontations." Actually it's about as penetrating and relevant as an Aaron Spelling soap opera. Elaine Paige, who created the title role in *Evita*, responds with a trouper's courage in following the exaggerated and stogy indications of her part as Florence Vassy, the American champion's second. Her *Heaven Help My Heart* has been released as a single, backed by Murray Head's *One Night in Bangkok* (a big hit in England).

Overall, the recorded production of *Chess* is huge, flossy, and intent on being "monumental," with the result that the project sinks with the speed and the finality of the Titanic. P.R.

HEAVENLY BODIES. Original soundtrack recording. Sparks: *Breaking Out of Prison*. Bonnie Pointer: *Heaven; The Beast in Me*. The Tubes: *Out of Control*. Cheryl Lynn: *At Last You're Mine*. Dwight Twilley: *Keep On Working*. And four others. PRIVATE ISZ 39930, © SZT 39930, no list price.

Performance: *Exhausting*
Recording: *Muscle bound*

Bland though it is, this soundtrack may be the best thing about the movie *Heavenly Bodies*. For one thing, it is a great home workout tool, something that's not really practical in the theater (although I don't think the producers of this paperback movie ever expected anyone to see it in a real theater—it has Made For Cable written all over it). And you don't have to pay attention to the sappy love story hinted at in the

songs either, the way you would if you sat through the film. Just drop the stylus and flex your peccs.

All of the music here is of the Jack LaLanne school of music tonality—power-bass drum beat, bouncy synthesized counterpoint, Pepsi-generation vocals. It's a genre I'm afraid we're going to have to live with for a while. What's amazing to me is how this kind of music can make artists as different as Sparks, Dwight Twilley, and Bonnie Pointer sound so much alike. The rest of the performers are as generic as the music. Gary Wright, the Tubes, Cheryl Lynn, and the deservedly unknown vocalists on "Heavenly Bodies" must have been thankful, I'm sure, to get the work, even if all they're asked to do is provide an aural exercise mat. M.P.

WEST SIDE STORY (Bernstein-Sondheim). Kiri Te Kanawa, Marilyn Horne, José Carreras, Tatiana Troyanos, others (vocals); orchestra and chorus, Leonard Bernstein cond. DEUTSCHE GRAMMOPHON • 415 253-1 two discs \$19.96, © 415 253-4 two cassettes \$19.96, © 415 253-2 two CD's no list price.

Performance: *Quasi-operetta*
Recording: *Hot*

With this bright, new recording of *West Side Story*, its composer, Leonard Bernstein, tries his hand at conducting his most popular theater score for the first time—that is, *all* of it for the first time. And in doing so he's opted for trained voices (the *crème de la crème*, at that) supported by singers and instrumental musicians drawn from the on- and off-Broadway talent pool.

It sounds wonderful. Kiri Te Kanawa, who has obviously done her homework in getting some Latin intensity into her singing along with the suggestion of an accent, is a gorgeous Maria, and José Carreras, who on the other hand has had to mask his Latin origins with an Anglo accent, is an ardent-voiced Tony. Tatiana Troyanos brings a mature sizzle to the role of Anita, and Marilyn Horne sings hauntingly in the *Somewhere* ballet number. But it is the orchestra under Bernstein's direction, and the original orchestrations he created for Broadway in 1957 with Sid Ramin and Irwin Kostal, that benefit most from this marvelous digital studio recording, made by Deutsche Grammophon in New York in September 1984.

DG's Compact Disc version is filled out with a fine performance, previously released on LP and tape, of Bernstein's *On the Waterfront* suite played by the Israel Philharmonic. That's giving good value on the premium cost of the CD's. But why did it take a German record company to be the first to get an American classic like *West Side Story* into this country's CD bins while Columbia Records sits on the original-cast album and the subsequent film-soundtrack album? Hard to know, but it's good somebody did, and in such splendid form.

Christie Barter

JAZZ



WILLIAM ALBRIGHT: *The Symphonic Jazz of James P. Johnson.* William Albright (piano). *Fascination; Keep Off the Grass; A-flat Dream; Yamekraw (Negro Rhapsody);* and two others. MUSICMASTERS ◉ MMD 20066 \$8.98.

Performance: *Interesting*
Recording: *Quite good*

Although pianist William Albright's performance is certainly commendable and eminently Johnsonesque, it is the music and not the rendering of it that makes "The Symphonic Jazz of James P. Johnson" a noteworthy release. Johnson, who died thirty years ago, was a prolific and often ambitious composer, but much of his classically oriented work has been neglected in favor of his flashier stride piano pieces. Albright combines such familiar Johnson fare as *A-flat Dream* and *Keep Off the Grass* with lesser-known works like *Concerto Jazz-a-Mine* and *April in Harlem*, surviving movements from two lost symphonic compositions that will make you wish that side of James P. Johnson could have been brought into sharper focus. C.A.

ELLA FITZGERALD: *The Songbooks.* Ella Fitzgerald (vocals); instrumental accompaniment. *Oh, Lady Be Good; Nice Work If You Can Get It; Fascinating Rhythm; Yesterdays; Laura; Alexander's Ragtime Band; The Lady Is a Tramp; Manhattan; My Funny Valentine; Over the Rainbow; Skylark; This Time the Dream's on Me;* and seven others. VERVE/POLYGRAM © 823 445-2 no list price.

Performance: *Prime Ella*
Recording: *Fine transfers*

The Ella Fitzgerald songbook recordings have never sounded as good as they do now on CD in PolyGram's Silver Collection series. I suppose we will eventually see all these recordings make their way onto CD's, but for this set nineteen tracks, recorded between 1956 and 1964, were selected. The arrangements—by conductors Buddy Bregman, Paul Weston, Billy May, and Nelson Riddle—hold up nicely, and Ella was in top form during the years represented. The program is not to be sneezed at either, with enduring songs by the Gershwins, Irving Berlin, Jerome Kern, Johnny Mercer, and Rodgers and Hart. The disc adds up to sixty-three and a half glorious minutes of continuous Fitzgerald magic. C.A.

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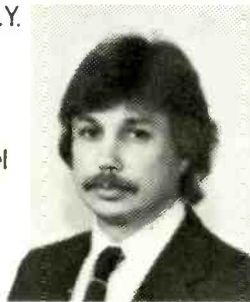
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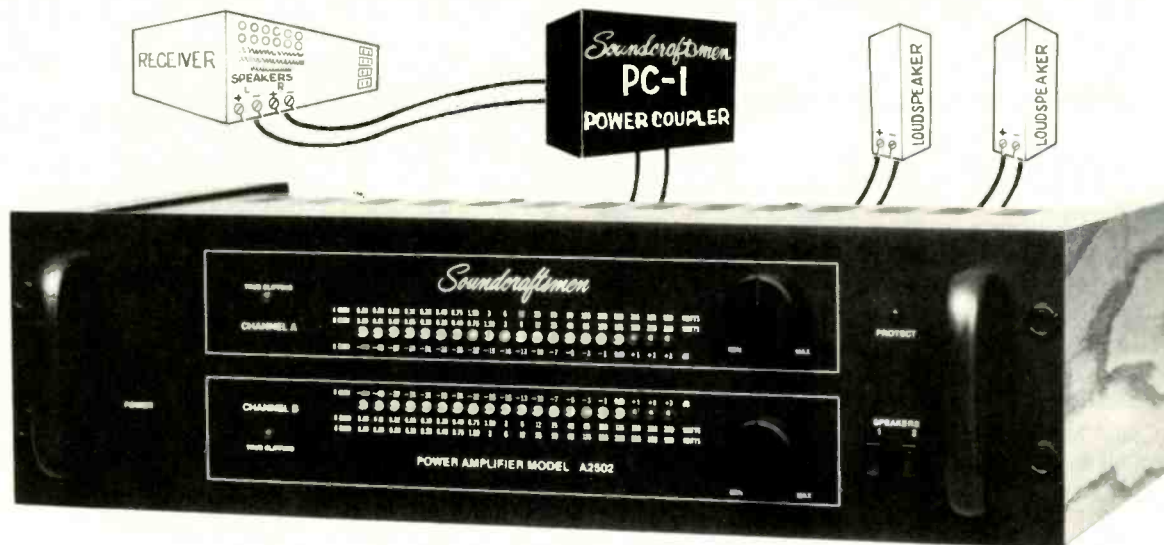
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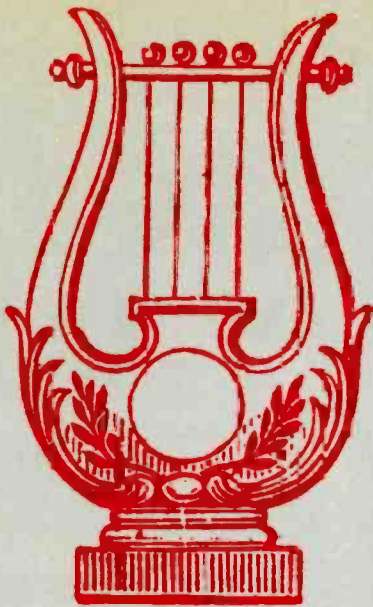
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LAURA BRANIGAN. Laura Branigan (vocals); instrumental accompaniment. *The Lucky One; Satisfaction; Solitaire; How Am I Supposed to Live Without You; Gloria;* and five others. RCA/COLUMBIA 60422 VHS Hi-Fi \$29.95, 20422 Beta Hi-Fi \$29.95, PIONEER ARTISTS PA-85-101 LaserDisc \$24.95.

Performance: *Limited*
Recording: *Substandard*

Laura Branigan can be an almost mesmerizing performer. She has an alluring texture to her voice and a look in her eyes that suggests she isn't as all-American wholesome as her other features would suggest. When you blend in a slightly kinky brand of Europop, well, you're not exactly sure what's going to happen next.

That's part of why this video is so disappointing. Essentially it's a concert taped at Caesar's Tahoe, intercut with snippets of staged, dramatic footage and one bona fide music video, *Self Control*, which borrows heavily from Michael Jackson's *Billie Jean* video. While *Self Control* is a killer—excellent in concept, execution, and style—the rest of the tape is fairly lame. The sound, which threatens to drop out altogether at one point, is muddy throughout, and the video was obviously shot with the idea of not disturbing the club audience—the lighting is bad and there are few closeups. Unless you just have uncontrollable fantasies about Laura Branigan, I'd say skip it. *A.N.*

GLADYS KNIGHT & THE PIPS AND RAY CHARLES. Gladys Knight & the Pips (vocals); Ray Charles (vocals, piano); instrumental and vocal accompaniment. *Every Beat of My Heart; Best Thing That Ever Happened to Me; Midnight Train to Georgia; I've Got to Use My Imagination;* and nine others. VESTRON MA 1003 VHS \$29.95, MB 1003 Beta \$29.95.

Performance: *Polished*
Recording: *Good*

This is a repackaged HBO concert recorded at the Greek Theatre in Los Angeles in the late Seventies. Gladys Knight and her Pips do a long set, and then Ray Charles comes on, wearing a jacket that you'd have to be blind not to pick out. Mainly, it's Gladys's show (Ray does two numbers by himself before Gladys joins him for three
(Continued on page 100)

THE DOORS



Ray Manzarek, Robbie Krieger, the late Jim Morrison, and John Densmore

STRICTLY on the technical level, "Dance on Fire," MCA's new video collection of the Doors' greatest hits, is one of the slickest archival rock packages anybody has yet come up with. It was produced by the surviving Doors themselves (Ray Manzarek, after all, met Jim Morrison at the UCLA film school), and it consists of lots of old promo films, clips of TV appearances, and concert footage combined with brand new, state-of-the-video-art thematic footage. The most successful example is the new clip of *L.A. Woman*, in which what looks like old 8mm film of the band is artfully intercut with shots of current denizens of the Sunset Strip. The technique is surprisingly effective.

There's actually quite a lot to admire here. *Break On Through* is as good a promo film as any I've ever seen from the Sixties. In fact, with its sophisticated and understated visual scheme (reminiscent of the cover photo of the Doors' first album), it puts all the superficially flashy stuff on MTV to shame. Equally impressive is a heretofore unreleased, splendidly shot concert version of *The End*, the band's signature Oedipal epic.

Speaking even as a non-fan, I have to admit that there's nothing on the tape that could remotely be called dull. Jim Morrison's charisma comes through

largely undiluted by the passage of fifteen years, though there's something vaguely creepy about the current adulation surrounding the man (as *Rolling Stone* put it, "He's Young, He's Sexy, He's Dead"). And as far as I'm concerned, the Doors' mixture of cheesy Farfisa rock and poetic pretensions has not worn particularly well (a significant exception here is *People Are Strange*), although I suppose if I were sixteen again I might feel differently.

In any case, it seems pointless to grouse about a program that's been so beautifully executed. Except for the couple of songs taken from television tracks, the sound is absolutely spectacular; the band could have been recorded yesterday. A treat for fans, and for those more or less agnostic about the Doors, it's still an interesting time capsule.

Louis Meredith

THE DOORS: *Dance on Fire.* The Doors (vocals and instrumentals). *Break On Through; People Are Strange; Light My Fire; L.A. Woman; Touch Me; The End; The Crystal Ship; Wild Child; Unknown Soldier; Roadhouse Blues; Texas Radio and the Big Beat/Love Me Two Times; Horse Latitudes/Moonlight Drive; Adagio; Riders on the Storm.* MCA HOME VIDEO 80157 VHS Hi-Fi and Beta Hi-Fi \$39.95. PIONEER ARTISTS PA-85-126 LaserDisc \$24.95.

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more), and while she is a smooth and affecting singer, things drag a bit when Ray's not around. At seventy-eight minutes, the tape is at least eighteen minutes too long (the useless interviews and backstage scenes could easily go), but it can make for a pleasant session in front of the tube. *A.N.*

MIDNIGHT STAR: *Midnight Star in Concert*. Midnight Star (vocals and instrumentals). *Electricity; Playmates; Slow Jam; Wet My Whistle; Night Rider; No Parking (On the Dance Floor);* and two others. U.S.A. HOME VIDEO 21347 VHS Stereo and Beta Hi-Fi \$39.95.

Performance: *Energetic blandness*
Recording: *Average*

Midnight Star made a minor cross-over splash on the Solar label with a novelty tune called *Freak-a-zoid* and *Wet My Whistle* a couple of years back, but it is otherwise a stereotypical black group. Professional sounding but lacking a distinctive character, the nine of them would make an excellent back-up for a more original act, but I suppose they have a following beyond the people we see in the audience here. The video itself is not interesting. *C.A.*

JONI MITCHELL: *Refuge of the Roads*. Joni Mitchell (vocals, guitar, piano); other musicians. *Wild Things Run Fast; Raised on Robbery; Refuge of the Roads; Sweet Bird of Youth; Banquet; You're So Square (Baby I Don't Care); You Dream Flat Tires;* and six others. PIONEER ARTISTS PA-84-100 LaserDisc \$24.95.

Performance: *Music 10, Concept 4*
Recording: *Excellent*

Shot during various stops on Joni Mitchell's most recent concert tour, "Refuge of the Roads" offers gorgeously recorded and performed versions of a nicely chosen cross section of her repertoire, from the early-Seventies *For Free* to her more recent Charles Mingus tribute. The crack band she's assembled plays its collective derriere off, the star is in terrific voice, and the digitally mastered sound nearly jumps out of your speakers. On the negative side, Mitchell's video direction is less impressive: fairly static camera work, unflattering lighting, and a lot of extraneous artsy intercuts from back-of-the-tour-bus home movies, a Mingus documentary, and even a Buñuel film. Mitchell the performer, meanwhile, occasionally seems awkward without a guitar in her hands, and her band (particularly bassist Larry Klein) desperately needs some fashion consultation.

On balance, however, there's a lot of impressive music making here (notwithstanding an unconvincing Elvis Presley cover that probably sounded better on paper). Mitchell, despite her at times needlessly ornate vocalizing and beatnik affectations, remains one of the more interesting presences in pop. Worth a look. *L.M.*

ELVIS PRESLEY: *The '68 Comeback Special*. Elvis Presley (vocals, guitar); instrumental and vocal accompaniment. *Guitar Man; Lawdy, Miss Clawdy; Heartbreak Hotel; Hound Dog; All Shook Up; Can't Help Falling in Love; Jailhouse Rock; Don't Be Cruel; Love Me Tender; One Night; Memories; If I Can Dream;* and fourteen others. MUSIC MEDIA M452 VHS and Beta \$29.95.

Performance: *Quintessential*
Recording: *Good, considering*

In June 1968, thirty-three-year-old Elvis Presley went before the NBC-TV cameras to tape his first television special, and the first live concert he had done in seven years. Since the beginning of the Sixties, the King had been sequestered out in Hollywood making embarrassing throwaway movies, and there were those—Presley among them—who wondered if he could still cut it. By the show's end, however, it was clear that Presley had experienced what amounted to an artistic reawakening.

Part of this special—the live concert in which Elvis wore his celebrated black-leather suit—was cablecast in January on HBO, but the home video offers the entire show, including an even stronger live performance, during which Presley prowls the stage like a caged animal, and the famous brothel scene that his manager, Colonel Tom Parker, insisted be cut from the original broadcast.

For the most part, the production numbers come off looking dated and hokey by today's standards, but the raw, stark live performances are sheer magic. This is the essence of what Presley—and rock-and-roll—was all about. For any serious rock video fan, it is mandatory viewing. *A.N.*

YES: *Yessongs*. Yes (vocals and instrumentals). *And You and I; Yours Is No Disgrace; Close to the Edge;* and three others. VIDAMERICA 7033 VHS Hi-Fi and Beta Hi-Fi \$29.95.

Performance: *Characteristic*
Recording: *Abysmal*

Yes was one of the first heavily synthesized, so-called progressive rock groups. Formed in London in 1968, the group soon saw its often indulgent style win American audiences over, and when it toured this country the following year, *Roundabout* became its first big hit single and keyboard artist Rick Wakeman its most popular member. Both Wakeman and *Roundabout* are found on "Yessongs," a video taken from film shot during Yes's world tour in 1973. If you go for electronic self-indulgence, you will probably love the sounds on this tape, but I think you'd have to agree that it sorely lacks visual excitement. The seventy-two-minute concert suffers from poor lighting conditions (it is rife with blurred green faces) and unimaginative direction, and the inserted clips of amoebas and sundry sea urchins don't help. *C.A.*

AR'S MAGIC SPEAKER

(Continued from page 62)

sound sources seeming as large (or as small) as they were intended to be and with each quite firmly placed in the overall stereo spread. Walking around the room, even close up to one of the speakers, had almost no effect on the apparent locations of the sound sources. The listener's position seemed to be far less critical than the placement suggestions for the MGC-1 would imply.

Switching on the ambience signals produced a very dramatic change. Formerly, the apparent hall width was defined by the speaker positions, about 8 feet apart in our listening room. The ambience speakers "opened" the imaged hall to the full 15-foot width of the room and more. With this effect came an increased sense of depth beyond the wall behind the speakers. But despite this major change in the width and depth of the sound stage, the apparent left-right locations of the sound sources on that stage did not change in the slightest.

The overall tonal balance of the sound shifted surprisingly when the ambience speakers were switched on, with both the lower-midrange and the high frequencies seeming louder, leading to a "richer" sound quality. And unless the ambience level was kept quite low, the overall subjective volume noticeably increased. But readings with a sound-level meter established that these effects were largely psychoacoustic rather than physical. Whenever turning on the ambience speakers seemed to double the sound level, the meter showed no more than about a 1-dB increase in actual level. Furthermore, the frequencies that appeared to have been enhanced by the ambience speakers (the highs and lows) are by design not even present in significant amounts in their output! These effects certainly validate the basic premises of AR's design, which assumes that a speaker's imaging and intrinsic sound quality are determined by the first-arriving direct sound while much of the spatial character and "body" of the sound comes from the later reflections.

The sonic contribution made by the MGC-1's ambience speakers can be demonstrated readily, and in our view it is all to the good. The overall downward-sloping response of the MGC-1 gave it a slightly subdued quality in our listening room compared to some more flashy speakers noted for a "sizzling" high

end. If required, a tone control can add the sizzle. For our part, the MGC-1 provides the steak, with excellent flavor and prepared to your taste, and that is what counts.

Acoustic Research takes pains to distinguish the MGC-1's sound from that obtained using a conventional time-delay system, but we had the necessary components on hand and could not resist making the comparison. Although speakers in the back of the room driven from a separate time-delay system gave their usual sense of added space and "liveness" to the sound from the MGC-1, the effect was totally different from that of the AR speakers alone. Instead of attempting to recreate a hall sound in the back or along the sides of the listening room like a conventional time-delay system, the MGC-1 puts the hall up front, expanding the apparent size of that portion of the listening room without movement of the phantom sound sources.

Although playing the MGC-1's ambience speakers too loudly does not create any grotesque effects (its time delay was deliberately kept short enough to prevent that), we felt that they are best used in moderation, like a conventional time-delay system. The appropriate amount of ambience to use depends considerably on the program material. The controller box allows considerable variation in ambience level (down to no ambience, if that is desired). We usually set it to the lowest level at which a distinct change in the size of the sound stage could be heard when the ambience was switched on and off. But switching off even an unobtrusive amount of ambience gives the same sense of loss that we experience when switching off a properly adjusted time-delay system: unusually realistic and compelling sound becomes merely very good.

Paradoxically, this massive speaker system, which one would expect to be at its best in a large room, seems able to generate enjoyable, life-size sound in *any* room large enough to hold a pair of them and a listener. This paradox and the name Magic Speaker notwithstanding, the AR MGC-1's are not at all magical. They're just an outstanding brew of old-fashioned research, new-fangled theories, and AR's considerable manufacturing expertise, a mix that has produced one of the best-sounding speaker systems you are likely to find. We found their sonic sorcery quite addictive. □

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JUNE

by Ralph Hodges



Las Vegas Languors

IF you have been wondering whether I attended the Las Vegas Consumer Electronics show earlier this year, the answer is yes. So did a virulent form of flu. We met, and its irresistible force rendered me an almost immovable object, which made judging sound quality even more difficult than usual.

Nevertheless, although I couldn't hear well, I could look, and what I saw didn't really coalesce into a connected vision of perfectionist audio for the year to come. Mainstream manufacturers continue to delve ever deeper into video and computer interfaces, and you can look for some high-end activity in these areas soon, as well as a general rush into car sound. For the present the high-end group continues in its sometimes inspired, sometimes absurd way to grapple with problems of its own devising.

A truly good audio system deals harshly with typical recorded material in that it lets all the warts show. But it deals equally harshly with itself, revealing immediately to an attentive listener when something (and often something not readily measurable) is wrong. Contrary to popular belief, you don't need special ear training to detect the difficulties. You simply need a sound

system of sufficiently high resolution to betray itself. Few people have ever heard such a sound system, and fewer still would care to be bothered with one. But the quest for the ideal goes on, like it or not.

As I see it, high-end manufacturers today are overspecializing. They hear something wrong, and they try something different. That may be a new form of speaker stand, a new cable, or a brick on top of the amplifier. (Don't laugh. The brick has been tried and applauded in some high-end circles.) If they like the result, the manufacturers may conclude that commensurately more satisfaction will be provided by more of the same treatment—or what they perceive that treatment to be. (After all, who knows what putting a brick on top on a particular amplifier *really* accomplishes?)

In all this I think they too often slip past the point of diminishing returns in hot pursuit of the Big Problem, without seeming to realize that their efforts have already reduced it to the third or fourth biggest problem and that it's time to

High-end manufacturers too often slip past the point of diminishing returns in pursuit of what they think is the Big Problem.

tackle something else. However, if they overspecialize to the point that they are incapable of tackling anything else, we get shows (like the recent one in Las Vegas) at which much that is displayed is not innovative, but merely a closer approach to some extreme (infinitely thick cables, infinitely massive power supplies) that may not even be clearly identified as a *desirable* extreme.

But I'm complaining too much. This year's Las Vegas CES, like all others, did give some indication of where the innovative minds in audio are tending. In loudspeakers, the seductiveness of film-diaphragm devices, particularly of the ribbon type, remains strong, despite questions about their directional characteristics and misgivings about their room-placement problems.

Magnepan's Tympani-IVa, incorporating Jim Winey's remarkable ribbon tweeter, was given the briefest of sneak previews (it was played for about an hour on one evening of the show). Audire surprised everyone with its initial loudspeaker design, described as the first true full-range ribbon system. (Audire also showed a 100-watt Class A mono power amplifier that is 42 inches high and is easily mistaken for a loudspeaker. In my opinion it represents some sort of ultimate in home amplifier design, but I'm not yet sure what ultimate.) Entec promises that its hybrid electrostatic (a sub-woofer complex accompanies each 7-foot-high electrostatic panel) will finally be available this year, ending many months of curiosity and anticipation.

In amplifiers, Nakamichi, under license from Threshold, has begun offering Threshold's novel Stasis current-bootstrap circuitry in affordable power-amplifier packages (about \$1,500 for 200 watts per channel is tops). And Hong Kong is making a long-expected bid for the high-end market through the preamplifier and power-amplifier introductions of a company called ANMA Electronics.

In record players, the air-bearing turntable stays alive and well through the efforts of such as Micro Seiki and Entec, and the ranks of air-bearing radial-tracking tone arms have been increased by new products from Eminent Technology and Maplenoll Electronics. It seems there will never be an end to the proliferation of moving-coil phono cartridges, but a genuine innovation has appeared on the horizon in the form of an FET cartridge, with a mechanically modulated gate. The cartridge is being readied for the market by Win Labs.

Finally, a company called Final Technology has been formed to test the market for an *optical* record player—for LP's, not CD's. There were *no* details available at the show. In fact, the only thing available from the principals was stony silence. However, keep your ears pricked up for this one. There are many reasons why the technology might prove to be utterly inappropriate, but it should certainly be interesting. □

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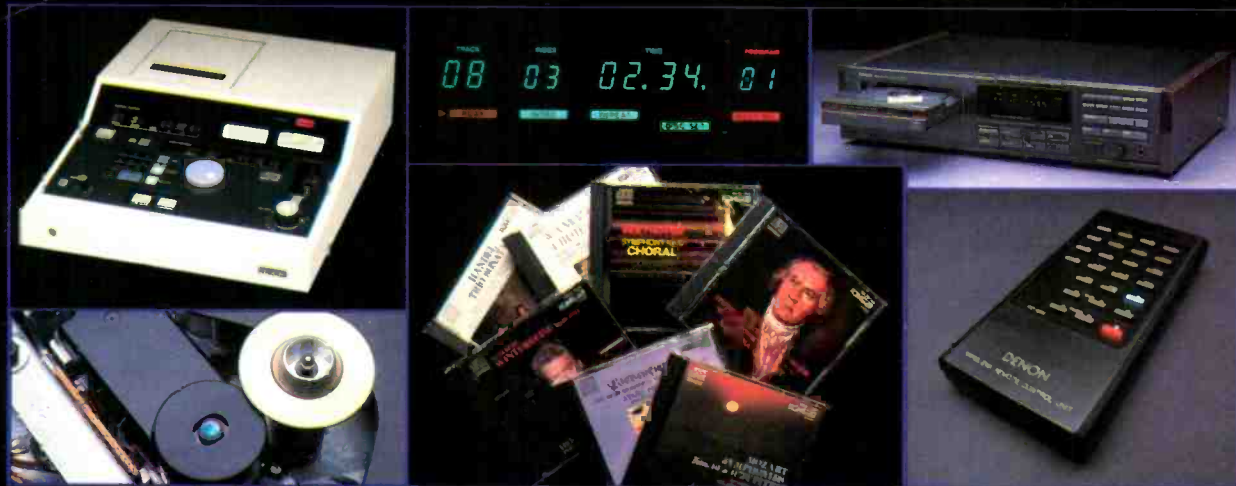
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