

"Polk Builds State-of-the-Art Components."

Consistently Superior Technology Results in Dramatically Better Sounding Loudspeakers for You.

atthew Polk's genius is multifaceted. In addition to breakthroughs like SDA technology which totally revolutionized the whole concept of stereophonic reproduction, it is also responsible for the advanced and exclusive component technology present in every Polk loudspeaker which results in unequalled high definition musical sound quality.

High Definition Reproduction

Polk loudspeakers are true high definition systems which reproduce sonic images with life-like clarity and detail, much like a high resolution camera captures a visual image with all the subtle detail and focus intact. When you listen to a pair of Polks, notice how you can hear each and every individual instrument clearly and distinctly, even when there are many instruments playing at the same time. This high resolution capability is in large part due to the consistently excellent transient response of all the drivers as well as the seamless blending achieved by the Isophase Crossover systems.

Polk's Exclusive Trilaminate Polymer Driver Technology

These superb drivers are specifically engineered to cover the entire fundamental musical range with life-like clarity and minimal coloration. Polk's exclusive trilaminate (3) layer) polymer cone technology is responsible for a purity and naturalness of reproduction unapproachable by conventional drivers which utilize paper, or simply vacuum formed plastic cones. Polk's unique trilaminate polymer cone is made of three complimentary materials, each of which has unique performance advantages all its own. One material is very light and structurally strong, one is very stiff with a high speed of sonic wave transmission, and one very effectively removes sonic colorations by efficiently damping the cone structure. The exceptional performance gained when all three are combined together could never be equalled by a simple one layer cone of any single material. Polk drivers utilize costly butyl rubber surrounds for more accurate cone movement and deeper, better bass



Tweeter voice coils are centered with exacting precision by a sophisticated machine designed and built by Polk Audio engineers.

response. Additionally, they don't deteriorate over time as do foam surrounds. They incorporate high-temperature aluminum voice coils which allow high power operation without burnout. Optimized Flux Density magnet structures are used for perfectly balanced operation assuring clearer, more highly defined, more musical sonic performance.

The Polk Isophase Crossover

The crossover network is the most important component in a high quality loudspeaker system. It is responsible for properly blending the sound of the individual drivers together into the homogeneous sounds of individual instruments and voices. The crossover acts like the "musical conductor" of the loudspeaker, telling each driver just when to come in and exactly how loud to play. The elaborate Polk Isophase Crossover Systems utilize huge copper coils and precision capacitors and resistors to assure the lowest possible harmonic, IM, and transient distortion with complex high level musical signals. Close tolerance, extremely costly mylar and silver mica capacitors are used in many models to achieve even higher sonic definition. In addition, driver equalization is optimized by the sophisticated and complex circuitry, while isophase (phase coherent) operation is maintained by careful control of the various phase relationships in the system. Many loudspeaker manufacturers skimp on this critically important component because it is usually hidden from sight, but Polk builds crossovers correctly so that our speakers will sound better for you.

Polk's Exclusive Silver Coil Dome Tweeter Technology

This state-of-the-art transducer is the only tweeter in the world which utilizes a voice coil wound with costly silver coated wire for more extended frequency response. The extremely light polyamide dome allows exeptionally quick transient response while the inherently well damped material eliminates annoying resonances. The small diameter diaphragm assures wide dispersion of high frequencies throughout your listening room. In addition, the huge magnet structure combined with the low mass moving system results in vanishingly low distortion, superb wave form accuracy and high efficiency. A specially contoured non-resonant faceplate improves dispersion. lowers diffraction and helps eliminate resonant distortion.

Polk Fluid Coupled Subwoofers

Most Polk home speakers utilize a fluidcoupled subwoofer system for tight, quick, deep, powerful and room-filling bass response. This system realizes the performance advantages of both large and small diameter woofers at the same time. Small diameter woofers have faster transient response, better midrange and dispersion. Large diameter bass drivers couple better to your room and produce more bass. The Polk Fluid Coupled Subwoofer System excels in all these areas. It utilizes the low frequency energy produced within the enclosure by the small bass/midrange driver to hydraulically energize the large diameter low resonance subwoofer below approximately 60 Hz. The result is remarkably clear, well-defined low frequency reproduction, exhibiting exceptional upper bass detail which extends smoothly and seamlessly down through the sub-bass and cleanly up into the midrange.



5601 Metro Drive, Baltimore, Md. 21210



"Matthew Polk Has a Passion for Perfection!"

Experience the Awesome Sonic Superiority of His New Signature Edition SDA 1C and SDA 2B.

he genius of Matthew Polk has now brought the designer styling, advanced technology and superb sonic performance of his award winning SDA Signature Reference Systems into the new Signature Edition SDA 1C and SDA 2B.

"They truly represent a breakthrough." Rolling Stone Magazine

Polk's critically acclaimed, 5 time Audio-Video Grand Prix Award winning SDA technology is the most important fundamental advance in loudspeaker technology since stereo itself. Listeners are amazed when they hear the huge, lifelike, three-dimensional sonic image produced by Polk's SDA speakers. The nation's top audio experts agree that Polk SDA loudspeakers always sound better than conventional loudspeakers. Stereo Review said, "Spectacular... the result is always better than would be achieved by conventional speakers." High Fidelity said, "Astounding ...We have yet to hear any stereo program that doesn't benefit." Now all 5 SDAs incorporate many of the 3rd generation advances in SDA technology pioneered in the Signature Edition SRS and SRS2 including full complement subbass drive, time-compensated phase-coherent driver alignment and bandwidth-optimized dimensional signal.

Why SDAs Always Sound Better

Stereo Review confirmed the unqualified sonic superiority of Matthew Polk's revolutionary SDA Technology when they wrote, "These speakers *always* sounded different from conventional speakers — and in our view better — as a result of their SDA design.

Without exaggeration, the design principals embodied in the SDAs make them the world's first true stereo speakers. The basic concept of speaker design was never modified to take into account the fundamental difference between a mono and stereo signal. The fundamental and basic concept of mono is that you have one

signal (and speaker) meant to be heard by both ears at once. However, the fundamental and basic concept of stereo is that a much more lifelike three-dimensional sound is achieved by having 2 different signals, each played back through a separate speaker and each meant to be heard by only one ear apiece (L or R). So quite simply, a mono loudspeaker is designed to be heard by two ears at once while true stereo loudspeakers should each he heard by only one ear apiece (like headphones). The revolutionary Polk SDAs are the first TRUE STEREO speakers engineered to accomplish this and fully realize the astonishingly lifelike three-dimensional imaging capabilities of the stereophonic sound medium.

"A stunning achievement"

Australian Hil

Polk SDA Technology solves one of the greatest problems in stereo reproduction. When each ear hears both speakers and signals, as occurs when you use conventional (Mono) speakers to listen in stereo, full stereo separation is lost. The undesirable signal reaching each ear from the "wrong" speaker is a form of acoustic distortion called interaural crosstalk, which confuses your hearing.

"Literally a New Dimension in the Sound

Stereo Review Magazine

The Polk SDA systems eliminate interaural crosstalk distortion and maintain full, True Stereo separation, by incorporating two completely separate sets of drivers (stereo and dimensional) into each speaker cabinet. The stereo drivers radiate the normal stereo signal, while the dimensional drivers radiate a difference signal that acoustically and effectively cancels the interaural crosstalk distortion and thereby restores the stereo separation, imaging and detail lost when you listen to normal "mono" speakers. The dramatic sonic benefits are immediately audible and remarkable.

"Mindboggling, astounding, flabbergasting" High Fidelity Magazine

Words alone cannot fully describe how much more lifelike SDA TRUE STEREO reproduction is. Reviewers, critical listeners and novices alike are overwhelmed by the magnitude of the sonic improvement achieved by Polk's TRUE STEREO technology. You will hear a hugh sound stage which extends not only beyond the speakers, but beyond the walls of your listening room itself. The lifelike ambience revealed by the SDAs makes it sound as though you have been transported to the acoustic environment of the original sonic event. Every instrument, vocalist and sound becomes tangible, distinct, alive and firmly placed in its own natural spatial position. You will hear instruments, ambience and subtle musical nuances (normally masked by conventional speakers), revealed for your enjoyment by the SDAs. This benefit is accurately described by Julian Hirsch in Stereo Review. ...the sense of discovery experienced when playing an old favorite stereo record and hearing, quite literally, a new dimension in the sound is a most attractive bonus..." Records, CDs, tapes, video and FM all benefit equally as dramatically.

"You owe it to yourself to audition them." High Fidelity Magazine

SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your home. You must hear the remarkable sonic benefits of SDA technology for yourself. You too will agree with Stereo Review's dramatic conclusion: "the result is always better than would be achieved by conventional speakers...it does indeed add a new dimension to reproduced sound."



5601 Metro Drive, Baltimore, Md. 21215





Polk's remarkable Monitor Series Loudspeakers have received worldwide acclaim by offering state of the art technology and performance usually found only in systems which sell for many times their modest cost. (stands optional)

"Polk Monitors Deliver Incredible Sound and Value"

They Utilize the same State-of-the-Art Components As the top of the line SDAs.

olk Audio was founded in 1972 by three Johns Hopkins University graduates who were dedicated audiophiles with a common dream: superior sound for evervone.

"The affordable dream"

They believed that it was possible to design and manufacture loudspeakers of uncompromising quality which performed as well as the most expensive and exotic loudspeakers available, but in a price range affordable to virtually every music lover. The Monitors are the spectacularly successful result of their quest.

The original Monitor 7 was the first product of their efforts and it was so successful that when it was shown at the Consumer Electronics Show, dealers and experts alike could not believe its superb performance and affordable price. Audiogram Magazine said, "when we heard the Polk speakers at the CES Show we were so impressed we could not believe the prices." The entire Polk Monitor Series was designed in this tradition of incredible, stateof-the-art sound and affordable prices.

"Vastly superior to the competition"

Musician Magazine

Polk Audio has worked hard over the ensuing years to maintain the Monitor Series' preeminent position as the standard for quality and value in the audio industry. The Monitors have been continually improved and refined as a result of Polk's never ending search for better sound quality. There have been literally thousands of improvements made to the Monitors and the result is that today, as in the past, the Polk Monitors are absolutely the best sounding loudspeakers for the money available on the market. Musician Magazine siad, "If you're shopping for stereo, our advice is not to buy speakers until you've heard the Polks." You owe it to yourself.

"The best high performance speaker value on the market."

Off the Record

A new generation of Polk Monitors is now available which incorporate the same high definition silver coil dome tweeter and Optimized Flux Density drivers developed for the SDAs. Polk Monitor Series loudspeakers have always had a well deserved reputation for offering state-of-the-art performance and technology usually found only in systems which sell for many times their modest cost. In fact, many knowledgeable listeners consider that outside of the SDAs, the Polk Monitors are the finest imaging conventional speakers in the world, regardless of price. They have been compared in performance with loudspeakers which sell for up to \$10,000 a pair and are absolutely the best sounding loudspeakers for the money available on the market.

"Absolutely first rate... superior sound at a modest brice" Stereo Review Magazine

All the Polk Monitors regardless of price offer consistently superb construction and sonic and performance. They achieve open, boxless, three-dimensional imaging surpassed only by the SDAs. The Monitors' silky smooth frequency response assures natural, nonfatiguing, easy to listen to sound; while their instantaneous transient response results in music that is crisply reproduced with lifelike clarity and detail. In addition dynamic bass performance, ultra wide dispersion, high efficiency and high power handling are all much appreciated hallmarks of Monitor Series performance.

The consistently superb performance of the Polk Monitors is in large part due to the fact that they all utilize very similar components

and design features. However, more importantly, it is the elegant integration of concepts and components which results in the superior sonic performance and value which sets the Monitor Series apart. Audiogram magazine said, "How does Polk do it? We think it is mostly execution. They hear very well and they care." Audiogram is absolutely right. At Polk we take the same care with each and every product we build, whether it is our most or least expensive. We lavish the same lengthy amount of critical listening and tuning on every single Polk speaker because we know that having a limited budget does not necessarily indicate that you have a limited ability to appreciate true musical quality.

"At the price they're simply a Audiogram Magazine

No matter what you budget is there is a superb sounding Polk speaker perfect for you. Polk's incredible sounding/affordably priced Monitor Series loudspeakers utilize the same basic components as the SDAs and begin under \$100, each. The breathaking sonic benefits of Matthew Polk's revolutionary True Stereo SDA technology are available in 5 SDA models priced from \$395. to \$1495 ea.

You can afford the incredible sound of Polk

The experts agree: Polk speakers sound better! There is a Polk speaker which is perfect to fulfill your sonic dreams at a price you can afford. Visit your nearest Polk dealer today and audition the remarkable Monitors and the revolutionary SDAs. You'll always be glad you bought the best.



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Stereo Review

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Cover: The Harman Kardon Citation Twenty-Three tuner (see test report on page 25) and the Sony TA-E77ESD ("The New Separates," page 86). Design by Sue Llewellyn, photo by Hing/Norton.

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by Christie Barter and William Burton

LONGEST-PLAYING CD

With each passing month recently the outer limit on a CD's playing time has been exceeded by one or another new release. usually by only a few seconds. The latest record holder was a recording of Rachmaninoff piano music on the Etcetera label (reviewed in this issue) that clocked in at 74 minutes, 32 seconds. But just as we were going to press, we received a recording of Dvořák's Stabat Mater on the German Metropolitan label that set a new record—by about 5 minutes. The new CD, manufactured by Pilz Compact Disc of Munich, West Germany, has a playing time of just over 791/2 minutes!

DAT BREAKTHROUGHS

Sony digital audio tape (DAT) recorders for home and portable use went on sale in Europe in October, and Sony duplication machines are now being offered to record companies for mass production of prerecorded DAT cassettes. The Sony DTC-1000ES home deck is selling for about \$2,000 in Europe. The company's remote-controlled TCD-D10, the first DAT portable on sale anywhere, weighs 4 pounds (with rechargeable batteries) and measures about 912 x 2 x 7 inches. Neither DAT recorder contains Copycode-detector circuits.

DAT critics have said that highspeed mass duplication of DAT's is impossible, but Sony's \$600,000 super-dupers can produce a prerecorded DAT for the same cost as a compact disc by using barium-ferrite tape, not the more expensive metal formulation. An 80-minute prerecorded DAT can be duplicated in 15 seconds using Sprinter contact printing (transferring the magnetic pattern by pressing the master tape and a blank tape together).

PHILIPS BRAND IN U.S.

The first home audio components to carry the Philips brand name in the U.S. are two compact disc players, the CD 960 (\$949)

and the remote-controlled CD 770 (\$549). Both players have Favorite Track Selection, and the CD 960 also features dual 16-bit digital-to-analog converters and a single integrated circuit for both decoding and error correction. Philips consumer-electronics products have been sold in the U.S. under the Magnavox, Sylvania, and Philco brand names.

TECH NOTES

The first direct-to-DAT recording has been made by Reference Recordings, which used an Onkyo DT-2001 DAT recorder to tape a live session by the Blazing Redheads, a San Francisco rock/jazz group. Although the master was recorded at 48 kHz, its sampling rate will be converted to 44.1 kHz (the CD standard) before duplication to prevent direct digital copying on home DAT decks. . . . A four-way speaker measuring about 6 feet square, but only 21/2 inches thick, has been developed by Technics. The Model AFB1000 uses twenty drivers and weighs about 838 pounds. . . . Sony is introducing a new 25-inch XBR Pro TV monitor and a portable Watchman TV with a 234-inch screen. . . . Mitsubishi will make a 40-inch TV picture tube for sets with the largest direct-view screens so far. . . AR's Powered Partners speakers were named one of the best-designed consumer products by the Industrial Design Society of America. . . . RCA is shipping two Super VHS videocassette recorders, the digital VTP695 at \$1,300 and the VHS Hi-Fi VTP640 at \$1,000.

DREAM MACHINE

Pioneer is promoting its Truck Riders line of autosound systems with a "Drive Away Your Dream Machine" contest. Through December 31, 1987, anyone who listens to a Pioneer dealer's Truck Riders demonstration will be eligible to win the grand prize, a 1988 Toyota SR-5 Turbo 4x4 truck outfitted with up to \$5,000 worth of off-road accessories, which will be awarded in a contest drawing on January 29, 1988. The Truck Riders line includes two high-power cassette radios and two speaker models.

MIISIC NOTES

Tyka Nelson, Prince's sister, has been signed to Chrysalis Records' new dance and r-&-b label, Cool Tempo. . . . Ellis Marsalis, father of trumpeter Wynton and saxophonist Branford Marsalis, is the host of Jazztown, a thirteen-part series on contemporary New Orleans jazz currently airing on National Public Radio. . . . A huge Plexiglas plaque has been created by the Recording Industry Association of America to commemorate Elvis Preslev's "landmark" recording achievements. The plaque is installed at Graceland.

When Los Lobos' La Bamba hit No. 1 on Billboard's Hot 100 singles chart, it became the first No. 1 hit for its composer, Ritchie Valens, subject of the popular biopic. Valens's own highest-charting single was Donna, which peaked at No. 2 in February 1959, three weeks after he had died in a plane crash.

THE DIVINE BETTE

Bette Midler will perform a song written by Barry Manilow, with Bruce Sussman and Jack Feldman, for a Walt Disney animation based on Dickens's Oliver Twist that's due for theatrical release next Christmas. Meanwhile. though Midler is not out on tour herself, a costume she once wore is. Included in an exhibit circulated this fall by the Philadelphia Maritime Museum is a mermaid outfit Midler donned in a stage show she called Divine Madness. Says Bette now, "There comes a time when you just have to let your clothes go out in the world and try to make it on their own."



Pure Artistry.

Sansui makes music an art form with finely crafted receivers that deliver crystal clear sound. Our S-X1200 produces 120 watts* of pure power, with a toroidal transformer to provide low-impedance driving capability. A transient enhancer adds dynamic impact to everything you hear.

Other quality features include station scan, continuously variable loudness control, connections for 2 cassette decks and 2 VCRs with bidirectional dubbing, and binding posts for heavy speaker cables. A black mirror finish makes this receiver as pleasing to your eyes as it is to your ears.

You'll find many of the same qualities in three other models: S-X900, S-X700, and S-X500. So select the Sansui receiver to fit your lifestyle and experience pure artistry in sound.



SPEAKING MY PIECE



ODAY'S New York Times carries a front-page story headlined "Top U.S. Corporations Lobbying Against Curb on Toshiba Imports." The story, of course, has to do with proposed legislation that would bar Toshiba products from this country in retribution for the sale, by a Toshiba subsidiary, of some restricted milling machinery to the Soviet Union. The Senate passed the bill by a large majority, and at this point it is before a House-Senate conference committee.

By the time you read this column, the bill may have become law, reflecting the general consensus that we have to do something to discourage other foreign companies from breaking trade agreements. Or, perhaps more likely now, it may have been voted down or vetoed by President Reagan, or some version of it may still be in committee. Whatever has happened to it in the Congress, it will undoubtedly continue to be the subject of much debate.

For the questions being raised about the proposed legislation go far beyond sanctions against the importation of television sets and microwave ovens from one Japanese manufacturer. The top corporations that the Times headline refers to, according to Congressional aides and industry officials quoted as

sources, include such "multinationals" as AT&T, General Electric, IBM, and Xerox, which have contracted with Toshiba for custommade high-technology parts that the U.S.-based companies build into their products, especially sophisticated computer systems.

Billions of dollars may be involved here, and the livelihood of many Americans. The Senate bill does provide for exemptions that are supposed to protect American companies, but according to the Times story "officials in the electronics and high-technology industries said the American companies have begun to recognize that their relationships with Toshiba and other foreign high-technology companies are so complex and intertwined that there is virtually no way to avoid serious economic damage.

That's the point, isn't it? Technological interdependence. The Global Community of the late twentieth century. Well, maybe we are learning something. It's high time. If those big multinational corporations have only now "begun to recognize" the complexities of all this. where must the rest of us be on the learning scale?

National security is not at issue in the Congressional debate over digital audio tape, or DAT. Neither is "serious economic damage" unless you call what the record industry says it is losing to home taping "serious." The proportions of the Toshiba debate make the DAT debate seem trivial. But there are some similarities that bear examination. Both debates are being conducted in the same political climate-you don't have to be much of a political analyst to come up with the idea that our trade deficit has inclined us toward protectionism lately. Both are concerned with imposing sanctions on high-technology products, mainly from Japan. And both measures before Congress, if adopted, would set precedents in the regulation of trade and technology that we might all come to regret.

Clearly, neither of these debates will be resolved once and for all, to everybody's satisfaction, in the legislature. It is just not that easy any more. But, again, maybe we are learning something.

Stereo Review

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Simels, Craig Stark, Joel Vance Production Director: Gerald Palacios Production Manager: Laura LaFontaine

> ROMAN BEYER Vice President and Publisher

Associate Publisher: Winston A. Johnson

ADVERTISING

National Manager: Richard J. Halpern (212) 719-6037 Eastern Manager: Charles L. P. Watson (212) 719-6038 Account Representative: Sharon Duce

(212) 719-6915

Assistant to the Publisher: Trisha Nickel Classified Advertising: (212) 503-5999 Midwestern Managers: Arnold S. Hoffman,
Dirk Barenbrugge, (312) 679-1100
Western Director: William J. Curtis
Regional Manager: Meg Roberts
(818) 784-0700

Tokyo Office, Iwai Trading Co., Ltd. 603 Ginza Sky Heights Building, 18-13, Ginza 7-Chome, Chuo-Ku, Tokyo, Japan 104 Account Manager: J. S. Yagi, (03) 545-3908

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Now we do for Amadeus what we've always done for Mozart.

For years you've relied on Yamaha to faithfully reproduce the vibrancy and clarity of vour music.

Now, innovative Yamaha technology does the same for your favorite movie videos as well.

Introducing the RX-1100U. The Yamaha receiver that combines our legendary audio quality with broadcast quality video. A major enhancement to our long line of successful receivers.

In fact, the RX-1100U contains so many exciting features, you might want to visit your authorized Yamaha dealer and spend a few minutes exploring



them for vourself.

Start by playing a video cassette

through the RX-1100U. And watch the results on the finest video monitor.

The powerful new video-enhancing circuitry

restores clarity and sharpness to even the weakest, noisiest video signal. So any prerecorded tape looks network crisp.

Then grab a camera, shoot a few minutes of tape on your own, and use the video enhancer while making a third generation dub.

You'll have a hard time telling the dub

from the original.

While you're at it, experiment with the new video Rec Out Selector feature. Use it to mix your video with different audio sources to create original music backgrounds and sound effects.

lust like a post-production shop. Next, take the most musically demanding CD, crank open the 125 watt/channel* amplifier, and listen to what's missing.

Distortion.

It's not there because the RX-1100U boasts our new Absolute Linear Amplification (ALA) circuitry.



This advanced amplifier technology injects a mirror

image of the output distortion back into the input stage. The distortion component drops virtually to zero.

What's more, this receiver has plenty of headroom—up to 360 watts/channel into a 2 ohm load—so it's never cramped by the wider dynamic range and varying speaker impedances associated

with digital sources.

Now, walk to the other side of the room, where you can appreciate the new RS interactive remote control to its fullest.

Notice how it packs fingertip operation of the receiver, as well as other Yamaha RS-remote CD players, cassette clecks and turntables, into one slim hand-held unit that ends coffee table clutter forever.

Home entertainment has certainly changed. It had to. You started out as an audiophile and find yourself becoming a videophile as well. Or vice



But you can still trust Yamaha to satisfy your needs.

Because when you want to know what's new in top performing equipment, we've always been the ones to listen to.

Now, with our RX-1100U, we're the ones to keep an eye on as well.

*125 wats RMS per channel, both channels driven into 8 ohms, from 20 to 20,000 Hz, at no more than



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Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622 CIRCLE NO. 14 ON READER SERVICE CARD

What Happened to FMX?

About a year and a half ago, Julian Hirsch expounded on the virtues of FMX broadcasting, which would improve the signal-to-noise ratio of FM stereo by up to 20 dB. Aside from the compact disc, this sounded like one of the few really important improvements in audio in many years. Unfortunately, I haven't seen a flood of tuners with FMX capability, nor are any of the broadcasters in my area bragging that they use it (at least not the ones I listen to). So whatever happened to FMX?

JOHN WILSON Hanover, NJ

As Peter Mitchell explains in "How to Buy a Tuner," page 93, implementation of the FMX system has been delayed for several reasons, but FMX-decoding IC chips are now ready for production.

Tampering with the Beatles

After several months of "mono vs. stereo" controversy surrounding the release of the first four Beatles albums on CD, I find it extremely strange that I have not heard any outrage about the blatant tampering with the master tapes in the reissue of "Please Please Me."

It is well documented that John Lennon made an error in singing the lyrics of the final verse of the title cut on that album, and the mistake can be heard easily on any LP pressing, American or British. But when I cued up my CD of "Please Please Me" to that spot, I found that a corrected version had been spliced in. Perhaps someone at EMI thought the mistake would be too apparent on CD and "cleaned it up."

If these recordings were released on CD in mono for the sake of historical accuracy (the most valid of the many explanations put forward), then who has the right to tamper with the tapes in such a drastic way as this?

> DAVID S. THOMAS Fishkill, NY

Equal Temperament

I usually enjoy Ralph Hodges's "High End" columns and often find them instructive. The September column. however, might be more aptly entitled "The Deep End" since he seems to have gone off it this time. He is confused about the nature of the well-tempered scale, and some of his statements are not just misleading but completely wrong! His statement about "... no note having any particular bearing on its predecessor or successor" is nonsense. Each successive semitone in the scale has a frequency that is a precise multiple of that of its predecessor, the

twelfth root of two. This makes sense since there are twelve semitones within an octave and the octave interval is represented by the ratio 2:1.

Far from being a scale that "makes no sense to the mathematician." the welltempered scale is considered by some musicians to be too greatly dictated by mathematical considerations. Hodges's conclusion that "if we had decided on a system of temperament that more closely approached mathematical ideals, distortion might very well be less audible or less objectionable" makes little sense. The heart of the tempered scale is a pure geometric progression, making it more ideal mathematically than the "natural" scales based partly on harmonics.

DAVID R. WALDMAN Staten Island, NY

For the Record

The article on "European Audio" by lan G. Masters in the August issue credits Europeans with invention of the phonograph record. Not so. The flat disc was invented by Emile Berliner in 1892 in the U.S. My reference is the late Roland Gelatt's The Fabulous Phonograph, which is probably the best nontechnical history of the phonograph record

> RAYMOND B. BERNSEE Ketchikan, AK

In his article Ian Masters credits Europeans with "much of the basic technology of consumer electronics, from the original phonograph record to the compact disc." Although Emile Berliner, a German immigrant to the U.S., was the first to produce a phonograph disc-he patented it in 1887-it was a Frenchman, Charles Cros, who first conceived it. In April 1877, Cros, unable to afford the application for a patent, deposited a paper with the Académie des Sciences in Paris in which he described the recording process and specified a disc. As Mr. Gelatt pointed out in his excellent book, "Berliner's first steps were to carry out in practice what Charles Cros had suggested in theory.'

CD Dynamics

I am one of the faithful, but I have a complaint about CD's. The loudness may be realistic for a symphony hall; at home, it's often ear-splitting. When will audio engineers recognize that if the pianissimos are to be heard, the fortissimos may have to be toned down?

NATHAN LEARNER Boca Raton, FL

At least one equipment manufacturer, dbx, includes a circuit in its CD players that enables listeners to compress the dynamic range of CD's. This seems a more reasonable approach than tampering with the original recording.

Copy Protection, Continued

The July issue carried several letters addressing the controversy surrounding digital audio tape (DAT). Your response directed readers to the Home Recording Rights Coalition. In an effort to assist your readers, you seem to have forgotten that every issue has two sides. Your readers will get only one point of view from the HRRC, primarily the rhetoric that suits their interests as hardware manufacturers.

The Coalition to Save America's Music represents those who make the music. The Coalition is made up of songwriters, music publishers, record companies, and others who are concerned about the \$1.5 billion annual loss to the music industry from home taping. DAT poses a new and even more serious threat to America's music community.

Encoding prerecorded material as non-copiable allows those involved in the creative process to decide whether or not their work may be copied for free. The choice should belong to them.

I think you owe your readers the same choice by letting them know where they can learn the other side of this issue. They can write to the Coalition to Save America's Music (SAM) at 1200 New Hampshire Ave., N.W., Suite 320, Washington, DC 20036; or telephone (202) 778-1019.

PATRICIA A. HEIMERS Director, Public Relations Recording Industry Association of America

To be fair, the telephone number for the Home Recording Rights Coalition is (800) 282-TAPE.

I would like to commend you for your very fair reporting on CBS's Copycode scheme. I truly enjoy making tapes of combinations of different music, and I will be very unhappy if any company prevents me from doing this. I will absolutely and permanently boycott CBS and all its associated companies if they are the ones responsible for this taking place.

P. MUSSO, JR. New Orleans, LA

Being a blind person, I depend on recorded media. Records and tapes have been my life. I hope that the record industry will think very deeply before it does such a drastic thing as to create bad sound on master tapes to prevent copying. I am crushed inside.

> FREDERICK T. HAYASHI Wahiawa, HI

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CIRCLE NO. 23 ON READER SERVICE CARD

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Proton's AV27 audio-video system.



300 Series Remote-Controlled Components with Dynamic Power on Demand" (top to bottom) AM-300 Stereo Amplifier, AT-300 Stereo Tuner, AD-300 Cassette Deck, 830R CD Player.

Your audio-video system should be a reflection of your lifestyle. That's why you'll want the ultimate in picture, sound and design.

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At the heart of the system is our superb, remote-controlled 300 Series audio components with exclusive Dynamic Power on Demand™ (DPD™). Since its introduction, DPD has received the highest acclaim. It does what no other technological innovation has for CD, other digital recordings, or hi-fi video listening pleasure. DPD boosts the amp's output up to four times its rated power, to let you hear even the highest musical peaks clearly, without distortion.

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looks. And, it's the perfect complement to Proton's stunning new 27" flat screen stereo monitor/receiver.

The Proton AV27 audio-video system. Once you own it, you'll know you've arrived.

The ultimate audio/video guide is yours free for the asking.

Proton's Ultimate System Guide for Audio/Videophiles tells you everything about the innovative technology and design that go into creating the renowned Proton line.

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CIRCLE NO. 20 ON READER SERVICE CARD

NEW PRODUCTS



The Koss SST/10 stereophone uses a closed-cup design and foam-filled Pneumalite earcushions to seal out external noise. Earcup pressure is said to be optimized by a cup-motion limiter. The slideband is notched for user comfort. and the SST/10 has a 10-foot cord with a 1/4-inch phone plug. A Hold-a-Fone storage hook is included. Frequency response is given as 10 to 30,000 Hz. Price: \$119.95. Koss, Dept. SR, 4129 N. Port Washington Ave., Milwaukee, WI 53212.

Circle 120 on reader service card



CBM America

The CBM-1000 portable CD player from CBM America, a division of Citizen Watch Company, weighs just over 1 pound and measures 5 inches square and 45 inch thick. The top-loading player has a three-spot laser, sixteentrack programming, a high-cut filter, and scan and repeat functions. The LCD screen indicates current track number, elapsed time in the current track, and time remaining on the disc. A line-out pin jack, AC adaptor, battery pack, and "earbud" headphones are included. An optional carrying case holds the CBM-1000 and up to five CD's. Frequency response is given as 20 to 20,000 Hz ± 3 dB, dynamic range as at least 90 dB, and channel separation as 80 dB at 1,000 Hz. Prices: CBM-1000, \$249.95; carrying case, \$29.95. CBM America, 2999 Overland Ave., Los Angeles, CA

Circle 121 on reader service card

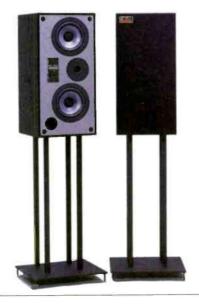


Yamaha

Yamaha's CDV-1000 optical disc player accepts the new CD Video discs in addition to standard 12-inch laser videodiscs, 8-inch laser videodiscs, and compact discs. (CD Video discs contain 5 minutes of high-resolution video with digital audio plus another 20 minutes of digital audio only.) Yamaha's Direct FM Time Base Corrector, using a specially developed LSI, is said to result in pictures that are exceptionally sharp and finely detailed. A "super-tracking tilt servo" mechanism is said to enable the CDV-1000's laser to read even badly warped discs. Other performance features include a noise canceller, a highperformance digital filter, and proprietary dropout-compensation circuitry.

Up to fifteen video chapters or audio tracks can be programmed into the CDV-1000's memory via the supplied wireless remote control. An on-screen chapter/track display with a roving cursor simplifies program selection, and the display also indicates the accumulated time of programmed chapters or tracks. The remote control offers random access to individual video frames and time codes. A four-mode repeat function can be set to replay indefinitely an entire disc, a single chapter or track, any user-defined segment, or an entire program. Price: about \$800. Yamaha, Dept. SR, 6660 Orangethorpe Ave., Buena Park, CA 90620.

Circle 122 on reader service card



SPL

SPL has added the Model 1000 to its Digital Monitor Tower speaker line. The Model 1000 has a 34-inch softdome tweeter with ferrofluid cooling and dual 54-inch polypropylene woofers. The port of the bass-reflex enclosure is located at the front to accommodate shelf mounting. The Model 1000 is compatible with amplifiers delivering from 10 to 100 watts. Frequency response is given as 40 to 20,000 Hz ± 3 dB. Dimensions are 91/2 inches wide, 20¾ inches high, and 11% inches deep.

The Model 1000 is finished in blackash vinyl veneer with a silver vinyl front baffle. A ten-year limited warranty is included. Price: \$400 a pair. SPL, distributed by Audio Products International, Dept. SR, 135 Torbay Rd., Markham, Ontario L3R 1G7.

Circle 123 on reader service card

NEW PRODUCTS



Onkyo

Up to six CD's can be inserted into the Onkyo DX-C600 compact disc changer. The CD's can be programmed to play in any order, and up to thirty-two tracks from any of the CD's can be selected for a programmed sequence. A random-play mode shuffles the track order automatically. The disc magazine does not have to be loaded into the changer in order to be programmed. Nonexistent track numbers that have been programmed in error are skipped automatically so that playback can continue without interruption. Locating

specific segments within tracks is simplified by two-speed, bidirectional search with the program audible.

Onkyo's Opto-Coupling design connects the player's digital and analog circuit blocks by fiber optics, not electrical wiring, which is said to eliminate the harshness sometimes associated with the CD medium. The DX-C600 has a three-spot laser, and oversampling and digital filtering are said to eliminate any audible effects of ultrasonic noise. A twenty-three-key wireless remote control is supplied. Price: \$600. Onkyo, Dept. SR, 200 Williams Dr., Ramsey, NJ 07446.



Meitner

The Meitner AT-2 turntable uses a small, lead-filled aluminum platter that supports the record by its label area only, holding it in place with an inverted, double-edged clamp. The subchassis rests on three large aluminum cones. The unique platter design is said to result in low resonance and efficient dissipation of vibrational energy to the surrounding air. The subchassis and platform are made of Corian, a synthetic marble that is said to have the inert characteristics of stone and to provide effective isolation from feedback. Adjustable controls for vertical tracking angle and pitch are provided, and the AT-2 plays 331/3-, 45-, and 78-rpm records.

The supplied AT-2 unipivot tonearm consists of three rods instead of the usual single arm tube. The arrangement is said to eliminate any standing-wave resonance. Price: \$1,500. Meitner, distributed by Museatex Audio, Dept. SR, 3143 de Miniac, St. Laurent, Quebec H4S 1S9.

Circle 124 on reader service card

Vector Research

The Vector Research VRX-9200R audio/video receiver uses eight discrete output transistors, which are said to allow it to drive audio signals with wide dynamics into complex-impedance loads down to 2 ohms without signal degradation. Power output is given as 120 watts per channel into an 8-ohm load. The VRX-9200R has built-in Dolby Surround decoding circuits, and activating the system switches the amplifier's output configuration automatically to 40 watts each into four channels. There are also MATRIX surround and HALL surround features to enhance mono or non-Dolby stereo signal sources.

The receiver provides input and output jacks for two video sources, a separate audio/video processing loop, a video-monitor output, and a dedicated CD input. Other features include twenty tuner presets, wireless remote control with motorized rotary volume control, preamplifier-out/main-in jacks, a head



amp for moving-coil cartridges, a midrange tone control, and power meters. Price: \$749.95. Vector Research, Dept. SR, 1230 Calle Suerte, Camarillo, CA 93010.

Circle 125 on reader service card

How Denon turned receiver design inside out.

Audio companies must have a fairly low opinion of the receiver customer. How else to explain the bewildering array of buttons, lights and winking fluorescent displays that festoon so many of today's receivers? These outward trappings may impress the innocent, but they contribute not one iota to better sound.



THE SAME ENGINEERS WHO DESIGN DENON PRO EQUIPMENT DESIGN DENON HOME AUDIO.

With their rugged anodized metal front panels, Denon receivers are certainly as handsome as any on the market. But Denon never forgets that it's inside, among the transistors, power supplies and heat sinks, that sound quality is determined. That's why Denon takes the typical priorities of receiver design...and turns them inside out.



DENON RECEIVER VS. DENON INTEGRATED AMP. ANY RESEMBLANCE IS STRICTLY INTENTIONAL.

For the results, look inside any Denon receiver. You'll find discrete output transistors, not cheap IC "power packs." You'll notice ample power supplies that handle the most demanding dynamic passages. In fact, the Pure Current Power Supply of the DRA-95VR reduces dynamic IM distortion by an impressive 60 dB.

"Distortion is, in a word, negligible."

High Fidelity Magazine

The circuit topology of every Denon receiver truly epitomizes the Denon credo, "Simple is Best." For example,

Of equal importance, though, is the fact of equal importance, though, is the DRA-that much of the circuitry used in the DRA-that much of the circuitry used in the company's that much of the circuitry used in the exotic components, and the result is a full exotic component, and will delight even the featured receiver that will delight even the most ardent component separatists.

integration a practical reality. Anyone with an easy chair will enjoy the remote control supplied with Denon's top two models. It operates not only the receiver, but also a choice of Denon cassette decks and CD players.

While you might expect to pay more for a Denon, our receivers start at under \$300*



AS BEAUTIFUL AS OUR DRA-95VR IS ON THE OUTSIDE, IT'S EVEN BETTER ON THE INSIDE

the DRA-95VR conquers distortion without resorting to the negative feedback that can degrade transient performance. And Denon's Non-Switching Class A output stage combines the purity of Class A with the efficiency of Class B.

Anyone with a Hi-Fi VCR will appreciate Denon's video switching. It makes audio/video

"The amplifier section is the 95VR's highlight."

High Fidelity Magazine

If they seem different from similarly-priced competitors, there's a good reason. At Denon, we pay more attention to the laws of acoustics than the dictates of fashion.



THE INS AND OUTS OF A SONIC TRIUMPH.



This was a combination of many things. Long and intense product review sessions. Critical testing of alloys for durability and conductivity. Throwing good prototypes away because they weren't good enough. And in the end, emerging with three removable FM-AM tuner/cassette players worthy of the name Alpine.

The problem wasn't making these units removable. It was making them sound absolutely magnificent regardless how many

times they had been removed (progressive sound degradation

sound degradation

Alpine is standard equipment in the Lamborghini Countach.
being the most common failing of

players that are pure the removable radios).

built for the long.

To this end, Alpine technicians employed in these new units their most reliable tape mechanisms, engineered to maintain precise tape-head alignment despite the typically rough handling removable radios must endure.

They included the legendary T-10 II Tuner for the most satisfying, noise-free reception of any tuner on the road.

And at what might be considered the weakest link in the chain, the connection between dash and radio, Alpine placed a new multi-pin connector with a life expectancy of 25,000 cycles (in and out of the dash = 1 cycle) with no degradation of signal.

What was an idea has become a triumphant reality:
three sonically su-

three sonically superior removable radio/cassette

players that are pure Alpine-quality and built for the long, long haul.

You can now hear the new Alpine Removables, the 7385, 7284 and 7283, at your nearest Alpine specialist.

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by Ian G. Masters



Discontinued Speakers

Recently I damaged the woofer in one of my fifteen-year-old Dynaco A-25 speakers. I want very much to replace or repair it because the speaker is housed in a gorgeous solid-walnut enclosure that matches three others I own. Unfortunately Dynaco no longer exists, and I don't even have specifications for the A-25. Is there any way to restore it, and, if so, should I replace the woofer on the other speaker as well?

JIM PURDY San Jose, CA

Unless you can get your hands on an exact duplicate of the original woofer, replacing it will almost certainly degrade your sound. Speaker design involves the careful matching of all the system's elements-tweeter, woofer, crossover network, and enclosure. Altering the characteristics of any one of them will upset this delicate balance and result in inferior sound.

In some cases, it might be possible to operate with only one woofer, as the lowest frequencies are more or less omnidirectional. Alternatively, an outboard subwoofer might stand in for the woofers of both speakers, allowing the use of the original pair as satellites. With the A-25 however, these are not viable options because the woofer handles much of the midrange, crossing over to the tweeter at 1.500 Hz.

Your best bet would be to find a secondhand A-25. If you're lucky, you might even find one in walnut; if not, it

could be cannibalized and the woofer installed in your old cabinet. This was a popular speaker in its day, so finding one should not be impossible—and even if you locate a broken one, it's more likely that the owner has blown the tweeter than the woofer.

High-Impedance Amplifier

My old integrated amplifier is still in very good condition, but its output is specified as 16 ohms. Speakers of that impedance are hard to find, so I have bought a pair rated at 8 ohms. Is it safe to drive these with my 16-ohm amplifier, or am I likely to damage them?

> LUIS OUIN Manila, Philippines

There is little risk to the speakers themselves, but driving too low an impedance is always unwise, as the higher current drain could damage the output stages of the amplifier. That possibility is even greater with older units like yours, as the chances of their having adequate protection circuits are fairly remote.

Your safest course would be to wire an 8-ohm resistor in series with each speaker, making sure that each resistor has a high enough wattage rating to handle the full output of the amplifier. Doing this involves a small sacrifice in total output power, but it would protect your amplifier by loading it properly.

Replacement Woofers

I am considering upgrading my speakers by replacing the woofers with ones of higher quality. Will this in fact improve my sound?

TRACY ALLEN Springfield Garden, NY

Probably not. Good speaker design hinges on the delicate balancing of the physical and electrical characteristics of the drivers used, the enclosure they are mounted in, and the crossover network that distributes the signal within the speaker system. To replace any one element, such as a woofer, would disrupt this balance and almost certainly result in worse sound rather than better, even if the woofer were superior to the original in "absolute" terms.

Hi-Fi Video Recording

I am trying to reconcile two statements about video I have read recently in STEREO REVIEW. One says that "a faster recording speed results in a higher-quality product," while the other holds that "the speed has no effect on the quality of a hi-fi recording." Are there speed-related differences in a VCR's audio or video quality?

> LEONARD FRIEDMAN Sacramento, CA

Videocassette recorders handle audio and video in entirely different ways, so the effects of tape speed vary. The picture information is recorded diagonally across the tape by a rotating head; its tape-to-head speed (called its "writing speed") is constant whatever the linear tape speed. Theoretically, therefore, the picture quality should not depend on what speed is chosen. With the slower speeds, however, the video tracks are closer together, so there is a greater possibility of interference, which shows up as noise. For this reason, some manufacturers roll off the high end of the video signal at the lower speeds to improve noise performance at some sacrifice of resolution.

Conventional audio, on the other hand, is recorded in a linear fashion along the edge of the tape. As with any audio recording medium, the slower the linear tape speed the worse the sound quality. It was to overcome this limitation that hi-fi video sound was developed. Like the video signal, the hi-fi audio tracks use the rotating head and therefore have a constant writing speed; because the audio signals are frequency modulated, however, they are relatively impervious to noise and therefore need no compensation at the slower speeds. So, in theory at least, a hi-fi recording on videotape should sound the same whatever the linear speed of the tape.

Fiber-Optic Cables

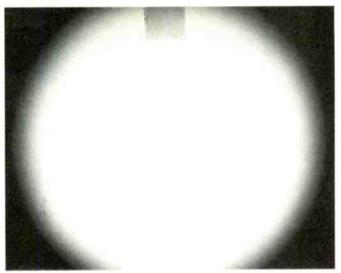
Could I replace the wires within my speakers with fiber-optic cables? If so, would the expense and effort be worth it?

> DAVE GILLESPIE Portsmouth, NH

No, and no. Fiber-optic cables are marvels of modern technology, and they allow transmission of huge amounts of information over very great distances. They are also useful in areas where electrical interference might be a problem, such as in compact disc players, because they are impervious to stray electromagnetic signals.

But fiber-optic cables are not replacements for conventional wires. They require a signal to be converted into light, usually in the form of a laser beam, and to be reconverted photoelectrically at the other end. To use optical cables within a speaker system is definitely a possibility for the future, but it would require optical transducers and builtin amplification. To convert an existing speaker is next to impossible.





To Create The Perfect Loudspeaker, You First Have To See The Light.

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accomplished something no other
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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.

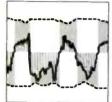
reproduce, without distortion, the dynamic range of music on Digital Audio Discs and fine analog recordings.

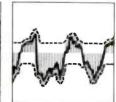
The Magnetic Field Amplifier in the CARVER Receiver gives you

150 watts per channel (continuous sine-wave output) 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.

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

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

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

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"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

"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

"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

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

Leonard Feldman, AUDIO

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.

SPECIFICATIONS: 150 watts per channel RMS into 8 ohms, 20 Hz to 20 kHz with no more than 0.05% total harmonic distortion





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POWERFUL.

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ACCURATE

by Julian Hirsch



Can a Receiver Equal Separate Components?

T one time, all audiophile music systems were formed of separate components. A "mix-and-match" assembly of tuner, turntable, tonearm, phono cartridge, preamplifier, power amplifier, speaker (stereo was not yet a commercial reality), and, possibly, an open-reel tape deck was the usual system format. People did not use receivers because there were none—at least, none of acceptable quality.

In those days an "all-in-one" receiver was synonymous with the conventional radio-phonographs of the time, the quality of which ranged from mediocre to abominable. The stigma attached to such products, which in any case were generally not available except as part of a console system from one of the major-brand manufacturers, ruled them out for serious consideration by audio hobbyists.

spread enthusiasm hi-fi beyond the narrow limits of a hobbyist activity, the obvious inconvenience of a multiunit component

system encouraged the development of single-unit receivers (often, then as now, called "tuner-amplifiers" to set them apart from massmarket products). The first hi-fi receivers, introduced in the late 1950's by Harman Kardon, combined a modest AM/FM tuner with a low-power (20- to 40-watt) mono amplifier. The preamplifier section was compatible with magnetic phono cartridges and provided such basic conveniences as tape inputs and outputs. The concept took root, and the receiver has been a major part of the hi-fi equipment scene ever since.

The early receivers, which predated the transistor era, tended to be rather hot in operation despite their limited power capability. Of course, this was equally true of separate power amplifiers, and I recall that my first stereo power amplifier, which delivered about 60 watts per channel, weighed something like 65 pounds and could not be enclosed in a cabinet because of the heat it generated!

Originally, hi-fi receivers made no claims to "state-of-the-art" performance—their forte was convenience. Serious audiophiles considered them unworthy of consideration, as many of them still do. It inevitable, however. people would begin to ask about the real differences between separate and integrated components, not only receivers vs. tuners and amplifiers but also integrated amplifiers

tle more panel space than is occupied by their controls. Most give off a negligible amount of heat and can safely be installed in an enclosed space. Their operating flexibility and control features can rival many separate systems. Nearly always, a receiver is less expensive than a combination of its equivalent separate components. Most full-line manufacturers produce equivalent products in both separate and integrated form, so it is easy to compare

vs. power amps and preamplifiers.

ten are) very compact, requiring lit-

Today, receivers can be (and of-

specifications and prices and judge for yourself.

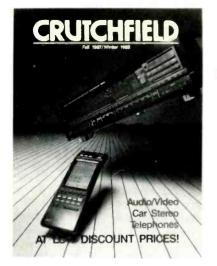
In many ways, the receiver appears to have a clear advantage over separates, but as usual there is more than one point of view to be considered. It might seem that the power limitations of receivers would rule them out for users who have lowefficiency speakers or for other reasons need a high power capability. In past years, the few receivers that could deliver 150 or more watts per channel were usually undesirably large and heavy. Their successors are still large. Despite recent advances in miniaturization (especially in power-supply designs), no one has yet miniaturized a watt or the radiating surface necessary to dissipate its equivalent in heat! The development of high-efficiency amplifiers and signal-tracking power supplies, however, has now made it possible to make relatively powerful receivers (100 to 200 watts per channel) that can be lifted and moved by almost anyone and do not have stringent ventilation requirements.

One of the continuing distinctions between integrated and separate components is in their control and operating flexibility. This is not a limitation of technology but rather one of marketing policy. Usually a separate preamplifier will have more inputs and control facilities than a receiver that contains identical operating circuits and delivers equal performance. But most good receivers today offer more operating flexibility than most users will ever need or use.

What about performance quality? In many cases separate components

Tested This Month

Harman Kardon Citation Twenty-Three Tuner Pioneer PD-M90X Compact Disc Changer Polk Audio SDA-1c Speaker System NAD Model 7600 Receiver ADC Model 16/2R Compact Disc Player Perreaux SM3 Preamplifier Jamo Compact 120 Speaker



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TECHNICAL TALK

carry slightly better specifications than the equivalent integrated component. This is becoming rarer today now that many receivers have distortion and noise levels far below audibly detectable levels. Many people hold that electronic components have sound qualities that are not related to conventional measurements. If such sonic differences exist, they almost certainly have nothing to do with any measurable audio parameters. Thus, even when receivers are measurably equivalent to separates, a segment of the audiophile population generally finds separates more satisfying. In addition, those who prefer vacuum-tube equipment for sonic reasons (or simple nostalgia) must also go the way of separate components.

Let's look at some of the major advantages and disadvantages of an integrated component, either an amplifier or receiver, compared with its separate equivalents. On the plus side, the integrated component needs fewer external interconnections since its operating sections are connected internally by short. properly shielded leads. Best of all, these connections are usually made without using plugs and jacks, which are the least-reliable parts of almost any electronic system, and especially of a hi-fi system. Problems with hum and other interference picked up by corroded or loosened connectors are nearly eliminated in an integrated product.

An integrated component is usually considerably more compact than equivalent separates, although stacked separates can often rival an integrated unit in size. Having all the control functions on a single panel often simplifies operation (it can complicate it, however, if the panel is too crowded or poorly marked). And, as I mentioned, an integrated component tends to be less expensive for the same level of performance than equivalent separates.

On the other hand, an integrated component cannot easily be upgraded. One of the attractions of separate components is the possibility of replacing just the amplifier, preamplifier, or tuner as new and improved models become available or your needs change without hav-

ing to replace the other parts of the system at the same time. Although the better receivers do provide separate access to each of the major operating sections, it doesn't make economic sense to leave a perfectly good power amplifier in a receiver unused in order to add a "better" external amplifier to the system. There is another side to this coin. however-such an arrangement makes it easy to add enhancement systems that may need additional amplification, such as time delays or Dolby Surround decoders, without unnecessary obsolescence.

Perhaps the most serious disadvantage of integrated components is

There is little pride of ownership in having a receiver, no matter how good, compared with owning limited-production separates.

that they are manufactured for a much wider market than the "high end" of the audio-enthusiast group. There is little pride of ownership in having a receiver, no matter how good, compared with the pride of owning limited-production separate components. The separates may or may not sound better or offer other performance advantages, but their quality of workmanship and materials is unquestionably beyond that of any mass-market product.

Pride of ownership is difficult to quantify, of course, but its reality is unarguable. After all, everything else being equal, most people would probably prefer to drive a Mercedes than a Hyundai, although both cars are quite capable of doing the same basic job of transporting people from one place to another.

Returning to the opening question, "Can a receiver equal separate components?," I think the answer is a clear "Yes" if we consider utility. The better receivers (which can be quite expensive) are superb products that can actually outperform some separates, but some people will always consider them inferior to high-end separates. Maybe they are, and maybe not. The decision is yours.

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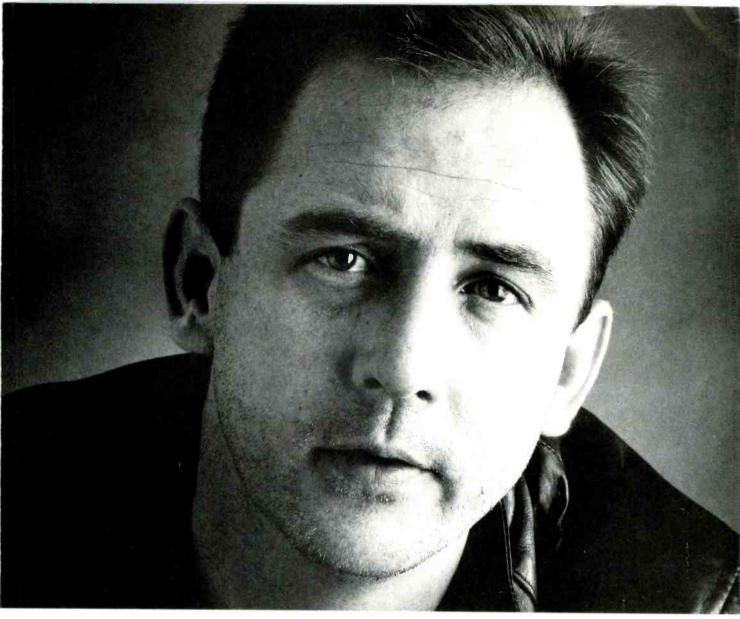
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HARMAN KARDON CITATION TWENTY-THREE TUNER

Iulian Hirsch, Hirsch-Houck Laboratories

s part of the recently revived. Citation line of premiumgrade components, Harman Kardon has developed an innovative AM/FM tuner, the Citation Twenty-Three. The FM section of the tuner features an unusual circuit design, called Active Tracking, to provide exceptional selectivity when needed without sacrifice of any audible performance qualities during normal operation.

In a conventional FM tuner, selectivity—the ability to discriminate against interference from signals removed in frequency by one or two channels from the desired stationis provided by band-pass filters in the intermediate-frequency (IF) amplifier. Today's tuners use ceramic filters that require no adjustment. The handwidth of an FM tuner's IF section must be at least 150 kHz to pass a fully modulated signal without distortion, and it is usually somewhat greater than that. Most tuners are able to reject signals 400 kHz from the desired one (alternate

channels) without difficulty, but adjacent channels (200 kHz away) can present a severe problem. Typical adjacent-channel selectivity measurements are in the 3- to 5-dB range, which in practical terms means that the tuner simply cannot reject such interference effectively.

Some tuners have narrow-band filters that can be switched into the circuit when needed, but these typically introduce a large phase shift and amplitude change near the outer limits of the filter pass-band, causing significantly higher distortion and degraded channel separation and capture ratio. Harman Kardon's solution to the problem is the Active Tracking system. When high adjacent-channel selectivity is needed, the usual IF filtering system is augmented by a phase-locked

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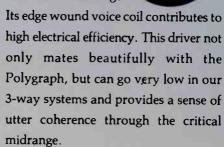
structure that's injection molded from

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TIVE PERFORMANCE



TEST REPORTS

loop (PLL) similar in principle to the circuits used in stereo multiplex demodulators and in the digital-synthesis tuning sections of almost all tuners. Although few specific details were available, the following is our understanding of the operation of this circuit.

Basically, a PLL system "locks" the frequency of a voltage-controlled oscillator (VCO) to a signal from another source. In the Harman Kardon Active Tracking system, a local oscillator is locked to the instantaneous IF frequency (at the output of the mixer stage) and accurately follows its variations. The tracking limits of the system are set just beyond the maximum allowable frequency deviation of an FM broadcast signal (\pm 75 kHz). The VCO's output effectively replaces the original signal; the difference is that it does not include interfering signals from an adjacent channel.

The tuner's resulting effective IFfrequency response "skirts" much steeper than those of

tuners using conventional filters. Because the Active Tracking circuit excludes the low-level modulation sidebands that lie outside its ±75kHz limits, but are vital to the accurate reproduction of the original program, certain tuner characteristics—such as capture ratio, channel separation, and distortion-are somewhat degraded, though not to an audible degree.

Like most contemporary tuners. the Citation Twenty-Three uses digital-synthesis tuning, but, unlike most, the desired frequency is set by a rotary knob. The knob, whose motion is smoothed by a flywheel. drives an optical shaft encoder that sends digital codes to the synthesizer circuits. To a user, the effect is much like that of an analog tuner except that the frequency changes in discrete steps of 100 kHz (10 kHz for AM). A fine-tuning feature, however, is enabled whenever the Active Tracking system is selected, and it can be used to adjust the frequency over a ±25-kHz range,

which can help eliminate interference from a strong adjacent-channel signal by slightly detuning toward the desired signal.

Except for the large tuning knob and small FINE TUNING knob, all of the operating controls of the Citation Twenty-Three are pushbuttons. Each button contains a green light that comes on when it is pressed. The display window has green LCD signal-strength indicators and large frequency numerals. The word "Stereo" appears when a stereo FM broadcast is received. Pressing the HI-Q button turns on the Active Tracking circuit and the FINE TUN-ING knob next to it. "Fine Tuning" and a center-tuned symbol then appear in the window; the symbol is replaced by left or right arrows as the FINE TUNING knob is turned. When the frequency is changed to another channel, the HI-Q circuit automatically disengages.

Each of the eight preset buttons can be switched between two frequencies by another button. The sixteen available preset channels can be divided between the FM and AM bands as desired. The interstation muting is turned on or off by a mute button, and a small knob on the rear apron adjusts the mutingthreshold level. A group of four buttons selects the AM or FM band, mono mode, and seek tuning, in which the tuner scans the band and stops at the first signal whose strength exceeds its muting threshold. Unconventionally, a slight turn of the tuning knob is used to begin a scan from the current frequency.

The rear apron of the Citation Twenty-Three has binding-post terminals for AM and 300-ohm FM antennas and a coaxial F connector for a 75-ohm FM antenna. A hinged. removable wire-loop AM antenna is furnished. There are gold-plated fixed- and variable-level audio output jacks; the adjustment for the variable outputs is also on the rear. The tuner has a single unswitched AC outlet.

The Citation Twenty-Three tuner is supplied with a wireless remote control that duplicates all its frontpanel controls except the HI-Q and fine-tuning systems. Using the remote, the tuner frequency can be varied by a pair of pushbuttons. The

FEATURES

- ☐ Digital-synthesis tuning with flywheel knob
- ☐ Active Tracking circuit for high adjacent-channel selectivity
- ☐ Fine-tuning control with range of ±25 kHz
- ☐ Sixteen preset station memories using eight buttons
- ☐ Variable and fixed audio output levels
- ☐ Switchable muting with variable threshold level ☐ Wireless remote control for
- all functions except Active Tracking and fine tuning
- ☐ Antenna inputs for 300- and 75-ohm FM antennas, AM antenna
- ☐ Pivoted AM loop antenna

LABORATORY MEASUREMENTS

(All figures for FM only except frequency response)

Usable sensitivity (mono): 14 dBf (2.8 μV) in normal mode, 20.5 dBf (5.8 μV) in HI-Q mode

50-dB quieting sensitivity: mono, 17 dBf (4.1 μV) normal, 18.5 dBf (5.6 μV) HI-Q; stereo, 41 dBf (62 μV) normal, 38 dBf (43.7 μV) HI-Q

Signal-to-noise ratio at 65 dBf: mono, 84.5 dB normal, 83.8 dB HI-Q; stereo, 72.5 dB normal, 72.7 dB HI-Q

Harmonic distortion (THD + noise) at 65 dBf: mono, 0.095% normal, 0.3% HI-Q; stereo, 0.11% normal, 0.32% HI-Q

Capture ratio at 65 dBf: normal, 1.2 dB; HI-Q, 6 dB

AM rejection at 65 dBf: normal, 64 dB; HI-Q, 74 dB

Image rejection: normal, 77 dB; HI-Q, 73 dB

Selectivity: alternate-channel, 69 dB normal, 84 dB HI-Q adjacent-channel, 5 dB normal, 46 dB HI-Q

Stereo threshold: normal, 42 dBf (62 µV); HI-Q, 35 dBf (31 µV)

Muting threshold: maximum. approximately 64 to 81 dBf (870 to 6,170 µV); minimum, 34 to 40 dBf (28 to 55 μV)

Stereo channel separation at 100, 1,000, and 10,000 Hz: normal, 46.5, 51.5, 46 dB; HI-Q, 34, 34, 28 dB

Frequency response: FM, 30 to 15,000 Hz ±0.8 dB; AM, -6 dB at 22 and 4,700 Hz

347955. Huey Lewis & The News-Forel (Chrysalis) 349985. Johnny Mathis/ Henry Mancini—The Hollywood Musicals (Columbia) 348979 Ting Turner-Break Every Rule (Capitol) 352633. Dolly Parton/ Linda Ronstaat/Emmylou Harris-Trio (Warner Bros.) 336396-396390. Billy Joel's Greatest Hits, Vol. 1 & 2. (Columbia) 324822. Ravel: Bolero: La Valse; Rhapsodie Espagnole-Moazel, cond. |Digital—CBS Masterworks 346478. Modonna-True Blue. (Sire) 343319. Janet Jackson-Control (A&M) 349571. Boston-Third Stage (MCA) 290916. The Best Of Forth Wind & Fire Vol. I (Columbia/ARC) 138586. Bob Dylan's Greatest Hits (Columbia) 319541. Elton John-Greatest Hits. [MCA] 318089. Michael Jackson -Thriller (Epic) 342105. Bangles Different Light. (Columbia) 335547. Berlioz: Symphonie Fantastique Borenboim, Berlin Phil. (Digital-CBS Masterworks) 339044. Mozart: Symphonies 40 & 41 (Jupiter) Kubelik, Bavarian Radio Or (Digital—CBS Masterworks) 339226. Gershwin: Rhapsody In Blue; more. Thomas, Los Angeles Phil. (Digital-CBS Masterworks) 316604. Tchoikovsky: 1812 Overture; Marche Slave; Beethoven: Wellington's Victory-Maazel cond (Digital-CBS Masterworks) 219477. Simon &



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293597. Led Zeppelin— Houses Of The Holy. (Atlantic)

350736. Rolling Stones -Rewind. (Ralling Stones Records

346957. Steve Winwood -Back In The High Life. (Island)

344622. Anita Boker Rapture. (Elektra) 319996-399998 Motown's 25 #1 Hits From 25 Years. (Motown) 291278. The Daobie Brothers-Best of the Doobies, (Warner Bros.) 345777. Peter Gabriel-So. (Geffen)

287003. Eagles Greatest Hits 1971-1975 (Asylum)

246868. Jim Croce-Photographs And Memories—His Greatest Hits. (Saja)

314443. Neil Diamond's 12 Greatest Hits, Vol. 2. (Columbia)

308049. Creedence Gearwater Revival Featuring John Fogerty/ Chronicle. 20 greatest hits. (Fantasy)

343582. Van Halen-5150. (Warner Bros.) 326629. Bruce Springsteen-Born in The

U.S.A. (Columbia) 342097. Borbra Streisand—The Broadway Album. (Columbia)

348649 Pachelbel Canon & Other Digital Delights -Toronto Chamber Orch (Digital—Fanfare)

353771. Balling/Rampal: Suite #2 for Flute & Jazz Piano Trio (Digital—CBS)

348318. The Police Every Breath You Take -The Singles (A&M) 336222. Dire Straits-Brothers In Arms.

(Warner Bros.) 341073. Steely Dan-A Decade of Steely Dan. (MCA)

314997-394999. Stevie Wonder's Criginal Musiquarium 1. (Tamla)

355834. David Bowie-Never Let Me Down (EMI America)

348110. Buddy Holly-From The Original Moster Tapes. (Digitally Remastered—MCA)

351692. Beastie Boys-Licensed To III. (Def Jam/Columbia

346544. Kenny G — Duotones. (Arista) 344721. Lionel

Richie-Dancing On the Ceiling. (Motown) 355156. Vladimir Horowitz

Ploys Favorite Chopin (Digitally Remastered CBS Mosterworks)

352948. Wynton Morsalis -Carnaval. Hunsberger Eastman Wind Ensemble (Digital-CBS Masterworks)

356287. Suzanne Vega— Solitude: Standing. (A&M)

354985. Billie Holiday-From The Original Decca Masters. (Digitally Remastered—MCA) 353037 Miles Davis-Sketches of Spain. Digitally Remastered— Cl. Jazz Masterpieces 357186. Haoters—One Way Home. (Columbia) 356873. The Outfield-Banain', (Columbia) 355362. Whitesnake.

(Geffen) 345751. Paul Simon-Graceland, (Worner Bros.) 356279. Gloria Estefan And Miami Sound Machine

-Let It Loose. (Epic) 355958-395954. Beethoven: Symphonies Nos. 8 & 9 (Choral)— Michoel Tilson Thomas, English Chamber Orch. (Digital—CBS Mosterworks)

357889. Coplond: Billy The Kid: Appalachian Spring; -Bernstein, NY Phil Dinitally Remastered-CBS Masterworks

357871. Tchaikovsky: Waltzes—S. Comissiona and Houston Symphony (Digital—Pro Arte) 355776. Stravinsky: The Firebird (1910 version); Song Of The Nightingale
—Boulez, New York Phil. Digitally Remastered-CBS Mosterworks 357178. The Fabulous

Number. (CBS Assoc.) 338905. Diana Ross & The Supremes—20 Greatest Hits. (Motown) 352229. Carly Simon— Coming Around Again.

Thunderbirds—Hot

330142. Mendelssohn/ Saint Saens: Violin Concertos—Cho-Liang Li. (Drg-CBS Master.)

Aristal



Garfunkel's Greatest

Hits. (Columbia)

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tuner is finished in black and measures 173/8 inches wide, 145/8 inches deep, and 234 inches high. It weighs 15 pounds. Price: \$650. Harman America, Dept. SR, 240 Crossways Park West, Woodbury NY 11797.

Lab Tests

We made most of our measurements in both the normal and HI-O operating modes. The tuner's sensitivity was good in the normal mode. but in the HI-Q mode it was somewhat reduced. The noise level was slightly lower than rated in both modes. Alternate-channel selectivity comfortably surpassed the ratings. The adjacent-channel selectivity, an average 5 dB in the normal mode, was a phenomenal 46 dB in the HI-Q mode, which not only far surpassed the specifications but has never been approached by any other FM tuner we know of.

Harman Kardon concedes that the Active Tracking system does reduce performance in some respects but claims there is no real sacrifice of listening quality. With the circuit in use, the distortion was roughly tripled though still negligible, and the channel separation decreased by 15 to 20 dB. Even so, the measured separation was a very uniform 30 dB or so across the audible frequency range, which is more than enough to produce full stereo performance.

Comments

The Harman Kardon Citation Twenty-Three is an attractive, easyto-use tuner that always delivered clean sound quality in our listening tests. It had a few idiosyncrasies, however, which were exceptionally obvious because of its overall excellence.

The muting threshold was always higher than we felt it should have been. Even when the threshold was set at its minimum, the tuner excluded many perfectly listenable signals. With a good antenna, or the right location, this would be no problem, but with an indoor dipole antenna the high threshold made the tuner appear to be rather insensitive. Most of the time we preferred to use the tuner with the muting system switched off.

The fine-tuning control had the rated ±25-kHz range, although in our location we found no adjacentchannel stations strong enough to hear, let alone suffer interference. In many cases we could hear heavy program splatter when we tuned 200 kHz away from from a strong station, but switching to HI-Q and adjusting the fine-tuning knob usually reduced this to near or total inaudibility. We never heard any deterioration of signal quality while listening to a number of stations in the HI-O mode.

Citation Ergonomically, the Twenty-Three is a well-designed, attractive, and functional tuner. Our only criticism of its external features concerns the indicator lights in some of the smaller pushbuttons, particularly those in the ends of the present selectors. The lights are very difficult to see in a well-lit room or when viewed at a slight angle instead of head-on.

Although we have no substantive criticism of the Harman Kardon Citation Twenty-Three, it is a fairly expensive tuner. In a situation where adjacent-channel interference is a problem, however, the HI-O feature alone makes the Citation Twenty-Three a clear winner. There is no other tuner that comes even close to matching its adjacent-channel selectivity. In addition, many people will consider that its attactive styling and general performance justify the price. We cannot imagine anyone being disappointed in it.

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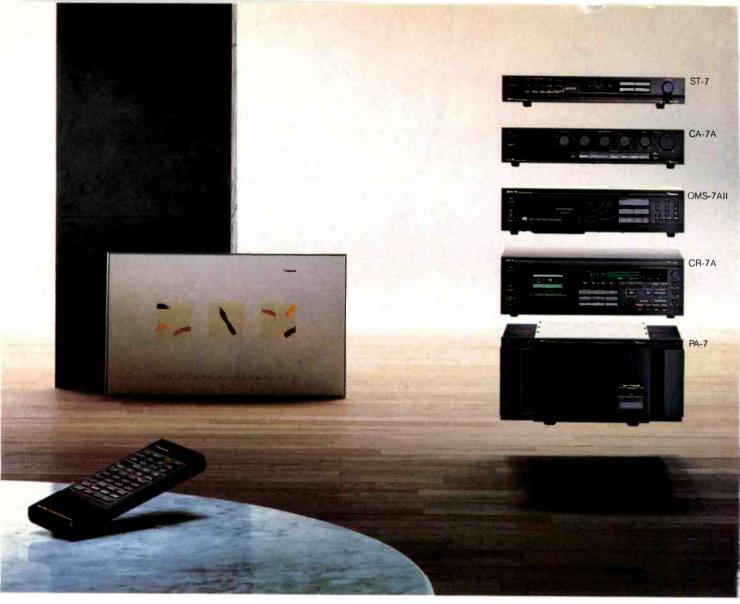


ing program. Akai Digital Oversampling CD Players, Twin-Field Super GX Head Cassette Decks, and P-Mount Turntables consistently earn praise from reviewers throughout the world. They are the

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PIONEER PD-M90X COMPACT DISC CHANGER

Julian Hirsch, Hirsch-Houck Laboratories

IONEER'S PD-M90X CD changer is an improved version of the PD-M6 we tested for the January 1986 issue of STEREO REVIEW. With a few exceptions, its control and operating features are identical to those of the PD-M6.

The most obvious difference between this player and most others is its removable magazine holding up to six discs. All of its programming features, including direct and programmed access to all tracks of all discs and a random-play mode, can be applied to all the discs in the magazine as well as all the tracks on any one disc. Different program groupings are easy to assemble since additional magazines are available from Pioneer and discs can be stored in them with complete safety and easy access. The player is also supplied with a single-play drawer that slides out when the eject button is pressed.

The controls of the PD-M90X are, for the most part, similar to those of other CD players. They include track skipping and high-speed search (with audible sound) in both directions, conventional play, pause, and stop buttons, and a

RANDOM button that plays the tracks on the disc(s) in a random order. A keypad, with an additional row of six keys to select the desired disc in a magazine, provides direct access to any track on any disc.

Up to thirty-two steps of programming instructions can be entered in the player's memory. In general, each selection must include both its disc and track number, so a maximum of sixteen tracks can be programmed from among six discs or thirty-two tracks from a single disc (only test discs are likely to have that many tracks). The PD-M90X can also accept a pause instruction as a program step, which can be useful when taping a program from CD's since a pause can be entered at the point where it will be necessary to turn over the tape cassette.

The PD-M90X has an exceptionally complete display. The normal display, in orange fluorescent characters, shows the numbers of the current disc and track and the elapsed time on that track. In addition, a row of disc symbols shows how many CD's are contained in the magazine; a red center section indicates the one currently being

played. Successive operations of the TIME button change the readout to show the time remaining on the current track, the time remaining on the disc, the total number of tracks on the disc and their playing time, and, in programmed operation, the number of programmed steps and their total playing time.

In timer-controlled operation, the PD-M90X can be started in either the normal or random-play mode when power is applied. It has a headphone jack with its own volume control on the front panel. The rear apron contains a single unswitched AC outlet, gold-plated jacks for the audio outputs, and a SUBCODE output socket for use with future accessories. Unlike the earlier PD-M6, the PD-M90X also has a gold-plated digital output jack to supply a digital signal to an external digital-to-analog (D/A) converter such as those now being built into some integrated amplifiers and receivers or sold as outboard accessory units.

The remote control supplied with the PD-M90X contains a number of keys not present on the control unit of the PD-M6 as well as a ¾ x 1½-inch alphanumeric LCD readout. The remote duplicates nearly all of the front-panel controls, and two additional keys electronically control the volume at the line outputs. A group of four red LED's, marked DIGITAL LEVEL CONTROLLER, on the player's display show the approxi-

STEREO REVIEW NOVEMBER 1987 35

Power Precision. Performance. The new generation of Citation separates goes far beyond its predecessors to create the ultimate listening experience.

Designed and developed by Harman Kardon, one of the most respected names in audio, every generation of Citation has earned a reputation of excellence with audiophiles around the world. A true testing and proving ground for the most revolutionary audio concepts, Citation's innovations have ultimately been featured in all Harman Kardon components.



Dr. Sidney Harman, Founder and Chairman of Harman Kardon

Steeped in audio breaktnroughs and aovanced designs. Harman Kardon's Citation division introduced the world's first Ultrawideband amplifier in 1963—the Citation 2 vacuum tube amplifier In 1972, the

vacuum tube amplifier In 1972, the Citation 14, the first FM stereo tuner with Phase Locked Loop (FLL) MPX decoding

was introduced. In 1977, the 150-Watt-per-channel Citation 19 became the first power amplifier to feature low negative feedback. 1981 saw the introduction of the Citation XX. Its exclusive High instantaneous Current Capability (HCC) design provided the instantaneous current required to precisely drive and control any loudspeaker system.

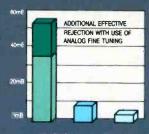
Now, just as the original Citation separates established design innovations that were years ahead of their time, the new Citation series sets the standards for the decade to come.

The new Citation twenty-three makes tuner design history as the world's first Active Tracking tuner and the world's first synthesized tuner with Analog Fine Tuning. This patented system delivers two aspects of tuner performance that were creviously mutually exclusive: high selectivity and high fidelity. Its



superior adjacent and alternate channel rejection lets you ture in more stations with more fidelity than was ever before possible.

A thorough analysis of internal layout and a strict code of symmetrical circuitry ensure rapid, accurate reproduction of the music signal.



In contrast to traditional methods, the Citation twenty-three's Active Tracking circuitry provides previously unheard of adjacent channel selectivity, with little or no sacrifice in stereo separation or THD

ADJACENT CHANNEL SELECTIVITY

CITATION TWENTY - THREE TYPICAL SINGLE IF TUNER

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As the world's first High Voltage/High Current power amplifiers, the 200-Watt-per-channel* Citation twenty-two and the 100-Watt-per-channel* Citation twenty-four redefine amplifier design. With just the flick of a switch, their exclusive High Voltage/High Current technology lets you select the optimum mode for driving either 8-Ohm or 4-Ohm loud-speakers. The result is higher power output and cleaner, clearer sound than any traditional design, without distortion, overheating or current limiting.

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Gold-plated input jacks on the Citation twentyone preamplifier provide reduced signal loss and improved long-

Citation's attention to detail can be seen as well as heard. The heavy rolled-steel, rubber-mounted chassis creates a solid, vibration-free environment that combines world class styling with sophisticated American industrial design.

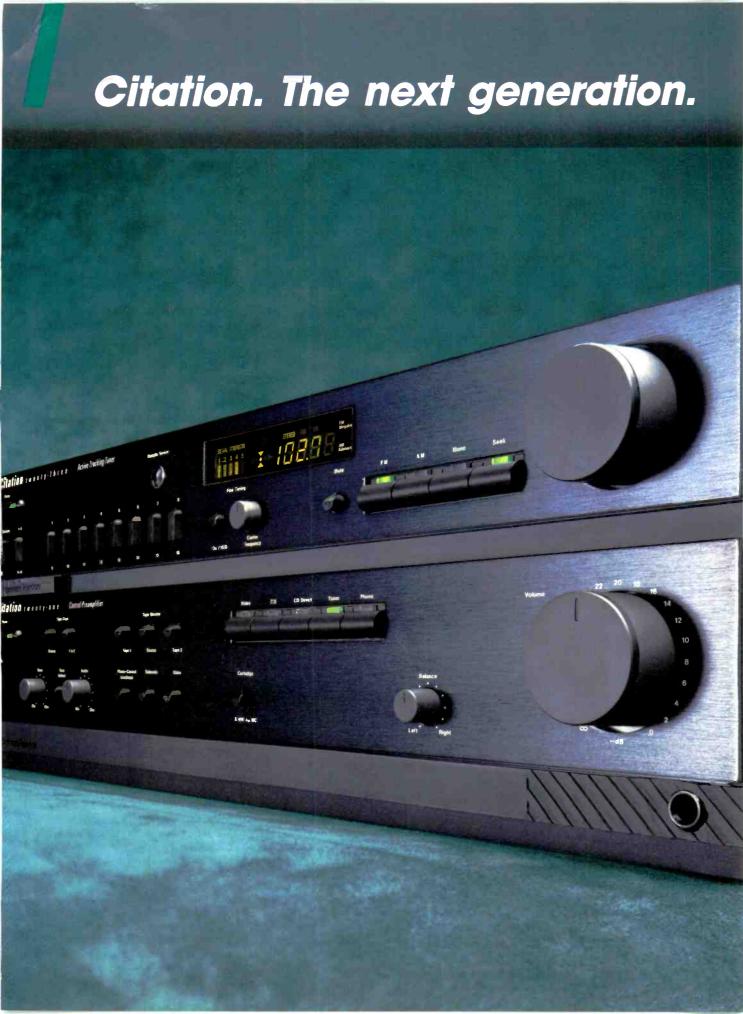
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Citation

harman/kardon

"20Hz-20kHz < .008% THD into 8 Ohms and Into 4 Ohms



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mate volume reduction, which varies smoothly from 0 to 24 dB. For 2 seconds after one of the remote volume buttons has been operated, the actual attenuation setting, in decibels, appears in the player's display window. Each time the PD-M90X is turned on, its digital volume-control circuit is set at 0 dB (maximum volume).

When any key on the remote control is pressed, its display shows the corresponding information (usually the disc or track number). Across the top of the display are the letters A through H, corresponding to memory keys on the control unit that allow up to eight different program sequences to be entered and stored. At any future time, pressing the TRANS(mit) button sends one of these programs to the player over the infrared beam. The programmed sequence can then be played as though it had been entered directly with the front-panel keypad. Each of the memories in

the remote unit can accommodate the thirty-two-step limit of the player's memory, but the sum of all the steps cannot exceed eighty. The remote memories can be modified or erased at will.

The Pioneer PD-M90X presents an attractive, elegant appearance that is enhanced by its glossy woodgrain side panels and black front panel with clearly legible gold markings. It measures 18 inches wide, 1234 inches deep, and 41/8 inches high, and it weighs 15 pounds. Price: \$800. Pioneer, Dept. SR, 2265 E. 220th St., Long Beach, CA

Lab Tests

The Pioneer PD-M90X delivered 2.03 volts output from a 0-dB recorded signal into an EIA standard load of 10,000 ohms in parallel with a 1,000-picofarad capacitor. The channel levels were balanced within 0.08 dB. The A-weighted noise level was -98.5 dB referred to the 0-dB

level, and the dynamic range was 97 dB. Channel separation was 100 dB at 1,000 Hz, narrowing to 83 dB at 20,000 Hz. The 1,000-Hz distortion was a very low 0.003 percent at the 0- and -10-dB levels and 0.0085percent at -20 dB. The D/A converter's nonlinearity at low levels produced an output-level error of about -2 dB with input levels of -90 and -100 dB.

The frequency response was flat within ± 0.1 dB from 20 to 20,000 Hz. Interchannel phase shift increased linearly with frequency, reaching 44 degrees at 20,000 Hz, which indicated the use of a doubleoversampling D/A converter multiplexed between the two channels. The square-wave response indicated the use of digital filtering.

The PD-M90X tracked all the calibrated defects on the Philips TS5A test disc without problems. Its cueing was accurate, and the slew time of about 2.5 seconds between Tracks 1 and 15 of the Philips TS4 test disc was about average for current CD players. The access time from one disc to another averaged about 10 seconds, since the first disc had to be returned to its magazine slot and the second one loaded into the player before play could be resumed. The impact resistance of the PD-M90X was excellent. A rather hard slap on its top plate or a solid blow to a side was required to make it mistrack.

Comments

The Pioneer PD-M90X did not disappoint us in any respect. All of its operating features that we put to practical test worked flawlessly. And, as our tests showed, its performance as a conventional CD player was first-rate. Its only obvious omissions are the ability to access indexed sections of a disc (either directly or by programming) and the ability to repeat a userdefined phrase or segment.

We wondered what distinguished the PD-M90X from the PD-M6 besides cosmetic features and the enhanced versatility of its remote control. Obviously, the digital output could be a desirable alternative method of interfacing with an amplifier in years to come, as this type of feature becomes more commonly

FEATURES

- ☐ Double oversampling ☐ Digital filtering
- ☐ Magazine for up to six discs and single-disc drawer
- ☐ Programming for sequences up to thirty-two steps, can include
- pauses Keypad for programming and direct access to any track on any
- ☐ Track skipping and fast search, with audible sound, in either direction
- □ Random-play mode ☐ Repeat of single track, entire
- disc, or programmed sequence ☐ Front-panel headphone jack with volume control
- ☐ Display of current disc and track numbers, elapsed playing time, total tracks on disc, total playing

- time on disc, number of discs in magazine, and programmed sequence
- ☐ Wireless remote control of all functions except power on/off and single-disc drawer eject
- ☐ Remote control of volume over 24-dB range, with visible indications on panel and in display window
- ☐ Remote-control memory storage of up to eight programmed sequences for instant transmission to player
- ☐ Gold-plated phono jacks for analog and digital audio outputs Subcode output jack
- ☐ Facility for operation by automatic timer in normal or random-play mode

LABORATORY MEASUREMENTS

Maximum output level: 2.03 volts Total harmonic distortion at 1,000 Hz: 0.003% referred to 0 or -10 dB, 0.0085% referred to -20 dB

Signal-to-noise ratio (A weighted): 98.5 dB

Channel separation: 100 dB at 1,000 Hz, 83 dB at 20,000 Hz

Frequency response: ±0.1 dB from 20 to 20,000 Hz Dynamic range: 97 dB

Maximum phase shift (from 20 to 20,000 Hz): 44 degrees at 20,000 Hz

Cueing time: 2.5 seconds on same disc; typically 10 seconds between different discs

Cueing accuracy: A Impact resistance: top, B+; sides, A

Defect tracking: tracked maximum defect levels on Philips TS5A test disc



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THE EVOLUTION OF THE DISC.

AND THE DISCWASHER.

Early records were scratchy and extremely fragile. Now, with compact discs, you can program the cuts you want to hear (in the order you want to hear them), sit back, relax, and enjoy hours of uninterrupted pleasure. We've certainly come a long way.

Discwasher has come quite a distance, too. And though our first product (the famous D4+™ Record Cleaning System) is <u>still</u> the industry standard for cleaning LPs, our new Discwasher Compact Disc Cleaner has a style and design that's more than equal to the remarkable discs it protects.

For starters, our CD Cleaner uses a computer-aided design to deliver a true "radial" cleaning (that's what the manufacturers recommend). And Discwasher's CD-1™ Cleaning Fluid is scientifically formulated to lift and suspend contaminants as our non-abrasive cleaning pad easily and safely removes the debris from the disc surface. The result is no audio drop-outs or playback skips to mar your enjoyment.

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used. Although the instruction manual does not mention internal circuit differences, our tests showed that the analog filters and 44.1-kHz D/A conversion of the earlier model have been replaced by digital filters and an 88.2-kHz oversampling converter. A measurable result was that the PD-M90X had a flatter frequency response than the PD-M6, which showed a slight but definite drop in response above 15,000 Hz because of its analog low-pass filters.

The added programming features of the PD-M90X (especially the capability of storing sequences in the memory of the remote-control unit) may not be very important to some people, but they are easy to use and do not complicate the more conventional aspects of the player's operation. In fact, the overall versatility provided by Pioneer's magazine loading system can simplify the problem of storage and access to discs. The magazines can be loaded and labeled according to any convenient system, greatly reducing the amount of handling to which the discs are subjected and the consequent risk of accidental damage.

Even more than with most audio components, it is imperative to read the instructions in order to use this CD player effectively. The Pioneer magazine requires that the discs be loaded with their labels down, opposite to the usual orientation; it does not recognize the presence of a disc if the label side is up. We also found it awkward to handle the discs when transferring them from the magazine to their regular plastic storage cases because the design of the magazine tray makes it difficult to grasp a disc by its edges. This fact underscores the desirability of storing your discs in the magazines if they are to be used in a Pioneer multidisc player.

In general, we appreciated the circuit refinement and versatility that distinguish the Pioneer PD-M90X from its predecessor. The differences are more than cosmetic, although we would not discount the improvements in appearance. After all, why not have a CD player that performs well, has more features than most, and looks good to boot?

Circle 142 on reader service card



POLK AUDIO SDA-1c SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

HE SDA-1c is the latest in Polk Audio's series of Stereo Dimension Array speaker systems. It is an improved version of the first in that series, the SDA-1. The Polk SDA speakers are designed to correct for the interaural crosstalk that occurs during stereo playback through conventional speaker systems. With conventional speakers, each ear receives not only the sound from its corresponding speaker (the left speaker to the left ear, the right speaker to the right ear) but also sound from the opposite speaker, which arrives about 0.5 millisecond

later because it has to travel the additional distance around the listener's head. One effect of this "crosstalk" is to limit the width of the stereo sound stage to the distance between the speakers.

If crosstalk is eliminated, the sound stage can broaden strikingly, not only filling the space between the speakers but extending beyond them to the full width of the room and even along the side walls. The degree to which this effect occurs depends on several factors, principally the amount of stereo separation in the recording itself. A mono signal will be heard as usual from a

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point midway between the speakers, and one with moderate separation may sound much as it would with the crosstalk present. If the two channels are largely uncorrelated and thus contain a large proportion of difference information (L - R and R - L), the maximum effect will be heard.

Although interaural crosstalk can

The Polk SDA-1c's crossover network has been simplified in the process of adapting it for use with isolated-ground amplifiers. As a result, it outperforms the earlier SDA-1, yet it is less expensive.

be canceled electronically (the Carver Sonic Hologram is an example of this technique), Polk has achieved cancellation in a passive acoustic system. Basically, the Polk SDA technique combines two speaker arrays in each cabinet. One, the "stereo" array, operates as part of a conventional front-firing system. The second, the "dimensional" array, is located immediately adjacent to the stereo drivers. The spacing between the two arrays is typically about 6 inches, roughly the distance between a listener's ears. The left and right speakers are constructed in mirror image, with the stereo drivers closest to the center of the room and the dimensional drivers toward the outer sides of the cabinets.

In addition to the usual amplifier connections, the left and right speakers are joined by a cable that carries signals from the stereo array of each speaker to the dimensional array of the other. Until now, the SDA design has required that the amplifier be able to function with a common connection between its output ground terminals, a requirement that most amplifiers meet. Among other changes, however, the SDA-1c's internal circuits have been modified to allow the amplifier's left and right grounds to be isolated from each other with the help of an optional adaptor available from Polk for \$50 (this feature

will be incorporated in all other Polk SDA speakers in the near future).

Although the SDA-1c is the same size and weight as the original SDA-I and appears to have the same driver complement, there are many internal differences between them. In the SDA-1, the dimensional array consisted of an acoustically iso-6½-inch midrange/woofer crossing over to a 1-inch dome driver at 2,500 Hz; together, the drivers operated over the full range from 100 Hz to the upper limits of audibility. Beside them was an identical stereo array, also acoustically isolated. Below the two arrays were two 61/2-inch woofers operating below 100 Hz and handling only a single stereo channel. A 12-inch passive radiator augmented their output below 50 Hz.

The SDA-1c uses a similar driver complement, but the cone drivers now use edge-wound voice coils similar to those developed for Polk Audio's flagship SDA-SRS speakers. Since doing the research that led to the SDA-1, Polk has determined that interaural-crosstalk cancellation, originally thought to require a relatively wide range of frequencies, actually need involve only the frequencies between 200 and 1,000 Hz. which provide most of our directional hearing cues. This range of frequencies is radiated by one of the 6½-inch drivers in the dimensional array. The two dome tweeters in each speaker are now vertically aligned on the centerline of the speaker panel, and both handle only the signal from a single channel. This configuration narrows the vertical radiation pattern at high frequencies, minimizing floor reflections that could interfere with the speaker's spatial qualities.

Surprisingly, limiting the bandwidth of the dimensional arrays-a technique first introduced in Polk's top-of-the-line SRS speakers-actually enhances the spatial spread of the SDA-1c and extends its benefits to a wider listening area. The complex crossover network has also been considerably simplified in the process of adapting it for use with isolated-ground amplifiers. As a result, the SDA-1c outperforms the earlier SDA-1 in several respects,

yet it is appreciably less expensive, even when the effects of inflation are ignored.

The Polk SDA-1c is 44 inches high, 1634 inches wide, and 111/2 inches deep. It weighs about 85 pounds. The top and bottom surfaces are solid oak, and the rest of the cabinet is finished in black. The sides are covered in black cloth. matching the removable grille, which is firmly retained by plastic fittings and covers the entire front of the cabinet. The nominal system impedance is 4 ohms. Price: \$799.95 per speaker in oak or walnut, \$699.95 in an all-black studio version.

Lab Tests

Because of the electrical connection between the left and right speakers, many of the performance qualities of the Polk SDA-1c are best measured with the interconnecting cable in place, one speaker driven and the other short-circuited. Except for measuring frequency response, we tested the system in that manner.

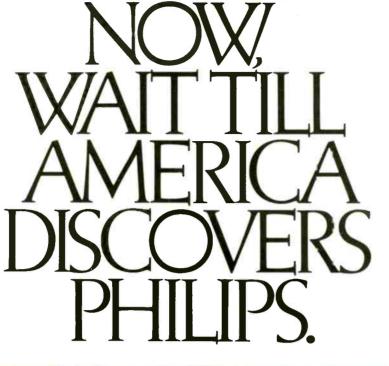
Our frequency-response measurements, both room response and

We found the room-filling spatial quality of the \$DA-1c to be addictive. And compared with earlier SDA speakers, it is relatively free from the need for critical listener positioning.

close-miked woofer response, were virtually identical to those we made on the original Polk SDA-1 almost five years ago. The overall response variation was ± 5 dB from 20 to 18,000 Hz. Above 70 Hz, the point of maximum bass output, the composite response curve was a relatively smooth, straight line that sloped gently down as the frequency rose, with unusually small superimposed variations. We noted with interest that the 5-dB tweeter-resonance peak at 13,000 Hz that we found in the earlier version was again present in the SDA-1c.

The SDA-1c is a relatively sensi-

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The first reviews for the CD 960 compact disc player (top) are in, and the verdict is unanimous: This is the new "CD reference standard". The FA 960 integrated amplifier (bottom) brings out the true potential of the CD sound—with 100 watts per channel at 8 ohms $(D \leq 0.03\%)$. Its CD Direct mode eliminates every avoidable source of noise and distortion.

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tive speaker, matching its 90-dB rating (sound-pressure level at 1 meter with a 2.83-volt drive level). The minimum impedance was 3.9 ohms at 25 Hz, with a maximum of 12 to 13 ohms at 53 and 20,000 Hz. The impedance averaged about 6 ohms over much of the audio range.

The bass distortion was phenomenally low. At a 2.83-volt (90-dB) drive level, it was between 0.3 and 0.8 percent from 100 Hz down to 25 Hz and only 3.2 percent at 20 Hz. The passive radiator's output was predominant below 50 Hz. Pulsepower tests produced a woofer rattle with 400 watts input to its 4.9-ohm impedance at 100 Hz. At higher frequencies, our amplifier ran out of power before the speaker distorted, reaching input levels of 800 watts at 1,000 Hz and 735 watts at 10,000 Hz (into a 9-ohm impedance).

Quasi-anechoic FFT response measurements confirmed our swept sine-wave data and showed that the horizontal dispersion of the system was excellent. There was little difference between the response measured on-axis and 45 degrees off-axis up to about 12,000 Hz. The group delay of the system was constant within 0.2 millisecond from 1,000 to 22,000 Hz.

Comments

Comparing our test data on the SDA-1c with our original data on the SDA-1, we were struck by their close similarity, which is hardly surprising in view of the basic similarity of the two systems but nonetheless indicates excellent manufacturing consistency over the years.

We were equally impressed by the new speaker's extraordinary bassdistortion measurements, which, unfortunately, we could not compare directly with the earlier data since we have changed our test procedures slightly in the interim. We cannot recall ever having measured distortion lower than 1 percent at 25 Hz from any speaker driven to our 90-dB SPL reference output level. According to Polk, this was the result of some modifications to the passive radiator, which is almost solely responsible for the low-bass output of the system.

As with other Polk SDA speakers we have tested, we found the spatial quality of the SDA-1c to be very addictive. It is certainly an acquired taste, and not everyone will prefer it to the more sharply defined imaging of some conventional speakers. For my part, I have always enjoyed the sensation of the room-filling sound provided by an SDA system, which is much more suggestive of a (hypothetical) concert hall than the imaging of most conventional speakers. A noticeable improvement in the SDA-1c, compared with earlier SDA speakers we have heard in the same room, is its relative freedom from the need for critical listener positioning. A useful effect is obtainable over most of the room, although for optimum results the listener should be equidistant from the two speakers.

Aside from the SDA effect, the SDA-1c tends to have a slightly soft sound, completely free from shrillness or stridency. Despite its powerful bass, it is not overbearing in the lower registers, and it does not color the human voice excessively. The speaker does not project the stereo stage forward of the grille (except along the side walls) but tends to have a more "laid-back" quality. The sound has depth, extending beyond the wall behind the speakers, as well as width, but the very techniques that create the SDA effect (multiple drivers and cross-coupling between channels) probably keep it from achieving the pinpoint positioning of certain sounds that can be experienced with some speakers using a minimum of drivers, especially when they are angled toward the single optimum listening location. On the other hand, that sort of imaging—to me, at least does not sound remotely like what I hear at a live performance, in spite of its striking sonic illusion. It is not likely that both types of sonic presentation could be achieved with the same speaker.

All in all, with the SDA-1c Polk has made a good speaker sound better and look better, made it usable with more types of amplifiers, and made it less expensive as well. That is a rare combination of improvements to find in any product!

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You can load up to five discs into the optional DP-411R CD player and either play all of them in order, or up to 30 segments (a segment can be a single track or an

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NAD MODEL 7600 RECEIVER

Iulian Hirsch, Hirsch-Houck Laboratories

AD describes the new Model 7600 Monitor Series stereo receiver as "the most powerful receiver" on the market. At a list price of \$1,498, it is also one of the most expensive. But as a single-unit equivalent of three top-of-the-line components—the Model NAD 2600 power amplifier, the 1300 preamplifier, and the 4300 tuner, which list for a total of \$1,844—the receiver could be considered economical. In addition, it comes with a wireless remote control that can be a complete system controller.

Like the Model 2600 power amplifier, the NAD 7600 employs a dual-voltage, signal-tracking power supply that makes possible an extremely high dynamic headroom (short-term power output) for a time far exceeding the 20 milliseconds of the standard dynamic power test. The amplifier section can deliver far more than its rated continuous output power for longer than 200 milliseconds, a period that NAD considers to be more representative of actual music requirements. NAD describes this characteristic by means of a "Power Envelope" rating, a plot of maximum power versus time. The concept of the rating makes sense to us, although it has no official standing, and we run this test on all amplifiers

The NAD 7600 receiver is rated to deliver 150 watts per channel continuously into 8-ohm loads from 20 to 20,000 Hz with no more than 0.03 percent total harmonic distortion. Although a couple of other receivers on today's market have similar or slightly higher ratings, NAD's claim to the power championship is based on its ability to deliver dynamic (20-ms) outputs of 400, 600, and 800 watts into loads of 8, 4, and 2 ohms, respectively. Furthermore, the two channels can be bridged to deliver continuous mono output of 480 watts into 8 ohms, with dynamic ratings of 1,200 and 1,400 watts into 8- or 4ohm loads. In this mode, a separate Model 2600 power amplifier (also bridged) is used to drive the other channel with the same power capability. As NAD points out, a combination of the Models 7600 and 2600

can deliver nearly 3 kilowatts of dynamic power into a pair of 4-ohm speakers!

The receiver's preamplifier section features a switchable movingmagnet (MM) or moving-coil (MC) phono preamplifier with extremely low noise levels. Its bass and treble tone controls, which NAD describes as "semi-parametric," are fairly conventional center-detented knobs except that each control provides a boost or cut over a two-octave band centered at one of three selectable frequencies. The center frequencies were chosen for their usefulness in correcting for common response problems. The tone controls can be completely bypassed with a frontpanel button. A switchable BASS EQ circuit provides a maximum 8-dB boost at 35 Hz, where most speakers need help, combined with a steep infrasonic cut that prevents overloading the amplifier or speakers at subaudible frequencies.

The receiver has high-level inputs for a CD player and a video sound source as well as full playback and recording facilities for two audio tape decks. Lever switches select tape-copying connections and the center frequencies for the tone controls. Small pushbuttons operate the other switching and selection functions as well as the balance control. Pressing the L or R button produces



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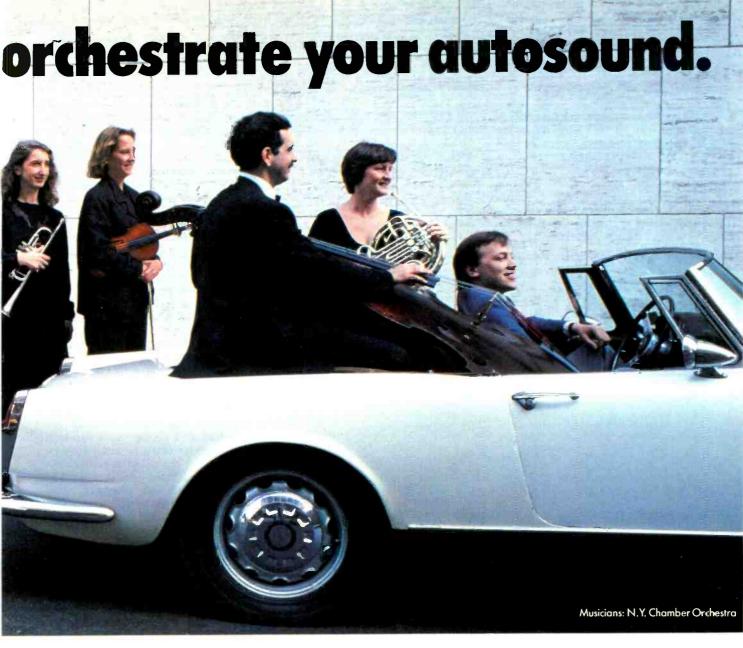
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easy for you to select the right components for your needs and your budget. And our exclusive Road Tests feature users' evaluations of various installations under real driving conditions.

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TEST REPORTS

a smooth change of relative channel levels (a small light glows when the balance is centered). Each control button is clearly labeled to show its effect when pressed.

Its tuner specifications indicate that the Model 7600 is a top-quality product, with at least one superlative rating, an image rejection exceeding 120 dB. The tuner section has a switchable FM noise-reduction circuit (FMNR) that automatically blends the stereo channels over the full frequency range, instead of the more usual high-frequency blending, at low signal levels. Except for the very weakest signals, which would not be listenable in stereo in any case, the sound maintains its basic stereo qualities, with some reduction in separation but a typical noise reduction of about 10 dB (roughly comparable to the performance of the Dolby B system in tape recording).

Although the receiver has a digital-synthesis tuner section, the control knob's tuning action is much like that of an analog tuner. But it has several major advantages. The tuning is always precise, and the tuned frequency is always visible on the large numeric display. When the tuning control is close to a station, arrows show the correct tuning direction; an amber light goes on when the station is tuned correctly.

The tuning knob does not actually vary anything in the receiver but merely turns a shaft encoder that sends digital pulses to the synthesizer circuit. The control is nearly frictionless, and a single spin will turn the knob for up to 10 seconds, time enough for the tuner to scan either radio band from end to end. The usual presets are provided, with each of the eight buttons assignable to one AM and one FM frequency.

The rear apron of the Model 7600 contains the usual input and output phono jacks, including preamplifier outputs and two sets of poweramplifier inputs, marked LAB and NORMAL. Removable jumpers between the preamp outputs and the power-amp inputs simplify the use of an external Model 2600 amplifier in bridged mode or of various signal-processing accessories. The normal amplifier inputs have 12-dBper-octave rolloffs below 15 Hz and above 40,000 Hz. In addition to the switched infrasonic filter in the preamplifier, these built-in rolloffs safeguard the system against overload from signals outside the audio range. Through the LAB inputs, the bandwidth is 3 to 80,000 Hz.

A slide switch on the rear apron bridges the amplifier, and another optimizes its power-supply voltages for operation either with "high" speaker load impedances (8 to 16 ohms) or for "normal" loads (4 to 8 ohms). Also on the rear is the switch to select either MM or MC mode for the single pair of phono-input jacks and another switch to connect a nominal capacitance of 100, 200, or

FEATURES

- ☐ Rated for 150 watts per channel continuous output, bridgeable for 480 watts mono output
- ☐ Signal-controlled power supply for high dynamic power output ☐ Low-noise phono preamplifier switchable for MM or MC
- cartridge Phono input capacitance switchable to 100, 200, or 300 pF
- ☐ High-level inputs for CD player and one video sound source
- ☐ Connections for two audio tape decks with dubbing possible from either deck to the other independently of program being heard
- ☐ BASS EQ and infrasonic filtering

- Bass and treble tone controls with two-octave bands and switchable center frequencies (50, 120, or 250 Hz for bass: 3,000, 6,000 or 12,000 Hz for treble)
- □ Volume knob motor driven when used with remote control
- Digital frequency-synthesis AM/FM tuner with eight presets, each usable for both bands ☐ FM noise-reduction circuit
- (FMNR) to improve weak stereo reception
- Analog-like tuning knob ☐ 75-ohm coaxial FM antenna input
- Pivoted ferrite-rod AM antenna Wireless remote control for volume, balance, tuning, input selection, power on/off

LABORATORY MEASUREMENTS

- ☐ Tuner Section (all figures for FM only except frequency response)
- Usable sensitivity (mono): 12 dBf $(2.2 \mu V)$
- 50-dB quieting sensitivity: mono, 11.7 dBf (2.1 μ V); stereo, 33.5 dBf (26 μ V)
- Signal-to-noise ratio at 65 dBf: mono, 86 dB: stereo 75.7 dB
- Harmonic distortion (THD + noise) at 65 dBf: mono, 0.128%; stereo, 0.064%
- Capture ratio at 65 dBf: 1.85 dB AM rejection at 65 dBf: 72 dB
- Image rejection: greater than 140 dB
- Selectivity: alternate-channel, 74 dB; adjacent-channel, 4.5 dB Stereo threshold: 19 dBf (4.5 µV);
- with FMNR, 44.5 dBf (92 μV)
- 19-kHz pilot-carrier leakage: -70 dB
- Hum: -90 dB
- Stereo channel separation at 100, 1,000, and 10,000 Hz: 45, 45, and 35 dB
- Frequency response: FM, 30 to 15,000 Hz +0.3, -0.2 dB; AM, -6 dB at 25 and 4,000 Hz

- Amplifier Section
- 1,000-Hz output power at clipping: 190 watts into 8 ohms, 255 watts into 4 ohms, 325 watts into 2 ohms
- Clipping headroom (relative to rated output): 1 dB (8 ohms)
- Dynamic power output: 480 watts into 8 ohms, 800 watts into 4 ohms, 1,000 watts into 2 ohms Dynamic headroom: 5.1 dB (8
- ohms) Harmonic distortion (THD +
- noise) at 1,000 Hz into 8 ohms: watt, 0.0034%; 10 watts 0.0021%: 150 watts, 0.0067%
- Maximum distortion (20 to 20,000 Hz into 8 ohms): 0.016% at 150 watts (20,000 Hz)
- Sensitivity (1-watt output into 8 ohms): CD, 4.4 mV; phono (MM), 2.25 mV
- Phono-input overload: 183 to
- A-weighted noise (referred to a 1-watth output): CD, =93.2 dB; phono (MM), =85.2 dB
- Phono-input impedance: 50,000 ohms in parallel with 118, 209, or 264 pF
- RIAA equalization error: ±0.15 dB from 20 to 20,000 Hz Tone-control range: ± 12 dB

Experts applaud a new speaker system they've barely seen.

Superb sound and virtual invisibility. 55

In our listening room, side by side with speakers costing three to five times as much, the AM-5 consistently produced the more exciting and listenable sound in A/B tests.

Stereo Review; Julian Hirsch, April, 1987

L... a sonic standout.

It was reassuring to find in extensive listening tests that no sonic essentials had been sacrificed to virtual invisibility.

The New York Times, Hans Fantel, Sunday, April 5, 1987

They're talking about the Bose® Acoustimass™ system a patented speaker design that delivers purer sound and virtual invisibility. So you no longer need a room full of speakers for a room full of sound. Listen for yourself and see it, if you can—at your local Bose dealer.



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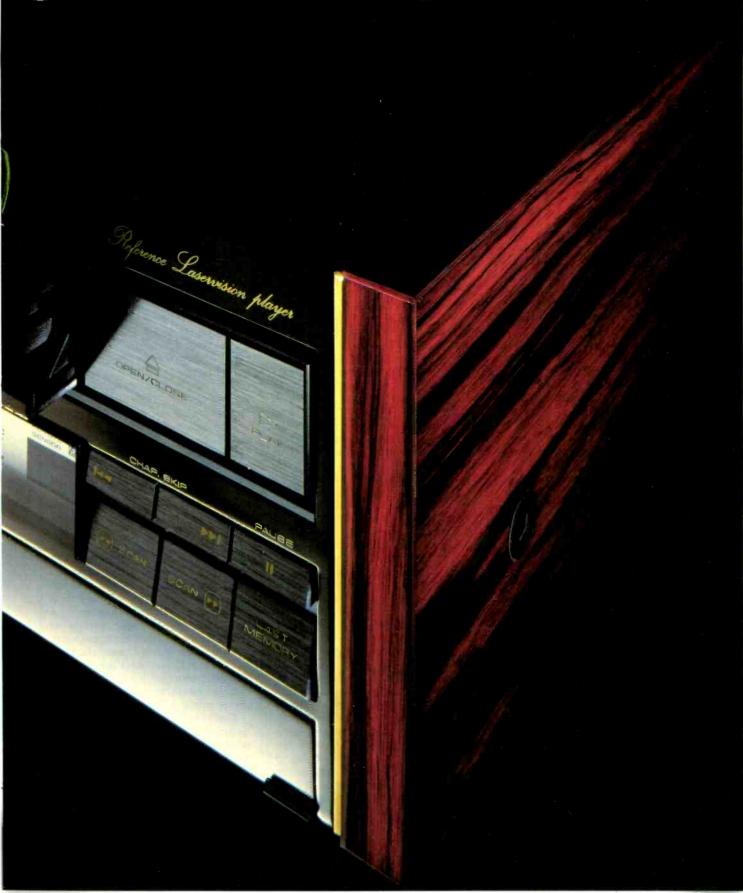
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UPGRADE YOUR IMAGE.



TEST REPORTS

300 picofarads (pF) across the fixed 47,000-ohm resistive input. In the MC mode, the input is 100 ohms in parallel with 1,000 pF.

The insulated spring-clip antenna inputs are designed for an external wire AM antenna, and the receiver also has an integral hinged ferritered AM antenna. The only FM input is a 75-ohm coaxial connector, but a coupler is provided for use with the more common 300-ohm FM antenna systems. Two of the three AC convenience outlets are switched. The MASTER POWER rocker switch on the rear is normally left on so that the receiver can be turned on or off from the remote-control unit.

The remote control operates all the basic functions, omitting only the filters, tone controls, and tapedeck controls. It is designed to rest on a table or to be held in the hand, and its infrared output is emitted over a wide angle; in most cases there is no need to point the controller directly at the receiver.

The NAD Model 7600, finished in charcoal gray and black with white markings, measures about 17 inches wide, 153/4 inches deep, and 61/4 inches high. It weighs about 38 pounds. Price: \$1,498. NAD, Dept. SR, 575 University Ave., Norwood, MA 02062.

Lab Tests

The FM tuner of the NAD 7600 had very good sensitivity, quieting, and distortion characteristics. The FMNR circuit performed as claimed, reducing stereo noise by about 14 dB at the stereo reception threshold of 19 dBf (4.5 μ V). The improvement gradually lessened to 6 to 8 dB at more useful signal levels and finally to zero at 65 dBf and beyond. There was a minimal stereo effect with very weak signals, but at any useful level the circuit worked as claimed. Applying our usual criterion for the stereo threshold of a tuner having signal-controlled channel blending, we found that the output level of an L-R modulated signal had decreased by 6 dB when the signal level was reduced to 44.5 dBf (92 μ V). The five signal-strength lights in the receiver's display window lit at levels of approximately 19, 32, 42, 63, and 72 dBf, so that unlike many such indicators, they

provided useful information about the received signal level.

The tuner distortion, in the range of 0.1 percent at fairly high signal levels, was roughly the same for stereo or mono signals. The quieting action was excellent, with the noise level measuring -86 dB in mono and -77 dB in stereo at high signal levels. The FM frequency response was flat within ± 0.2 dB from 30 to 15,000 Hz, and the channel separation, 45 to 50 dB from 30 to 5,000 Hz, decreased to 30 dB at 15,000 Hz. The AM tuner section's frequency response was flat from 100, to 2,500 Hz and down 6 dB at 25 and 4,000 Hz.

The other tuner performance parameters were all good or better. Two of them transcended our previous experience in tuner measurements. The hum level was an almost unmeasurable -90 dB, and the image rejection could not be measured at all because it exceeded our 140-dB measurement limits!

The BASS EQ response rise began below 100 Hz, reaching 7.5 to 8 dB at 36 Hz and falling 24 dB per octave below that frequency. The RIAA equalization was so accurate that we had to plot it on a ten-times-expanded scale to measure it. The response was flat within ± 0.15 dB from 20 to 20.000 Hz.

Because of our experience with the NAD 2200 amplifier, a junior relative of the Model 2600 used in this receiver, we were prepared for some impressive power measurements, and we were not disappointed. NAD recommended that we make our measurements with the HIGH load-impedance setting, at which the amplifier can operate safely into almost any reasonable speaker impedance. Into 8 ohms, the 1,000-Hz output clipped at 190 watts per channel (a clipping headroom of 1 dB). Dropping the impedance to 4 ohms, we measured 255 watts at the clipping point. We then switched to NORMAL (low) impedance, measuring maximum outputs into 8 and 4 ohms of 136 and 210 watts, respectively-still nothing to be ashamed of. We also loaded the amplifier with 2 ohms, measuring a potent 325 watts at clipping.

The standard dynamic headroom measurement, with a 20-ms burst

repeated twice per second, produced maximum outputs of 480 and 800 watts into loads of 8 and 4 ohms using HIGH impedance and 1,000 watts into 2 ohms at the NORMAL setting. The 8-ohm dynamic headroom was 5.1 dB. Power-envelope measurements resulted in outputs (with 200-ms bursts) of 375, 380, and 420 watts into loads of 8, 4, and 2 ohms, respectively.

Comments

Not surprisingly, the sound quality from the NAD 7600 was as good as we have heard from any tuner, amplifier, or receiver. We were not tempted to test its almost limitless power reserves, out of consideration for our speakers and ears, but there was no doubt that in terms of power this receiver is exactly what NAD claims it to be!

Some of the most striking qualities of the Model 7600 had nothing to do with its sound. The tuning "feel" was extraordinary, so far superior to the usual pushbutton tuning or scanning systems that one wonders why more tuners don't have similar controls. The FMNR worked so well that we were not aware of its action except when switching it on or off.

It is probably stretching things a bit to call the tone controls on this receiver "semi-parametric," but the family of response curves they produced were reminiscent of a good graphic equalizer with exceptionally well-chosen center frequencies. Although we rarely use tone controls. the Model 7600's unconventional and highly effective system is much more flexible than most. As with any equalization system without a calibrated microphone, reaping its full benefits requires the operator to have a good ear for tonal changes. but the excellent instruction manual suggests settings for various corrective effects, and the results were pretty much as claimed.

The NAD 7600 must be used to be appreciated fully. Its features and performance make it not only the most powerful receiver on the market, but one of the very best you can buy at any price. If any compromises were made in its design, we didn't find them.

Circle 143 on reader service card

Introducing the Bose® 401™ Direct/Reflecting® speaker system: Our most affordable floorstanding speaker.

What separates the 401 system from other speakers? Direct/Reflecting speaker technology. Taking their cue from a live performance, Direct/Reflecting® speakers deliver a precise combination of direct and reflected sound. The result is a sense of musical realism and impact usually experienced only during a live performance.

Only Bose makes Direct/Reflecting speakers. To the listener, the benefits are immediately obvious:

- Full stereo—so you enjoy natural, balanced stereo throughout the listening area, no matter where you stand or sit.
- Even sound distribution so you hear the correct blend of instruments and vocals everywhere in the room, not just between the speakers.

■ Lifelike spaciousness—your music sounds life-sized, instead of being confined to the speakers.

The 401 system draws on the design heritage of the world-acclaimed Bose 901° Direct/
Reflecting° speaker system. A result of years of ongoing research, the 401 system is built around the Stereo Space™ array, an innovative way to achieve a sense of musical realism usually heard only during a live performance.



Since conventional speakers radiate primarily direct sound, stereo is heard in only part of the room.



The 401 system projects both direct and reflected sound, providing full stereo everywhere.

What separates the 401 system from all other Direct/Reflecting® systems is that it's Bose's most affordable floorstanding loudspeaker. It gives you true musical realism at less than half the price of a 901 system.

The 401 system's spaciousness, ifelike performance and high power handling capability combine to bring but the best in today's source material—especially digital compact discs and hifi video. And like all Bose

products, it's subjected to the Syncom[®]computer comprehensive quality assurance program.

Audition the new Bose 401 system soon at your nearest Bose dealer. For more information, write Bose Corporation, Department SR, The Mountain, Framingham, MA 01701.





The 401 system consists of two slim, m rror-image speakers that recuire less than one square foot of floorspace each.

Each speaker has two longexcursion 61/2" woofers that operate in a computer-designed ported enclosure, for deep, powerful bass with low distortion. The 2" tweeter delivers crisp, clean highs.



Better sound through research.

s Escort Scared or Sma

Cincinnati Microwave, the maker of Escort and Passport radar detectors, has ignored DAK's third, one-on-one Maxon versus Escort radar challenge. I think they're hiding behind 'independent' magazine reviews and refusing to meet us on the true field of battle. And now, I think I've finally figured out why. I believe they're in a NO WIN SITUATION! Read On,

Ry Drew Kanlan

It's time to attack. No more Mr. Nice Guy for me. I've done everything I can to get them out for a conflict.

I've offered \$10,000, then \$20,000, if they could beat Maxon's lowest price \$99⁹⁰ detector (now on sale for just \$79%) by more than 10 feet. I've even offered to print the results in my next catalog, win, lose or draw.

In a minute, I'm going to introduce Maxon's revolutionary new Micro-Detector that is CORDLESS and built to trounce Escort and Passport, but first let's see what we can do to compare detectors.

IS THIS FAIR? YOU DECIDE

In their recent ads. Cincinnati Microwave quotes what Car and Driver Magazine's April '87 issue says about Passport, "At \$295 direct from the factory, it's the most expensive piece of electronic protection in the group, but it's worth every nickel in roadgoing peace of mind."

Well, wouldn't you think that Passport obliterated every other detector by a country mile? And, don't you think everyone is going to go out and find the magazine and read the WHOLE review???

Well, look what else Car and Driver said in the same article (and not quoted in Passport ad), "As it turned out, the top five brands are so close in their "Overall Sensitivity" scores that a minor juggling of the X/K-band weighting formula would upset the apple cart." Wow, imagine that!

So, Passport didn't beat everyone by a mile. In fact, on the X Band tests, it appears that it came in 3rd in a Dead-Ahead Trap, 3rd in an Over-the-Hill Trap, and 3rd in an Around-the Corner Trap.

But in choosing Passport as best, Car and Driver says, "... an 'excellent' appraisal of support systems (cords, lights, alarms etc.) is well worth several hundred feet of warning distance...

Which brings me back to the point I've been trying to make since I first challenged Escort. Today, a good detector can often sniff out police radar as much as 60 seconds ahead.

Traveling at 55 mph, you only cover about 80 feet a second. So, whether there's a 10' or even 100' difference in sensitivity, with today's detectors it just doesn't make much difference.

READ THIS

So, if Passport or Escort lose to the

\$79% Maxon, it would be catastrophic for their advertising. And, even if they beat Maxon by a second or two, are they worth double or even triple the price?

So, that's why I think they're in a no win situation. Without the magazine's loving editorial comments, we'd be down to who won and by how many feet?

And while they may or may not be scared of losing to Maxon, so far, they sure seem to be smart enough to stay out of a footage contest.

MAGAZINE ROUND UP

Popular Mechanics Magazine in November '86, in their Around A Corner Test said, "The low ranked . . . and Passport had to be rounding the bend and pointing at the radar gun before they'd detect it. Too late then!" (Not quoted by Passport.)

Although in July, after Cincinnati Microwave complained, Popular Mechanics said in an Around A Corner Test. "Consistent with the results of our previous test, Passport was easily the best of the minis." (Quoted in Passport Ads.)

Speaking of 'consistent', the magazines aren't consistent even from issue to issue.

By the way, in July's test they hated Maxon, but at least they said, "No detector in this group had to round the corner before sniffing out Smokey.

Road and Track Magazine (September '86) top rated Passport even though Maxon (a recommended buy) appears to have beaten Passport in Uninterrupted Alert, and Passport beat Maxon in initial alert.

So, when you get right down to which detector protects you, an on-the-road test without all the loving editorial 'quotable remarks' seems to be the only way to go.

We need to win or at least tie, to prove to the world that our challenge is for real, and not, as Cincinnati Microwave said, "an advertising gambit". But, speaking of advertising gambits, read this!

PROTECTION FROM RASHID \$5? WHOOPEE

Last year, Cincinnati Microwave announced to the world, in virtually every magazine | picked up, that all radar detectors but theirs would be obsolete.

It seemed that a K band collision avoidance system called Rashid VRSS would knock out everyone's detectors

Well, I said then that the \$558 system that recommends cutting a 61/2" hole in your grill for installation, wasn't going to take over the highways.

But Cincinnati Microwave kept advertising about Rashid. (My opinion of an advertising gambit). It's been a year and nobody I've talked with has run into a Rashid. I challenged Cincinnati Microwave to prove that there were even 500 on the road in the whole U.S., but they've been silent. (I wonder why???)

Anyway, just to prove that we had the technical expertise, Maxon has developed and implemented an Anti-Rashid circuit in the new Micro-Detector.

It's added about \$5 to your cost which we all think is a waste, but at least we won't get any more letters saying that the only reason we think it's worthless is because Maxon doesn't have it.

TRUE BREAKTHROUGH NO. FIVE

Unlike the questionable value Anti-Rashid circuit from Cincinnati Microwave. Maxon has now leapt ahead. Now you can have a micro detector that operates from 6 AA rechargeable batteries (included).

Now you can forget plugging your radar detector into your cigarette lighter. A revolutionary circuit design gives you cordless freedom and improved protection.

Maxon is using a circuit used in jet fighters and other military applications which replaces the traditional Gunn diode oscillator with a DRO (Di-electrically Resonated Oscillator).

The efficient DRO circuit is much more stable when subjected to temperature extremes and vibration (hence its use in the military, especially aircraft). Its only disadvantage is that it costs more.

The new detector also has incredible "support systems". Its bright LEDs, dim themselves at night. And speaking of dimming, they can be switched off so you can't be spotted from the rear.

And, as for the separate X and K warning tones, not only is the volume adjustable, 'Mute' lets you silence the alarms without adjusting volume. They will automatically reset after the alert passes.

You can plug the Micro into your cigarette lighter, you can run it for about 8 hours on its rechargeable batteries, and it automatically recharges from your cigarette lighter overnight or while you use it plugged in during the day.

OK, now it's time to prove that Maxon is Number One. Cincinnati Microwave.

eat our dust!

Let's cut through the Radar Detector Glut. We challenge Escort & Passport to a one-on-one Distance and Falsing 'duel to the death' on the highway of their choice. If they win, the \$20,000 check pictured below is theirs.

By Drew Kaplan

We've put up our \$20,000. We challenge Escort to take on Maxon's Dual Superheterodyne RD-1 \$9990 detector (right) (Now just \$79%), Maxon's new Mini RD25 \$9990 detector (middle) or Maxon's Cordless Micro-Trouncer \$149% radar detector (left) on the road of their choice in a one-on-one conflict.

The real question today is: 1) How many feet of sensing difference, if any, is there between Maxon's Detectors and Escort's or Passport's? And 2) Which is more accurate at interpreting real radar versus false signals?

So Escort, you pick the road (continental U.S. please). You pick the equipment to create the false signals. And finally, you pick the radar gun.

Maxon and DAK will come to your highway with engineers and equipment to verify the results.

And, we'll have the \$20,000 check (pictured) to hand over if you win! **BOB SAYS MAXON IS BETTER**

Here's how it started. Maxon is a mam-

moth electronics prime manufacturer. They actually make all types of sophisticated electronic products for some of the biggest U.S. Electronics Companies. (No, they don't make Escort's.)

Bob Thetford, the president of Maxon Systems Inc. and a friend of mine, was explaining their anti-falsing Dual Superheterodyne Radar detector to me. I said 'You know Bob, I think Escort really has the market locked up." He said, new designs can beat theirs"

... Next Page Please

... Challenge Continued

So, since I've never been one to be in second place, I said, "Would you bet \$20,000 that you can beat Escort?" And, as they say, the rest is history.

By the way, Bob is about 6'9" tall, so if we can't beat Escort, we can sure scare the you know what out of them. But, Bob and his engineers are deadly serious about this 'duel'. And you can bet that our \$20,000 is serious.

We only ask the following. 1) The public be invited to watch. 2) Maxon's Engineers as well as Escort's check the radar oun and monitor the test and the results.

3) The same car be used in all tests. 4) We'd like an answer from Escort no later than December 31, 1987, and 60 days

1/4 second gives you protection from signals from other detectors, intrusion systems and garage door openers.

So, when the lights and X or K band sounds explode into action, take care, there's very likely police radar nearby. You'll have full volume control, and a City/Highway button.



Maxon detectors are backed by Maxon's standard limited warranty.

There are many cheap imports that aren't very good. My quarrel with them is that except for themselves, I don't know who they think is any good!

CHECK OUT RADAR YOURSELF RISK FREE

Put a detector on your visor, dash or windshield. When it sounds, look around for the police. There's a good chance you'll be saving money in fines and higher insurance rates.

If you aren't 100% satisfied, simply return it in its original box within 30 days for a courteous refund.

(RD-1 Pictured to Right.) To get your Maxon, Dual Superheterodyne, Anti-Falsing Radar Detector risk free with your credit card, call toll free or send your



notice of the time and place of the conflict to alert the public. And, 5) If Escort can prove that there are even 500 Rashid units in operation, we will present them with a check for \$5,000 at the conflict.

HOW'S THIS FOR FAIR?

Cincinnati Microwave will be deemed the winner and given the check if either Escort beats Maxon's RD-1 or RD-25 by 10 feet in both uninterrupted and initial alerts or equals the Micro-Trouncer, OR if Passport beats Maxon's RD-1 or RD-25 by 2 seconds at 55mph in both uninterrupted and initial alerts or equals the Micro-Trouncer. So, DAK wins only if we beat both the \$295 Passport and \$245 Escort Radar Detectors.

SO, WHAT'S DUAL SUPERHETERODYNE?

OK, so far we've set up the conflict. Now let me tell you about the new dual superheterodyne technology that lets Maxon leap ahead of the pack.

It's a technology that tests each suspected radar signal 4 separate times before it notifies you, and yet it explodes into action in just 1/4 of one second. (1/10th second for the Micro-Trouncer.)

Just imagine the sophistication of devices that can test a signal 4 times in less than a 1/4 of one second. Wow!

But, using Maxon is easy. These long range detectors have all the bells and whistles with separate audible sounds for X and K radar signals.

LED Bar Graph Meters accurately show the radar signal's strength. And, you won't have to look at a needle in a meter.

Keep your eyes on the road, you'll see these meters with your peripheral vision.

You'll have a very high level of protection. Maxon's Dual Conversion Scanning Superheterodyne circuitry combined with die-cast aluminum ridge guide wideband horn internal antennas, really ferret out radar signals.

And the key word is 'radar', not trash. The 4 test check system that operates in Note from Drew: 1) Use of radar detectors is illegal in some states.

2) Speeding is dangerous. Use your detector to help keep you safe when you forget, not to get away with speeding.

DON'T WASTE MONEY

As I've said, good radar detectors today are very similar. The RD-1 is great. It is much smaller than Escort at just $3\frac{1}{2}$ " wide, $4\frac{3}{4}$ " deep and $1\frac{1}{2}$ " tall.



If you want an even smaller detector, the RD-25 at just 2%" wide, 4½" deep and 1" tall, with its included windshield mount and identical specs is for you.



If you want the very best, or if you want to forget cords and be able to slip a



4½" wide, 3¾" deep, ¾" tall (It mounts sideways to the rest) detector into your shirt pocket, choose the Micro-Trouncer.

I'd love to tell you that the Micro-Trouncer is light years ahead in detection, because its circuitry certainly is.

But, I'd be into advertising gambitland if I claimed that 1 or 2 seconds of improvement over Maxon's other detectors or even over Escort and Passport really make a significant difference.

Caution: Cincinnati Microwave is right.

check for DAK's \$79° sale price (\$4 P&H). Order No. 6116.

Note: An optional suction cup windshield mount and extra coiled power cord (we can't afford to throw them in for free) is just \$5% (\$2 P&H) Or. No. 4800.

d d d d 't n n 2

(RD-25 Pictured in Middle.) To get your Maxon, Dual Superheterodyne, Anti-Falsing Mini Radar Detector complete with 2 Power Cords, Window Suction Cup, Dash and Visor Mounts risk free with your credit card, call toll free or send your check for just \$99% (\$4 P&H) Order No. 6117. CA res add tax.

(Micro-Trouncer Pictured to Left.) To order Maxon's Top-Of-The-Line, DRO Circuit Radar Detector with Mute, 4 Second LED Meter Hold, Dark Switch, Cordless Battery Operation (6 AA Ni-Cad Batteries Included) with Windshield, Dash, and Visor mounts and 2 power/charging Cords risk free with your credit card, call toll free or send your check for this revolutionary \$249 suggested retail detector at DAK's market breaking price of just

ket breaking price of just \$149^{so} (\$6 P&H) Order No. 6119. OK Escort, it's up to you. We've got \$20,000 that says you can't beat Maxon on the road. Your answer, please?

Escort and Passport are registered trademarks of Cincinnati Microwave. Rashld VRSS, and Rashld Radar Safety Brake are registered trademarks of Wehlcle Radar Safety Systems, Inc.



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DAK has obliterated the \$349 suggested retail price. Now for just \$9 $\overline{9}$ %, you can copy price lists at trade shows, articles in libraries, receipts in your car, stock quotes on airplanes, recipes at home or blueprints on a construction site.

By Drew Kaplan

You're in a restaurant. An important meeting is in progress.

The person you're meeting with shows you a confidential price list. You whip out your new Silver Reed Industrial Pocket Copier and make yourself a copy.

Great Idea, but. While thousands of rich executives are currently increasing their productivity by using this sophisticated copier at meetings, in hotels, and of course at home, it's simply been too expensive for the rest of us to use.

Well, no more. Silver Reed couldn't find as many rich executives as it needed, so DAK bought all their copiers for cash! Now, for just \$99%, which I've been told is \$40 below the Japanese manufacturing cost, we can all make full size, crisp, flawless copies wherever we are, instantly.

Now we can all enjoy the productivity and luxury of the rich. We can forget the \$349 suggested retail price.

We can forget the 1987 Confidential \$230 Dealer Price List Cost. Cordless, hand held copying is now a reality while our limited supply lasts, for just \$99%.



HOW IT WORKS

Dozens of magazines have reviewed this product because of its revolutionary miniaturized technology and utility.

Just glide this less than 2 pound copier over any printed surface including words, pictures and graphs. And, your permanent copy will instantly emerge.

This copier uses the newest sophisticated CCD image sensors to scan the material to be copied.

It then digitally converts the image. Finally, much like a laser printer, it prints an image so sharp and crisp and with such incredibly fine dots, that it can even have more contrast than the original.

Since it uses the newest thermal technology, there are never any chemicals or powders to bother with. And best of all, absolutely no maintenance is required.

It's a phenomenal amount of technology for just \$99. Plus, look at everything you get!

It comes with built-in rechargeable ni-cad batteries. So, you won't have to buy batteries. And, even the charger is included. There's a leatherette carrying case and it all fits easily into your briefcase, purse or overcoat pocket.

HERE AND THERE

So, if you want to copy a column out of an encyclopedia, or a document that can't be removed from a file room or library, or stock quotes from the paper, Silver Reed has the solution.



At home you can copy checks, recipes or airline ticket schedules.

On the road, you can copy your expense receipts as they occur. If you're like me, you often lose half of them, so this copier is saving me a lot of money.



And look at this. It's ideal for copying numbers & addresses from phone books in phone booths. Now you don't have to scribble notes; just pass the copier down the pages and you'll have a perfect copy, even from the yellow pages.



BUT IT'S ONLY 3" WIDE

It copies a 3" wide path, as long as you like, flawlessly. So, it's really great for sections of blueprints, computer printouts and hard to copy items like box labels in the warehouse or on the dock.

You can copy a typical 6" letter (that's the average text amount) in two quick passes. So, for letters, checks, research or newspaper articles, you can now copy where no copier has gone before.

ALL THE CORDLESS USES

From copying EKG results for doctors to bibliographies for students and professors, you'll be more productive.

Forget taking tedious notes. Just copy paragraphs or sections you need. You'll have error free permanent records.

You can copy charts or music. Copy an income statement or a balance sheet.

And, if you've ever stood in line at a federal, state or city archive as I have, you can now copy anything instantly.

And, speaking of aggravation, being stuck in a hotel room or on a commuter train can just devastate my productivity.

I can't copy my notes. I can't copy sections of articles I'm reading to show my fellow DAK executives, and I hate writing notes on original spec sheets.



If you make house calls to sell insurance, . . . Next Page Please

...Copier Blow-Out Continued or real estate, or if you simply work on school projects at other peoples' homes as my wife does, this copier is a must.

You can copy title reports, old medical forms, or even original blueprints. For working on school projects, you can instantly copy class phone/address lists and save lots of tedious note taking.

You can copy the front and back of a check. Or, you can copy a map so you won't get lost. It's all really easy.

Copy driver's licenses if you own a store and cash checks, or if you have an accident. Hospitals can copy health cards or IDs for permanent, error free records.

And if you're into government espionage (our side only please), this copier should replace your old spy camera.

Of course, the most common use is at your desk. You'll be amazed at how many things you'll copy when a copier is at your side. As I mentioned, if I read an article, I like to copy the important parts for others at DAK, to maximize my efforts.



BUT IS IT REALLY GOOD?

OK, if you're standing next to your desktop copier, which copier should you use? Well, the answer is simple. Assuming you don't have to wait for the desktop copier to warm up, (the Porta Copy is instant on) the answer is the desktop.

But, you'll love the quality of this copier. You'll love all the places you can take it. And, now that it doesn't cost \$349, you'll love how much cheaper it is.

The quality of the copy is nothing short of superb. So, you won't be sacrificing quality for portability.

It's just 6%" tall, 4" wide and 1%" deep. It weighs less than two pounds (Wow). It has a copy density control that lets you adjust for imperfect originals.

It comes complete with a carrying case, a roll of paper and the recharger for its internal ni-cad batteries. It's backed by Silver Reed's limited warranty.

Desktop Blow-Out Too

If you don't need cordless portability, DAK also bought all of Silver Reed's top of the line desktop copiers too. Forget the \$449 suggested retail price. Forget the 1987 Confidential \$280 Dealer Cost.

For an incredible \$229 you can copy full 8½" X 11" papers and even books, flawlessly. It is maintenance free and doesn't require toner or powders.

Take a moment and journey back with me to about 1978. My very first real luxury was renting a Xerox® machine for my office at home.

Every time I made a copy of a letter or a magazine article, I felt successful.

My wife copied recipes and a never ending series of school projects for our kids. I could copy checks, tax returns or receipts. But, it cost me \$100 per month

for the rental, plus a charge per copy.

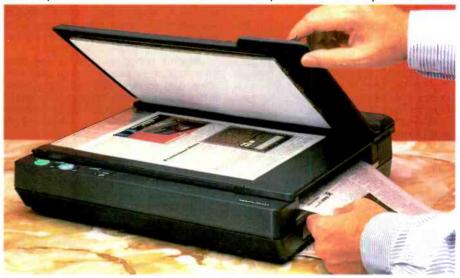
Well, now at home or in my own office at DAK, I can make perfect copies of letters and reports. I can make 8½" wide copies from 3" to 11" long.

This copier is absolutely silent. There are no fans to disturb you. The only sound you'll hear is a gentle whirr during the actual copy process. It's absolutely perfect for your desk at work.

We had to send a copy of our cancelled check for a house payment to our bank. And, I copied a poem from a book for my son to learn. We even made copies of my son's 3rd grade speech.

This desktop copier is just 16" wide, 14½" deep and 4¼" tall. It's backed by Silver Reed's standard limited warranty.

THE UGLY SERVICE PROBLEM Everyone knows that copiers need ser-



At DAK, we have several large expensive copiers. But, we have a 64,000 square foot building. So, they are never nearby. I can buy 12 of these copiers for the cost of just one standard machine.

And since the copy quality is so good, several departments at DAK have their own. They're thrilled and I'm happy because they save time.



Just switch it on and in 3 seconds you're ready to make great looking copies. There's even a contrast control to compensate for imperfect originals.

It uses the same breakthrough CCD image sensing circuitry as the portable. The revolutionary computerized thermal technology that makes these copiers possible, provides you with crisp, dramatically sharp copies with contrast that can even surpass the original.

My wife often says she married me because I had a copier at home. (She was a teacher at the time.) And, we all use it a lot. From homework assignments to road maps to report cards, our copier is always running.



vice. But Silver Reed's sophisticated maintenance free thermal copiers eliminate the problem. Forget powders, toners and drum cleaning. Just turn these copiers on and enjoy the luxury of making copies whenever and wherever you want.

MAMMOTH COPIER BLOW-OUTS RISK FREE

I love having a copier. I never have to get in the car when I need a copy of a document when I'm at home. And now, I can even make flawless copies in an airplane, a hotel room or on a loading dock.

If you're not 100% thrilled with either copier, return it to DAK in its original box within 30 days for a courteous refund.

To order Silver Reed's Hand Held Porta Copy Cordless Copier complete with built-in ni-cad batteries, charger, carrying case and a 30' roll of paper risk free with your credit card, call toll free, or send your check for DAK's limited blowout price of just \$99° (\$6 P&H). Order No. 6203. CA res add tax.

Extra 30 foot rolls of Thermal paper are just \$1⁴⁹ each. A box of 5 is just \$7⁴⁶ (\$1 P&H). Order No. 4679.

To order Silver Reed's DeskTop AC Powered Copier with CCD Imaging, 3"-11" long Copying, for home or office use risk free with your credit card, call toll free or send your check for DAK's limited blow-out price of just \$229 (\$12 P&H). Order No. 6204.

100' Rolls of Pure White Thermal Paper are just \$490 (\$1 P&H). Order No. 4836.

Having a copier at home or in your briefcase is one of life's true luxuries. And, once you have it, you'll realize that it's a money saving necessity as well.



DAK INDUSTRIES

24 Hours A Day 7 Days A Week
1-800-325-0800

For Toll Free Information, Call 6AM-5PM Monday-Friday PST Technical Information. 1-800-272-3200 Any Other Inquiries. 1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304

\$3 Rip-Offs Exposed?

Who says people can't make money with their computers? There are people downloading games, utilities and word processing programs for FREE from public bulletin boards and then selling them to you for \$3 to \$6. Well, now you can get thousands of programs for your IBM PC, clone or other computer, mostly for FREE, plus help the American Cancer Society!

By Drew Kaplan

Get free programs yourself! If you own a computer this may be the most important article you ever read.

Imagine printing 10 foot long banners, playing dozens of arcade style action and adventure video games (no joysticks required), using spreadsheet programs, typing labels automatically, speeding up the use of your computer and doing everything from listing out text files, to making DOS easy.

Well, there are over 2,000 numbers you can dial right now, and on many of them you will find hundreds of disks full of exciting 'Public Domain' software.

These are hobbyist boards. Most of the System Operators, or SysOps as they are called, operate these electronic bulletin boards for fun.

And, every SysOp I've spoken with loves to have new blood, and that's you.

You can leave messages, people sell things (not businesses), and there's a wealth of Public Domain software. Why is there Public Domain Software?

THE AMERICAN DREAM

Many computer engineers find that they have special needs and so they write sophisticated programs.

Since they aren't in business, they place these programs on bulletin boards for everyone to use. That way their name gets known and everyone benefits.

In other cases, programs are developed at universities or under government grants where sale is prohibited, so these too find their way onto the public domain bulletin boards.

Another class of programs called Freeware is released to the public for limited use. Along with the program is a request

for contributions if you like the program.

It's totally up to you, but if you like the program and some guy spent 5 months writing it, usually sending him \$10-\$25 will get you an expanded version, some new documentation and his undying love and gratitude. But it's up to you.

Imagine programs that let you track your stocks, generate forms, play solitaire, golf or sail, make your computer into a piano (wow!), diagnose the speed and accuracy of your computer, rename and re-sort directories and a million more useful and fun programs.

BUT PEOPLE ARE MAKING MONEY

It's OK to copy these programs for yourself and you are actually encouraged to make copies for friends. This way the software really gets spread around.

But, there's a loophole that allows you to make and distribute copies and to 'recover distribution costs'.

Well, now there are companies making money (by downloading free programs and selling them to you for \$3 to \$6) on the backs of these generous programmers who have actually done the work.

So, if you pay \$3-\$6 is it a rip-off, or is it still a good deal, because the software is obviously worth many times the price? It's up to you to decide.

ENTER DAK

OK Martha, here's the catch. No, there's no catch. You don't have to buy 10 tapes or disks. You don't even have to buy a modem from DAK.

Of course, you'll need a modem, but you can even borrow a friend's and both benefit from the great software.

I started DAK as a hobby 22 years ago when I was a student at UCLA. And, I've tried to keep it a hobby ever since.

So here's what I'm going to do. I want you to have all the productivity, and yes fun, you can with your computer. So I've put together two packages so you can vastly broaden your computer's use.

I have a list of 2,000+ electronic bulletin boards, AND I've packed a ton of the great programs from the bulletin boards for IBMs and clones onto two (2) disks, to show you a little of what you'll get in case you don't already have a modem.

AMERICAN CANCER SOCIETY

Unfortunately I can't afford to give you everything for free, but look at this. I'll send you the list of 2,000 electronic bulletin boards for \$2 (\$1 P&H). Order No. 4888. And/Or two (2) disks full of programs for \$3 (\$1 P&H) for both disks. Order No. 4889. Ca add tax.

DAK will donate to the American Cancer Society (I have a personal interest in their research) all proceeds from the sale of the List and Disks beyond the cost of producing and distributing them.

And what's more, the cost of this 'ad' will NOT be included in my costs. So, the disks, the duplication, the printing, the typing, packing and postage etc., will be subtracted and the rest will be donated.

watch my next effort for a picture of the first check I donate.

URGENT, DON'T CALL DAK

I've set up a special P.O. BOX for this service. Send your order with checks only (no cash or credit cards) with the words 'LIST' and/or 'DISKS' to DAK, P.O. BOX 3045, Canoga Park, CA 91306.

Please no phone orders or phone inquiries. All information must be handled through the P.O. BOX. Even if you order anything else from DAK, these items still MUST be ordered separately.

Computer Floodgates

You'll be deluged with free programs, instant information and incredible entertainment when you connect ADC's Hayes Compatible 1200 baud auto-answer/auto-dial modem to your computer at a breakthrough price.

By Drew Kaplan

Get ready. If you're just using your computer for word processing or spread sheets, boy, have I got a surprise for you.

With a modem you can dial any of the thousands of electronic bulletin boards across the country and download (I'll explain in a minute) programs that will literally knock your socks off.

And forget expensive long distance calls. With thousands of electronic bulletin boards, there are likely to be several right in your own area.

FREE FREE FREE FREE

I just printed out a 10' banner for my son's birthday. The program prints on any printer, daisy wheel, dot matrix or ink jet. Wow, and it was free.

I'm really enjoying three action video games. In Striker, a helicopter game, I have to pass through enemy territory to recover my spies, get supplies and more. I haven't won yet. In Beasts, I keep getting eaten and in Pango, well, it's arcade action at it's best.

I've designed forms using a form pro-

gram. I've compared my Visual Computer's speed to a true PC (100%), and an AT Clone came in over 600% faster.

If you're like me, whenever you type a DOS command and make a mistake you get frustrated.

Well there's a program that not only remembers your last few entries, it lets you use the up arrow to retrieve them and you can edit them without retyping the entire line. Great!

There's a program that turns the entire face of my monitor into a clock and another program that just puts the time in the upper right hand corner.

How about a word processing program with spell check and all the refinements you'd expect for hundreds of dollars? Well, it's free too.

What you're reading about is the wonderful world of Public Domain Software. From File Utilities to diagnostic and debugging to multi-tasking, you'll find thousands of programs to experiment with.

From C compiling to artificial intelligence language, you'll have a wealth of knowledge. There are even programs that let your computer talk or play music.

PHONE LINE BLUES

So, you don't have a spare phone line? Don't worry. You can use your regular phone line. You won't hurt it, and who wants to talk on the phone when you're using your modem anyway.

GIVE A MAN A FISH

Please forgive me. I'm not invoking the Bible to sell you a modem. But, truth is truth. You can buy most of the programs you'll find, but that requires someone to sell you a fish each day.

With a modem you can fish forever so you'll continue to quench your thirst for knowledge and entertainment forever.

And, you won't be alone. Enclosed with your modem will be step by step instructions on how to use the bulletin boards.

So, don't be shy. Get your feet wet. Everyone is friendly and glad to help once you're on-line.

HAVE I LOST YOU YET?

First, I may have hit you with some ... Next Page Please

...Computer Floodgates Continued 'Jargon' that isn't familiar. Well have no fear. Everything will be explained with your modem, but look at this.

I've referred to an electronic bulletin board. It's really complicated and you'd probably never understand what it is.

Wrong! An Electronic Bulletin board is nothing more than a computer, just like the one you probably own, hooked to an auto-answer modem like ADC's.

Instead of word processing software, you run a bulletin board program and have lots of storage capacity. Simple?

I mentioned downloading. Well, it's simply like bringing up a program from

your own floppy or hard disk.

All you do is use your modem to connect you to the bulletin board and then when you download, you're bringing a file from the bulletin board's hard disk to your own computer. The distance may be great, but the principal is identical.

You'll find information about virtually any subject that interests you. If you're into butterflies, why look through every nature magazine in the library. Just access the word Butterfly, to read every article.

Wow, no flipping through pages and books. The computer finds it all.

ARE YOU GETTING THE MESSAGE?
For stamps, coins, soccer, football,
American Indians, chocolate, coffee,
mortgages, banking, ulcers, steel production and more, the information is
instantly available.

PAY PAY PAY PAY

No, it's not all free. There's lots of information that you can buy. It's like an electronic bookstore. And, it's great.

OK, I'm aggressive. You can see it in my challenges. And, my friends will tell you I'm definitely a 'Type A' personality.

Well, when I buy stocks, I want to know about the company. And frankly, I get frustrated. I want to invest NOW, and it takes days or even weeks for me to get 10K reports so I can get the inside information and history I need.

Well, now I can get the inside information instantly by using my modem. I can get the Company profile, SEC filings, officers' names and ownership. So, I can check out companies that I do business with or that compete with me.

Well, with a modem, you can instantly read and download complete information on over 9,000 public companies.

You'll find forecasts of sales, including product mix. And, you'll even find officers' salaries. What a killer edge you'll have when you do business or invest!

SO MUCH MORE

If you write, you can send your copy by modem directly to typesetters. Want a date? There are matchmaking bulletin boards. What fun. Most of these boards seem to be free. But, some are X rated.

So, there's no limit to the information and enjoyment that your computer and modem can bring to you. Now let's look at ADC's incredible 1200 baud modem.

THE MODEM

I call it the 1200 Baud Smart Duck. Because, IF it walks like a duck, sounds like a duck, and looks like a duck, it darn well better act like a duck. And, ADC's new Hayes Compatible 1200 baud autoanswer/auto-dial modem is a great duck.

Hats off to Hayes. They've just about written the book on specs and protocol for the 1200 baud modem market.

Every professional modem bills itself as 'Hayes Compatible'. But the big question is, how much does it really cost to make a top-of-the-line 1200 baud modem? Or, who's getting rich?

For DAK's new breakthrough price of just \$119%, you'll not only be getting a duck that quacks properly to Hayes modems, but sings like a nightingale to your pocketbook. It can save you a fortune in time with its extra features.

may need a short sex education course.

Sex Education 1A. You need to determine whether your computer's RS232 connector is male or female.



If you look at the picture above, you'll note that ADC's RS232 Modem connec-



DUCK SOUP

Any computer with an RS232 standard serial port, will work flawlessly with this powerful automated modem.

I've owned a Hayes 1200 baud modem for about 4 years. I just unplugged it and plugged in ADC's to operate my Hewlett-Packard dumb terminal which I use at home to monitor DAK's computer.

The only differences I noted were improved monitor sound, more screen displays and a help menu. And, oh yes, one last extra. I use a few local data bases whose phone lines are always busy.

Well, ADC's intelligent modem recognizes a busy signal, hangs up and keeps retrying the number every 30 seconds.

There are less important (to me) extras like day, date and time, an extra phone jack and auto tone/pulse switching.

1200 BAUD POWER

The ADC Modem will communicate at 1200 baud (about 120 characters per second) or 300 baud (about 30 characters per second) automatically, depending on the link at the other end.

It comes with a modular phone cord that you simply connect to any standard modular jack. And, it uses standard Bell 103 and 212A protocols. (Don't worry.) It operates in half or full duplex.

Its built-in microprocessors let you automatically answer in-coming (auto-answer) calls & act on all Hayes commands.

It even waits for dial tones and phone network tones during auto-dial. The modem is 9½" X 5½" X 2". It's backed by ADC's standard 1 year limited warranty.

HOOKING IT UP MADE EASY

All you need is a serial output, a cable and a modem program. Use your own for any computer. Or you can use ours for the computers below. All our modem programs on disk let you save, upload and download files. Look how easy it is.

If you own an IBM PC or a Clone, usually you'll find an RS232 serial port already built-in. All you need is our cable and modem program on disk, which we've packaged together for just \$14*0 (\$3 P&H). But, before you order your cable, you

tor has holes going in. It's a female. If it had copper pins sticking out, it would be a male. Now wasn't that simple?

So, if yours is female, order our male cable and modem program Or. No. 4353. If you have male pins sticking out, order our female cable, Order No. 4354.

For your Apple IIC, your serial interface is built-in. All you need is our cable and modem program on disk. They are just \$14% (\$3 P&H). Order No. 4356.

For your Apple IIE, you'll need a serial interface with an RS232 port, a cable and a modem program. It's all yours for just \$69 (\$4 P&H). Order No. 4357.

1200 BAUD SMART DUCK RISK FREE

For business or pleasure, you'll communicate, gather information and save time. If you aren't 100% satisfied, simply return it in its original box to DAK within 30 days for a courteous refund.

To Order Your ADC 1200 Baud Intelligent Auto-Answer, Auto-Dial Modem risk free with your credit card, call toll free or send your check for DAK's market busting price of just \$119⁹⁰ plus \$6 P&H. Order No. 4334. CA res add tax.

Super Bonus: Now you can try a Pay Data Base for Free. CompuServe's \$39 (we sold it separately for \$24) complete kit includes \$25 worth of on-line time (they charge about \$6.25 per hour) is yours free with ADC's modem. Wow!

It is said that knowledge is king. With the information you can acquire through this modem, you'll have the informational power of 10 kings. And, you'll have a full range of entertainment thrown in as an extra horus

in as an extra bonus.

Heyes, IBM, and Apple IIE & IIC are registered trademarks of Hayes Microcomputer Products, International Business Machines and Apple Computer.



DAK INDUSTRIES Call Tall Free Fox Credit Card Orders Only

Call Toll Free For Credit Card Orders Only 24 Hours A Day 7 Days A Week 1-800-325-0800

For Toll Free Information, Call 6AM-5PM Monday-Friday PST Technical Information. . . . 1-800-272-3200 Any Other Inquiries. 1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304

Eable Controller Improved

Get all the cable channels on any TV or video recorder with this all new wireless infrared remote control cable tuning system. And at just \$69%, we're sure to break the cable market wide open.

By Drew Kaplan

If you've got cable, we've got it all. Now you can tune in up to 72 cable channels on any TV or VCR from your favorite easy chair.

The Universal Cable Controller receives all VHF Low Band channels 2-13 and VHF Mid-band 14(A)-22(I)

Plus, it tunes the Super Band VHF channels 23(J)-36(W) and Hyper Band channels from 37-73. You'll get a lot of entertainment for our breakthrough price.

Just imagine all the exciting shows that are fed right to your TV but can't be tuned in. And, even cable compatible TVs and VCRs, usually only have 10 or 12 presets. So, unfortunately, you have to choose only your favorites.

With the Cable Controller you won't have to choose. You can instantly tune in up to 72 channels all the time, anytime. So, your choice of entertainment will never be restricted.

MOVIE CHANNELS

If there are movie channels on your cable and they're not scrambled, the Controller is all you need. If they're scrambled, you'll need the cable company's box.

Note: Check with your cable company before viewing anything at all, to see if they require you to pay a fee. SPORTS PLUS

There are lots of 'Super Channels' broadcast on cable. On the all sports channel you'll watch 'World Class Sports' whenever you wish. All Movie Channels give you entertainment at all hours.

And 'Super Stations' from New York and Atlanta give you major city TV for cities other than your own. Plus, there's Cable News Network for a world wide perspective on the news and much more. Why not see what's on your cable?

ONLY FOR CABLE

If you don't have cable, the Cable Controller isn't for you. It only finds you extra channels when you are connected to a cable. And, it doesn't tune in UHF.

But, if you're on cable, your cable company is rebroadcasting UHF over unused VHF channels. So with the Cable Controller tuner, you'll get it all.

TOTAL RANDOM ACCESS TUNING

The wireless infrared remote hand controller does it all. It switches both the TV and the Controller on and off and selects your channels. And, look at this.

If you like to watch two ball games and switch between them as I do, there's a special 'Alt' switch that lets you flip back and forth with the touch of a button.

Plus, you can select favorite channels for step tuning. So, you can tune all channels or just your favorites with the step tuning controls. I have 4 movie channels on my cable and I love to step tune through them during commercials.

For all other channels, you'll enjoy total random access tuning. You can go directly from channel 2 to 28. Or you can step tune one channel at a time.

Once you've set your own TV to channel 3, you can just forget it. Any fine tuning is handled from the wireless infrared



remote handset. And you'll have microprocessor controlled synthesized tuning for the finest picture.

You'll see the number of the station that you have selected displayed on the command base. And, you can tune channels either from the remote or the base.

Color tints, volume, brightness and contrast are all controlled by whatever method you now use.

INSTALLATION

Nothing to it. All cable systems use 75 ohm round cable. Simply unscrew the end from your TV and screw it into the Controller base input.

Then screw in an identical cable (included) between the Cable Controller and your TV. Finally, plug your TV's AC plug into the Controller and the Controller's AC plug into the wall.



WHAT IT IS

The Cable Controller is actually a very sophisticated, all electronic VHF TV tuner/receiver. It's really like a TV set without a picture tube.

Since it's all electronic, you won't be getting snow from dirty tuning contacts and loss of fine tuning as the set ages.

The Controller tunes all the possible stations that your cable can broadcast. something that would be very expensive to build into standard TVs, because not all TVs are going to be used on cable.

GREAT FOR VIDEO RECORDERS

Now you can record off cable. With the Cable Controller hooked to your video recorder, you can open the world of cable to your video recorder too.

Cable compatible video recorders that

don't even tune in 72 channels can cost much more. Plus, if you use your cable compatible VCR as a tuner for your TV, you can't record one cable channel while you watch another.

You can feed both your TV and video recorder. Or, you can separate them so you really can watch one program and record another.

WHAT IT ISN'T

It isn't one of the infamous 'black boxes' you might have read about that illegally decode various 'Pay TV' channels. On cable, most of the programming isn't scrambled, it's just found outside the tuning range of the average TV.

So, if there is a Pay TV channel that is scrambled, or is only unscrambled on one TV in your house, the Controller is not made and should not be used to tune

it in without paying.

Actually 'Cable Compatible' TVs and video recorders do basically the same thing as the Cable Controller, but cable tuning is usually an added feature that often doesn't cover as many channels.

The Cable Controller is made and backed by a standard limited warranty from Universal Security Instruments Inc.

TRY THE WORLD OF CABLE **RISK FREE**

Relax up to 25 feet away. Change channels, adjust the fine tuning or turn your set on or off. Explore the vast number of cable channels available to you.

Try it risk free. If you aren't 100% satisfied, simply return it in its original box within 30 days for a refund.

To order your Universal 72 Channel Cable Controller with Wireless Infrared Remote Control risk free with your credit card, call toll free or send your check for DAK's market breaking price of just \$69°° plus \$6 for postage and handling. Order Number 4870. CA res add tax.

There's a whole new world of entertainment waiting for you just off your normal TV tuning range. With the Cable Controller, you can sit back in your favorite easy chair and tune in the world.



1-800-325-0800 For Toll Free Information, Call 6AM-5PM Monday-Friday PST Technical Information. . . . 1-800-272-3200 Any Other Inquiries......1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304

The Observers

At the office or at home, you can scrutinize up to 4 separate areas with both picture and sound. New technology allows a single cable to both power a camera and carry the audio and video signals. There's even an automatic switcher for up to 4 cameras. It's all yours at an amazing new price.

By Drew Kaplan

It does it all. And, it's absolutely terrific. You can monitor loading docks or swimming pools. You can watch for pilferage, shoplifting or accidents.

And, there's even an output for a video recorder so you can make a permanent record. Now you can see who comes and goes. And, you'll see what they do.

The system comes with a 12" video monitor, a sequential switching system that allows you to view up to 4 cameras from 4 to 60 seconds each, a camera complete with microphone, and an infinitely adjustable mounting arm.

You'll also get 57 feet of cable and you can add up to 300'. You can even add a weather resistant case for outside use.

LOOK AT ALL IT DOES

The technological breakthrough that allows you to make a single wire installation lets you have sound and picture monitoring of all types of areas.

Risk areas: Monitor secluded side doors, corridors, equipment yards, tool cribs and other storage areas.

Hazardous areas: Prevent accidents or get help for one fast. You can see when people do unsafe things.

Supervision: You can't be everywhere at once. Now you can see who comes and goes. Monitor an entire night crew if you're on the premises, or have an 8 hour tape you can view in about 11/4 hours using high speed search on your VCR.

Retail Protection: Don't leave your employees alone in your store or in your parking lot or structure. Now the manager can be there to assist. And, you can have a recorded audio and video record.

Theft: From shoplifting to employee theft to vandalism, anonymity is the culprit's protection. With observation cameras, no one knows when they are being watched or when a recording is being made. It's a safety feature to protect employees from danger and to protect the company from all sorts of crime.



NOT JUST FOR WORK

You can monitor your front door, your back yard and your pool. You can even monitor the animals in your barn or your baby in the bedroom. So, if you raise animals or children, you can always keep an eye on their safety.

Always check local laws which may restrict some types of observation.

EFFORTLESS INSTALLATION

From 3 lux to 30,000 lux, you can watch what's happening with this superb new system. You'll be amazed at how sensitive it is at low light levels.



And, whatever you monitor, you'll have a superbly detailed high contrast picture.

While I wrote this ad, I had a camera aimed out the window. As it got dark, I couldn't see down the street. But the camera's automatic sensitivity adjusted, so I could see the street on the monitor almost as well as I had in the afternoon.

And best of all, the cameras are incredibly easy to install. You don't even need AC plugs where you mount them.

And, the infinitely adjustable mounting arms attach with only 3 screws to floors, walls or ceilings.

Switch on the monitor and press a camera button. All power for the entire system comes from the monitor/switcher.

You can have one or all 4 cameras connected. And, connecting the cameras is the simplest thing of all.

This system uses standard round coax type cable, just like your home's cable TV system. Through this standard cable, Magnavox sends power for the cameras.

And, the camera sends both audio and video signals back down the very same cable. So, installation consists of simply running one standard video cable.

The monitor has a built-in electronic switcher. Most automatic switchers that I've seen in surveillance, cost hundreds of dollars. With Magnayox it's included.

You set it to lock onto any camera for a minimum of 4 seconds and a maximum of 60 seconds, or pick one camera.



The signal (both audio and video) from all cameras being viewed can always be sent to your VCR for a permanent record.

And there's more. By simply running a standard video cable, you can also watch the output of the monitor on other TVs in other rooms.

ENDLESS USES

Think of the feeling of safety you'll have when you can monitor both the

front and back of your home from the kitchen or the bedroom, or both.

The monitor is 12" wide, 11½" tall by 12½" deep. Each camera is just 9" deep, 4.5" wide and 2½" tall and weighs 2½ lbs. It's made by Magnavox and backed by their standard limited warranty.

OBSERVE YOUR WORLD RISK FREE

Use it to protect your business or home, your employees, your family and your possessions. If you're not 100% satisfied, simply return it in its original box within 30 days for a courteous refund.

To order Magnavox's Observation System, complete with 12" Monochrome Monitor, 4 Station Electronic Automated Switcher, Black and White Camera, 57' of Cable, and Infinitely Adjustable Mounting Arm risk free with your credit card, call toll free, or send your check for only \$299 (\$11 P&H). Order No. 4415.

Each Extra Camera with Built-in Microphone, 57' Cable and Mounting Arm is just \$169 (\$4 P&H). Order No. 4549.

Weather Resistant Cases are just \$39% (\$3 P&H). Order No. 4550. CA add tax.

100' extension cables are just \$19% (\$2 P&H) Order No. 4551. Note: a pair of cable ends is included, so you can make your own cable, up to 300'.

To view almost double the width you see in the picture above, there's an 88° wide angle lens for just \$69° (\$2 P&H). Order No. 4823.

You'll have a new sense of security when you can see and hear what's happening. And, by connecting a video recorder, you can have a permanent record of the comings, goings and actions of everyone on your property.



DAK INDUSTRIES

Call Toll Free For Credit Card Orders Only 24 Hours A Day 7 Days A Week 1-800-325-0800

For Tall Free Information, Cell 6AM-5PM Monday-Friday PST Technical Information....1-800-272-3200 Any Other Inquiries......1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304

2-Way Ear Thrillers

Now you can experience auditory euphoria. Discover a truly controlled and patented method of reproducing a musical frequency response that spans 10hz to 40,000hz, right in your head, at a limited market breaking \$49% price!

By Drew Kaplan

It's thrilling. Koss's two-way audiophile stereophones reproduce music with such incredible impact and purity that you'll be astounded by the music you can't hear from your conventional speakers or headphones.

With a 10hz to 40,000hz frequency response, certainly only CDs can really fully utilize the capabilities of these breakthrough stereophones, But, any music you hear will be unequalled.

Before we examine how Koss has really widened the frequency response capabilities beyond conventional audiophile definitions, let's 'touch and feel' the sound.

Nobody can actually hear 10hz, but the bottom registers of string instruments, organs and bass drums produce a virtual tidal wave of sonic impact from

about 10-45hz that will envelope you. It's really a feeling as much as a sound.

You'll experience a new feeling of depth, warmth and fullness. Instruments will become separate and distinct.

In fact, you'll hear string basses and individual bass instruments separate and provide you with realism never before available outside of an orchestra pit.

From 45hz to 3,500hz you'll hear totally unrestrained musical perfection. They can handle the music from a single violin to a full orchestral crescendo with incredible purity and presence.

Because they aren't stretching their acoustic limits, your music will be cleaner and more open than ever before. At 3,500hz, the woofer crosses over and the tweeter takes over.

Wait till you hear the gentle sound of brushes on a snare drum. The upper harmonics of a violin. A separate tweeter reproduces sounds up to 40,000hz.

And, while most of us probably can't hear much above 20,000hz, most headphones strain just to reach 20,000hz.

Koss reproduces sounds that you can hear and feel so effortlessly that you'll think you're sitting next to a vocalist.

You'll even hear their clothing rustle and experience other sonic cues of a live performance. Most of these cues which actually may exist on CDs are masked by normal reproduction.

Close your eyes and a flute will float right in front of you. Tubas will be well separated from singers and trumpets because they are reproduced by separate drivers within the headphones.

2-WAY ENGINEERING BREAKTHROUGH Koss has patented a piezoelectric bi-



morph disc with a special cone to create a special tweeter with a frequency range of 3,500 to 40,000hz.

As you may already know, high frequencies are extremely directional, so even with a good tweeter in a stereo system, you won't have as crisp highs unless you sit directly in front of the tweeter.

You can try this in your own system. But, you'll find the highs too strong because they have to be overpowering or you'd lose them in the room.

Since this tweeter fires directly into your ear, it can be much more sensitive and its movements can be much finer; hence, the dramatically improved highs.



Also, other headphones use the same driver for the highs and lows so they have to compromise between the massive movements for low bass and the fine vibrations of the highs.

Well, Koss produces massive base by using a special large mylar driver with a rare earth dynamic coil.

So, with these stereophones you'll have massive movements from the bass driver without any interference with the highs. And, there's more.

Bass, to a large extent, is a function of the driver and the enclosure. With speaker systems, it's acoustic suspension or ported, or even passive radiators that help make the bass full and rich.

Koss uses a sealed enclosure in the form of a Pneumalite® ear cushion that surrounds and fully encloses each of your ears. So, your ears actually become

speaker enclosures.

A nice side benefit is that there is no pressure on your ears from the stereophones because they are totally enclosed. The real benefit, of course, is that you'll thrill to music with a bass component down to 10hz. Wow!

So, these stereophones are immune to room conditions. You'll be in a perfect acoustical environment. Forget speaker placement. Forget curtains, carpets and couches. Your sound will be perfect.

John Koss, writing to customers, said of these stereophones (at their \$85 suggested retail price), "Perhaps the PRO/ 4X isn't for everyone; perhaps the very qualities that so excite me are too special for many. But for the discriminating music lover, the PRO/4X with its unique new dual elements provide that extra margin for greatness.

Well, at \$85 these headphones are phenomenal. At DAK's breakthrough \$49% price, our limited supply won't last long.

THE PRIVACY ISSUE

It's a fallacy. People are supposed to wear headphones so they won't bother other people.

Rubbish, I wear headphones so no one will bother me. Forgetting the price, I simply can't equal the sound quality produced by these stereophones.

Koss's Stereophones have an infinitely adjustable headband. Plus, each ear swivels so that it perfectly matches your head. There's a 12' coiled cord with a standard 1/4" stereo plug. They're backed by Koss's standard limited warranty.

SHATTER YOUR CONCEPTION OF SOUND RISK FREE

Wait till deep bass wells up and engulfs you in its massive tide. Listening to music with these stereophones is really a participatory event.

From the rich full thunder of a kettle drum to the finest detail of a violin har-

monic, you'll be there.

If you're not 100% thrilled, simply return them in their original box within 30 days for a courteous refund.

To order Koss's 2-Way StereoPhones With The Patented Piezoelectric Bimorph Disc with Special Cone Tweeter and separate woofer risk free with your credit card, call toll free or send your check for DAK's market breaking price of just \$49⁹⁰ (\$4 P&H). Order No. 4882. CA res add tax.

Whether you're a professional musician or a dedicated music lover, these Stereophones will deliver the finest in stereo listening by mixing the music in your head, not on your living room walls.

By sealing out all outside noise, and separating the woofers and tweeters, these stereophones will provide unequalled musical brilliance.

15" Thundering Subwoofer

Man's best friend meets the audiophile's best friend at an earthshaking bone jarring new price. Now you can add the impact of a 15" subwoofer to any stereo system for just 99%.

By Drew Kaplan

A puppy may be man's best friend. Woof, Woof. . .But, now I've got a new friend you can add on to your stereo system. It doesn't need to be taken on walks, washed or fed. But, it makes a great cocktail table for you when you're being fed. And, oh what a woof it has.

GREAT SOUND FOR EVERYONE

It's called a subwoofer. And, normally it is the beloved pet of only the most ardent audiophiles.

It's not generally understood that it can be used with virtually any speaker system in any stereo. And, in addition to substantially increasing and perfecting the bass response, it has a significant impact on the mid-range clarity too.

Before I tell you exactly how marvelous your stereo will sound when you connect this subwoofer to it, there are two things you should know.

First, you'll be getting your new friend at a phenomenal price. DAK has sold over 10,000 of Cerwin-Vega's 12" subwoofers. They had a retail price of \$332, but we sold them for \$16450.

Second, your new friend comes complete with a paid up health insurance policy in the form of a 2 year limited warranty from its father, BSR.

By the way, the puppy sitting on top of the subwoofer is the same puppy I used with Cerwin-Vega's, but wait till you hear what's under him now. You'll have BSR's 15" massive infusion of explosive bass, added to your system for just \$99°.

But don't be misled. BSR bass is clean and tight; never sloppy or overpowering. It adds a feeling of depth and fullness to your music that you simply can't get with two or 3-way speaker systems.

HERE'S WHAT IT DOES

Basically, the problem with most speaker systems is that the bass overpowers the system. In a 3-way system, a woofer may be crossed over at about 800hz. And, in a 2-way system as high as 3000hz.

So, the woofer must handle movements of up to an inch at frequencies below about 80hz, while at the same time attempting to reproduce the very fine vibration type movements of the mid-range frequencies.

It is this difference in movements that causes both the bass to be weak or not precise, and the mid-range to become muddy (intermodulation distortion).

Even the best 3-way systems fall prey to these problems. And, it's why a subwoofer can do so much for your midrange clarity as well as your bass.

PROBLEM SOLVED

BSR's subwoofer has a specially engineered crossover network that sends frequencies above 120hz to your regular speakers and reproduces just the mamoth movement frequencies from 120 hz down to 22hz with a special floor firing dual wound super subwoofer.

If you have downstairs neighbors, this subwoofer isn't for you. The woofer is a very special hybrid. It has a mammoth one and one half inch voice coil which allows the speaker to make the very large



movements required to reproduce the very low frequencies.

But, it would do a lousy job of reproducing mid-range, which is why, cost aside, manufacturers don't put big voice coils in normal 10" or 12" woofers.

To make the massive movements accurate, this woofer has a very large magnetic structure. This magnetic structure also makes the subwoofer system extremely efficient. (The sensitivity is 91.5 db at 1 watt at 1 meter.)

So, whether you have two or three-way speaker systems, with 8", 10" 12" or even 15" woofers, you'll find the sonic improvements staggering.

You'll hear and feel the awesome effect of thunder rumbling through your home. You'll hear a depth and dramatic fullness to your music that won't be heavy but will thrill you with its massive strength.



Here's a 'floor's eye view' of the subwoofer. You'll feel and hear

EASY HOOKUP

It's easy to connect. Simply run the right and left speaker wires from your amplifier to the input terminals of the subwoofer. It works with any system from 20 to 150 watts per channel.

Then, you simply connect the speaker

wires from your two standard 8 ohm stereo speaker systems to the output terminals on the subwoofer. They receive the exact signal that they did before except that everything from 120hz down is routed only to the subwoofer.

Placement of your regular speakers is just as critical as usual for stereo imaging, but the subwoofer can be placed anywhere because low frequency material is totally non-directional.

The subwoofer makes a perfect cocktail or end table. Its rich wood-tone appearance matches any decor. It is 24½" long, 16¼" high and 20" wide.

TRY AUDIOPHILE'S BEST FRIEND RISK FREE

The fullness, richness and depth is awe inspiring. Wait till you connect this subwoofer to your system and experience truly massive force from your music.

If you aren't 100% satisfied, simply return it to DAK in its original box within 30 days for a courteous refund.

To order BSR's Thundering Subwoofer with its dramatic 15" Dual Wound Voice Coil Subwoofer risk free with your credit card, call toll free, or send your check for DAK's breakthrough price of just \$99% (\$14 P&H). Or. No. 4514. CA res add tax.

You can't replace the love and softness of a warm puppy. But, wait till you experience the richness and depth this subwoofer will add to your bass and the clarity you'll hear in your mid-range.



DAK INDUSTRIES

Call Toll Free For Credit Card Orders Only 24 Hours A Day 7 Days A Week

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

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ADC MODEL 16/2R COMPACT DISC PLAYER

Julian Hirsch, Hirsch-Houck Laboratories

ONG recognized as a major source of phono cartridges and equalizers, ADC extended its product line into the digital age in 1984, when it began making compact disc players. Partially engineered by dbx, the players have been especially notable for their simplicity and moderate

prices. ADC also promotes the players' transport ruggedness, tracking ability, advanced error-detection/correction circuitry, and resistance to shock.

The ADC 16/2R, the latest in the line, provides all the basic operating features required of a CD player, but unlike many of today's players it has an open, uncluttered front panel. Its principal controls are two rectangular pushbuttons, which are clearly and unambiguously labeled STOP/OPEN and PLAY/ PAUSE. The 1-inch-square controls for track-skipping and fast-scan modes are logically identified as SKIP, REV, and FF, with the usual arrows to show direction-no cryptic or confusing nomenclature here. There are smaller buttons for displaying the time remaining on the disc, setting the player to repeat the current track or the entire disc, and controlling memory functions.

TEST REPORTS

The ADC 16/2R can be programmed to play sixteen tracks in any order, during a pause or stop or while a disc is playing, in a simple process using the ENTER/SET and SKIP buttons. Any single entry or all entries can be deleted with the CLEAR/ALL CLEAR button.

The only other front-panel feature of the 16/2R is a power button. The rear apron contains two audio output jacks. The ADC 16/2R, which is finished in black with contrasting white markings, measures 17 inches wide, 11% inches deep, and 31/8 inches high. It weighs 10 pounds. The player is supplied with a very compact wireless remote control, measuring only 434 inches long, 244 inches wide, and 5/8 inch thick; it duplicates all of the front-panel controls except the power switch. Price: \$250. ADC, Dept. SR, 71 Chapel St., Newton, MA 02195.

Lab Tests

The output signal level of the ADC 16/2R from a 1,000-Hz 0-dB track of a test record was 1.95 volts into a standard EIA load of 10,000 ohms in parallel with a 1,000-pico-farad capacitor. The two channels had identical outputs. The harmonic distortion at 1,000 Hz was 0.0018 percent at 0 dB, 0.004 per-

cent at -10 dB, and 0.019 percent at -20 dB. The -20-dB reading included a number of low-level spurious (nonharmonic) signals.

The ADC Model 16 / 2R is a good, moderately priced, "no-frills" compact disc player. Moreover, it is easy to use.

The A-weighted noise level was -98.8 dB referred to 0 dB, and the dynamic range (the THD + noise level of a -60 dB signal, referred to the output from a 0-dB signal) was 89.7 dB. Channel separation decreased from 93 dB at 1,000 Hz to 68 dB at 20,000 Hz. The player's square-wave response confirmed its use of analog low-pass filters, and the phase shift between channels, which increased from about 4 degrees at 1,000 Hz to 81 degrees at 20,000 Hz, showed that its two channels shared a single D/A converter by multiplexing. The converter had a slight nonlinearity at very low signal levels, its output being low by about 1.5 dB at -90 to -100 dB. The player's frequency response, which was extremely flat

over most of the audio range, fell off slightly below 50 Hz, to -0.6 dB at 20 Hz, and had a peak of about 0.5 dB at 16,000 Hz.

The slew time of the laser tracking mechanism was 4 to 5 seconds, slightly slower than some others we have tested but still quite satisfactory. It made a perfect transition between two adjacent tracks unseparated by a silent interval. The calibrated defects on the Philips TS5A test disc could be played at their maximum levels with no signs in mistracking. The 16/2R was fairly sensitive to impact on its case, however; it mistracked with moderate finger tapping on the top or side.

Comments

The ADC 16/2R is a good example of a moderately priced, relatively "no-frills" CD player that delivers excellent sound quality with enough operating flexibility to satisfy most people. Moreover, it is easy to use. We found nothing in the character of its sound to distinguish it, for better or worse, from a host of other CD players, most of them more expensive.

Of course, it is not the equal of many of the others in its range of operating features. Some of those the 16/2R does not have may be important to certain people and of no interest to others. Among the ones that come to mind are phrase-repeat capability, direct access to (or at least identification of) indexed portions of a disc, elaborate programming systems such as random play, a headphone output, volume control, external timer control, and direct access to numbered tracks.

On the other hand, most of these features increase cost but never have a commensurate effect on sound quality. If you just want a good, functional CD player, the 16/2R should be a satisfactory choice. Its impact resistance is not ideal, but that should be no problem if your floors are reasonably free of vibration. We would expect the ADC 16/2R to have a special appeal to people who prefer simplicity to a dazzling display of colored lights or a panel full of controls. This is a product that appears to have been designed with their needs in mind. Circle 144 on reader service card

FEATURES

- ☐ Sixteen-bit D/A converter multiplexed between channels
- ☐ Three-spot laser pickup
 ☐ Programming for up to sixteen tracks in any order
- Track skipping and fast search in either direction; audio muted during search
- ☐ Repeat of any track or entire disc
- ☐ Initial display of total number of tracks and disc playing time
- Display of current track number and elapsed time on track, switchable to show remaining time on disc
- ☐ Wireless remote control for all front-panel functions except power

LABORATORY MEASUREMENTS

Maximum output level: 1.95 volts
Total harmonic distortion at
1,000 Hz: 0.0018% referred to
0 dB, 0.004% referred to -10
dB, 0.019% referred to -20 dB
Signal-to-noise ratio (A-weighted):
98.8 dB

Dynamic range: 89.7 dB Channel separation: 93 dB at 1,000 Hz, 68 dB at 20,000 Hz

Frequency response: +0.5 dB, -0.6 dB from 20 to 20,000 Hz Maximum phase shift (from 20 to 20,000 Hz): 81 degrees at 20,000 Hz

Cueing time: 4 to 5 seconds Cueing accuracy: A Impact resistance: top, C+, sides,

Defect tracking: tracked maximum defect levels on Philips TS5 test disc



Jeep is a trademark of American Motors. Walkman and Discman are trademarks of Sony Corp.

For those of you who have wanted to listen to high quality sound both in and out of the listening room, your wait is over. AR's new Powered Partners™ stereo loudspeakers are unlike any portable or transportable speakers to date. They feature an individual powerful amplifier, a 4" woofer and 1" tweeter in each impact-resistant, black crackle, cast aluminum enclosure. They also feature individual volume and tone controls, inputs for anything from an FM or cassette

Walkman™ or Stereo TV Receiver to the latest portable CD players. A battery pack, DC adaptor, and carrying case featuring Music Windows with Velcro™ closures, are optional touches of perfection.

Simply put, the Powered Partners deliver the best sound you can carry. No surprise. They come from AR, the company that's been making speakers sound great for 32 years.

"It's no trick to make a great speaker when price is no object." Andy Petite, chief designer, Boston Acoustics

> The 3-way T830 Tower System. It needs only $10 \times 9\%$ of floor space, only 32" in height. Suggested retail value: \$480 a pair.



"It is a far greater engineering challenge for speaker designers to build a great-sounding speaker for \$200 than \$2000. When cost is no object, they can include whatever they need to get the quality they're

"However, that kind of quality doesn't always filter down through their product line. At Boston Acoustics. we take pride in designing every system to measure up to the highest standards. To show you what I mean, let's look at our newest model, the T830 tower

system.

"We designed the T830 to deliver exceptional performance at a very reasonable price, and did it by making knowledgeable and intelligent choices. We custom-designed all three of its drivers: an 8" high-compliance woofer, 31/2" midrange and 1" dome tweeter. No compromises here.

"The midrange and tweeter are ferrofluid cooled for greater power handling capacity. The diaphragms of all three drivers are made of copolymer. Although it is more costly than conventional materials, we used copolymer because of its structural uniformity and immunity to atmospheric changes.

"We make all these drivers under our own roof, using specialized machinery and jigs that we've designed or adapted ourselves. This helps us maintain consistent high quality, and save through

efficiency.

"For the enclosure, we used the same dense, non-resonant structural material as in our highestpriced system. To keep the cost down we used wood-grain vinyl instead of costly wood veneer. It looks rich, and makes absolutely no difference in sound quality.

"More important than what we put into our systems is the quality of sound that comes outand how that matches your expectations.

'From our very first product to our latest, audio critics have appreciated what we've accomplished delivering demonstrably high performance at truly affordable prices. Here's what Julian Hirsch said about the T830 in Stereo Review:

'In all measurable respects, the Boston Acoustics T830 delivered outstanding performance. Few speakers we have tested have had such a flat frequency response or such low distortion, for example, and most of those were considerably more expensive...we were enormously impressed.

"When you compare the T830 against similarlypriced systems, you'll also find it sounds better in a number of ways. More musical, smoother, its imaging more precise. And it can play louder without distortion.

"What we've accomplished is no trick. It's knowing

what to do, then doing it.

"If you'd like to know more about the T830 and other Boston Acoustics speakers, please write or call. We promise to reply promptly."

Boston Acoustics

247 Lynnfield St., Dept. S., Peabody, MA 01960 (617) 532-2111



PERREAUX SM3 PREAMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories

o the best of my knowledge Perreaux is the only New Zealand hi-fi manufacturer whose products are sold in the United States. The Perreaux product line is aimed at the "highend" audiophile, and each of the company's components—power amplifiers, preamplifiers, and FM tuners—is designed and constructed with the utmost attention to detail and the highest-quality materials. The SM3 stereo preamplifier exemplifies the Perreaux approach.

The SM3 is a "minimalist" design, eschewing all forms of intentional signal modification. It has no filters or tone controls; the silvercolored panel bears only a pushbutton power switch and a nearby blue pilot light, a balance control, a volume control, an input selector, and a tape source/monitor switch. The low-profile SM3 has a 19-inch-wide,

13/4-inch high rack-mounting panel with standard mounting holes. Overall, its chassis measures 16% inches wide, 13 inches deep, and about 21/8 inches high including its rubber feet.

The gold-plated phono jacks on the rear apron include the main outputs, tape in and tape out, the AUX/ CD and tuner inputs, and three sets of phono inputs, marked MM (moving magnet), MC (moving coil), and LOAD. Since there is only one phono selector position, it is clear that the preamplifier can be used with one or the other type of cartridge but not both, at least not with full frontpanel control.

As we interpret the preliminary instruction manual furnished with our sample of the SM3, the only difference between the two cartridge inputs is that the MC input does not have a capacitor between the cartridge and the preamplifier stage. The LOAD jack is apparently connected across the phono-preamplifier input so that the input termination for a moving-coil cartridge, which is usually meant to be terminated in a resistor of about 100 ohms, can be reduced from the normal 47,000 ohms to any desired value by plugging a suitable shunt resistance into the LOAD jack. The load resistance for a moving-magnet cartridge can be reduced in a similar manner if desired, and the load capacitance can also be increased (from the standard 100 picofarads) by plugging the necessary capacitance into the MC input jack. According to the manual, suitable plug-in components can be obtained from Perreaux dealers.

The phono section of the SM3 uses passive RIAA equalization, with a "flat" amplifier providing the necessary gain. A HI/LO switch on the rear apron, near the phonoinput jacks, changes the phono gain to suit the type of cartridge used (it does not affect the input termination or equalization).

TEST REPORTS

The SM3 uses only discrete transistors (no integrated circuits), lowloss polypropylene and polycarbonate capacitors in the signal paths, and a power-MOSFET output stage. Its AUX/CD input is attenuated, presumably to match the higher output of a CD player to that of a typical tuner. The main line amplifier has a high maximum output capability, driving a rated load of 10,000 ohms or higher. The circuits are assembled on a single large printed board with gold-plated conductors, and the other side of the board, except where components are mounted, is covered with what appears to be gold-plated conducting foil. The power supply is unusually robust for a preamplifier, from its shielded toroid transformer to its more than 56,000 microfarads of filter capacitance. Price: \$1,795. Perreaux. Dept. SR, 4701 Hudson Dr., Stow. OH 44224.

Lab Tests

All tests were made with the Perreaux SM3 driving an EIA standard load of 10,000 ohms in parallel with a 1,000-picofarad (pF) capacitor. Its frequency response, through the tuner input, was flat within ± 0.05 dB from 45 to 20,000 Hz and down 0.5 dB at 20 and 50,000 Hz. The RIAA phono equalization was nearly as flat, +0.05 dB, -0.15 dB from 30 to 20,000 Hz and -0.6 dB at 20 Hz. The (unadjusted) phono-input termination measured 50,000 ohms in parallel with 115 pF.

The clipping output of the SM3 was an astounding 28 volts at 1,000 Hz, a higher value than we can recall ever before measuring from a preamplifier. The distortion, again through the tuner input, was between 0.0014 and 0.002 percent for outputs between 1 and 20 volts at 1,000 Hz. At 10,000 Hz distortion varied between 0.0023 and 0.0028 percent. The A-weighted noise level (referred to a 0.5-volt output) was -92 dB for a high-level input, -81.2 dB for phono with LO gain, and -85.5 dB for phono with HI gain. The sensitivity for a 0.5-volt reference output was 41 millivolts (mV) for the tuner input, 111 mV for AUX/CD, 0.63 mV for phono (LO), and 0.082 mV for phono (HI). The phono overload with LO gain was between 136 and 765 mV over the 20- to 20,000-Hz range, and with HI gain it was between 14.5 and 98 mV. The channel separation at

the tuner input was 90 dB at 1,000 Hz and 65 dB at 20,000 Hz, at the phono input 60 dB at 1,000 Hz.

Comments

Measuring the performance of the Perreaux SM3 was almost as difficult and painstaking a task as measuring that of a CD player. Obviously, its designers spared no effort to achieve the greatest possible refinements, and, as often happens with high-end audio products, there is probably a considerable amount of "overkill" in the design. Still, much of it may be justified on the plausible ground that even if each minute improvement cannot be heard by itself, the total effect of many such improvements may make an audible difference.

At any rate, the SM3 is a handsome preamplifier, matching the style of other Perreaux products and presenting a straightforward appearance that should not faze even the least technically minded user. The controls have a smooth, positive action that fairly shouts quality. As far as we could determine, that impression is no illusion.

It is also worth mentioning that the preliminary instruction manual, though without pictures on glossy paper, is more informative and detailed in its explanations than most "finished" manuals I have seen. The meanings of the various specifications and the applicable test conditions are set forth with a clarity that is practically unique in my experience.

But what about its "sound"? Those people who find unique sonic properties in different preamplifiers will have to listen to the SM3 for themselves. It certainly did not add or subtract any significant property to or from any program I could pass through it. I find it hard to imagine how it could be otherwise.

Although the Perreaux SM3 is hardly inexpensive, it does offer commensurate value to someone who wishes merely to select and control the volume of a particular program source and pass it on to the power amplifier without change (such as noise or distortion). That is what an ideal preamplifier should do, and it is what this one does.

Circle 145 on reader service card

FEATURES

- ☐ All discrete transistors ☐ Heavily filtered power supply
- Toroid power transformer High-grade, low-loss capacitors in signal path and 56,400 μF of
- filter capacitors Passive RIAA equalizer
- Power-MOSFET output stage with high output capability
- Gold-plated input/output jacks ☐ Detented volume control
- ☐ Center-detented balance control ☐ Inputs for tuner, auxiliary/CD,
- phono, and tape deck

 Tape-monitoring loop
 Separate inputs for MM and MC
- phono cartridges with adjustable resistance and capacitance, HI/LO gain switch
- ☐ Turn-on and turn-off time delay to prevent audible switching transients

LABORATORY MEASUREMENTS

Frequency response through high-level input (EIA standard load): +0, -0.5 dB from 20 to 50,000 Hz

Voltage output at clipping: 28 volts at 1,000 Hz

Harmonic distortion (THD + noise at 1,000 Hz): 0.0088% at 0.1 volt, 0.0016% at 1 volt, 0.0014% at 20 volts

Sensitivity (for a 0.5-volt output): tuner, 41 mV; aux/CD, 111 mV; phono (LO gain), 0.63 mV; phono (HI gain), 0.082 mV

A-weighted noise (referred to a 0.5-volt output): tuner, -92 dB; phono (LO gain), -81.2 dB; phono (HI gain), -85.5 dB

Input-overload level: phono (LO gain), 136 to 435 mV, depending on frequency; phono (HI gain), 14.5 to 67 mV, depending on frequency

Phono-input impedance: 50,000 ohms and 115 picofarads (adjustable, see text)

RIAA phono-equalization error: +0.05, -0.6 dB from 20 to 20,000 Hz

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with an assortment of elegantly useful features you won't find on any other machine.

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But like many things in this non-digital world we live in, numbers are only part of the story. As with all our Monitor Series components, we've designed the 5300 to deliver the best possible audible performance under real-life circumstances. To do that we combined leading-edge technology and an assortment of "human engineering" features you won't find on any other machine. The process took over three years, and involved a thousand thoughtful, careful and (we think) correct design decisions. A very few examples . . .

- The 5300 uses an accurate three-beam laser pickup and operates with four times oversampling and full 16-bit precision. A ninety-five point digital filtering system suppresses spurious sidebands, resulting in complete freedom from filter coloration.
- Separate transformer windings are used to power the digital and analog sections of the 5300. Every supply is individually controlled, resulting in a total of *eleven* separately regulated power supplies (seven positive, four negative).
- Two ultra high performance 16-bit digital-to-analog converters are used to completely eliminate inter-channel phase error.
- B Color



Name

- Two disc error displays indicate the occurrence of correctable and non-correctable errors on your compact discs. This system allows users to evaluate technically flawed discs.
- A unique processing circuit that controls the dynamic range is included for those times when you want to listen to compact discs as background music. The same circuit reduces the distortion caused by tape saturation when making cassette copies of CDs.
- Many albums that have been re-issued on CD have a harsh, sterile sound. The 5300 has a special circuit that boosts the subdued ambience information in these recordings, thus producing a richer, easier, more three-dimensional sound.
- Most wireless remotes control volume with an electronic system that adds audible noise to the music. The 5300's high-performance remote actually controls a small motor that changes the volume, without adding noise.

In short, what makes the 5300 CD player unique ... is a long story. If you'd like to read it, write for our Monitor Series brochure. Or visit your authorized NAD dealer—and hear the result of a thousand design decisions, correctly made.

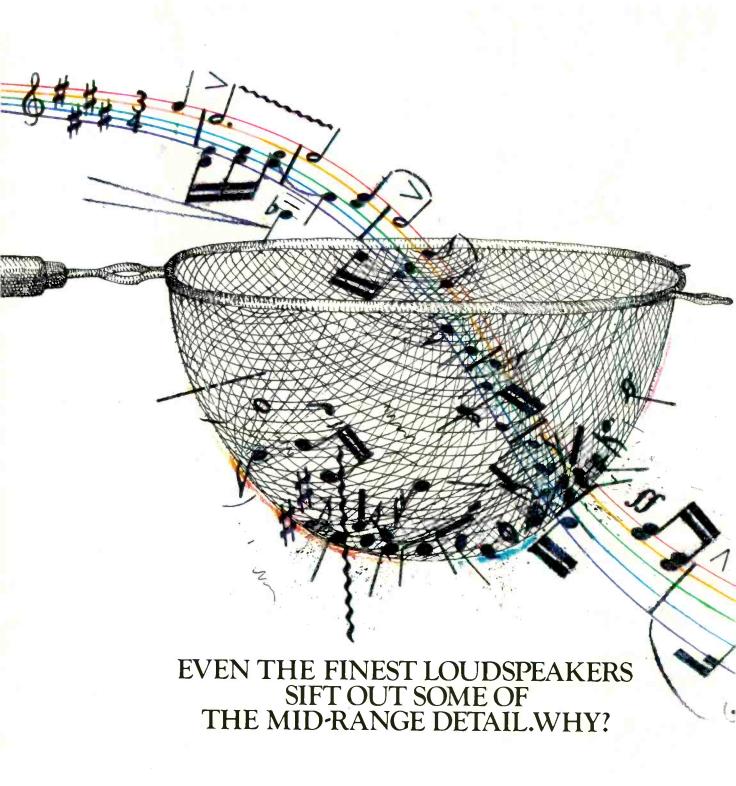
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Polyimide/Titanium Mid-range

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sections are suddenly resolved into many individual instruments rather than a mass of instruments," and they compelled him to add that Altec Lansing's speakers have "high end sweetness and openness... with astounding inner detail."

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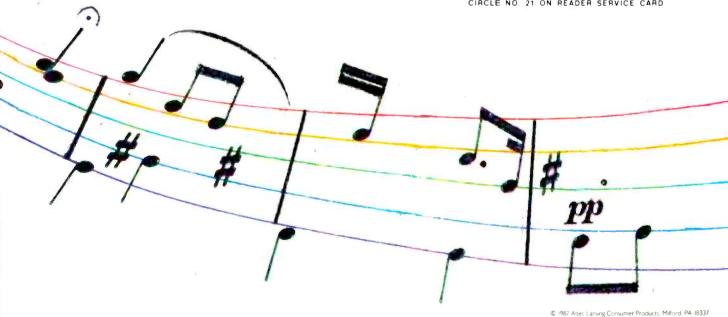
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JAMO COMPACT 120 SPEAKER

Julian Hirsch, Hirsch-Houck Laboratories

AMO'S Compact series of speakers is intended for applications where a large or distinctive-looking loudspeaker might seem intrusive or clash with the room decor. Although the Compact series will probably not appeal to ardent audiophiles (and it was not intended to do so), the speakers give a considerable measure of sound quality for their size and price.

At present, there are four models in the Jamo Compact series, from the subminiature Compact 50 to the bookshelf-size Compact 120. The Compact 120 is a three-way system whose 8-inch woofer operates in a ported enclosure. The first crossover, at 1,200 Hz, is to a 5-inch cone driver, and at 5,000 Hz there is a second crossover to a 1-inch dome tweeter. The tweeter is loaded by a short exponential horn mouth is 3 inches in diameter. The model name derives from the speaker's rated power-handling ability-120 watts into its nominal 4- to 8-ohm impedance. The system's sensitivity is rated as 92 dB soundpressure level (SPL) at 1 meter with a 1-watt input. Its rated frequency range is 38 to 20,000 Hz, with an unspecified variation.

The speaker's wooden cabinet is 161/2 inches high, 101/4 inches wide, and 8¾ inches deep. Each speaker weighs 14 pounds, 5 ounces. The molded-plastic front panel is barely large enough to contain the three drivers. The two cones are protected by fixed perforated-metal grilles, and the tweeter diaphragm is located out of harm's way at the throat of its horn, more than an inch behind the panel. The woofer port is on the rear of the cabinet, which also has fittings to adapt it for wall mounting. The Compact 120 is available in a black or white finish. Price: \$320 a pair. Jamo, Dept. SR, 425 Huehl Rd., Northbrook, IL 60062.

Lab Tests

The room response of the Jamo Compact 120 speakers was generally smooth. Their output level decreased smoothly with frequency, dropping 5 dB between 300 and 10,000 Hz. There were the usual minor irregularities in the averaged response curve from the two speakers, but none of them deviated by more than a couple of decibels from a straight line joining the two end frequencies.

The woofer's response, measured separately at the cone and the port and combined after correction for their relative diameters, peaked at 120 Hz and fell off at 6 dB per octave below and above that frequency. It leveled off at about 400 Hz, splicing smoothly to the room curve. The maximum output in the resulting composite frequency response was at 120 Hz, where it was about 5 dB higher than the level of the adjacent midrange portion of the curve. Overall, the system response varied ±6 dB from 26 to 19,000 Hz.

The minimum system impedance was 6 ohms at 200 Hz, and its maximum of 21 ohms occurred at 1,500 Hz. The impedance averaged between 6 and 8 ohms, and it never reached the 4-ohm minimum of the published rating. The measured sensitivity was 92 dB SPL, as rated.

When we drove the speaker with 2.25 volts (equivalent to a 90-dB SPL in our sensitivity test), the bass distortion measured 1.4 to 1.9 percent from 100 Hz down to 80 Hz and rose smoothly with decreasing frequency to only 4 percent at 40 Hz and 6.2 percent at 30 Hz. These figures were obtained from closemiked measurements at the port, which radiates most of the speaker's output below 100 Hz.

Quasi-anechoic FFT frequency-response measurements showed that the speaker's horizontal coverage was somewhat restricted. Frequency-response curves made on-axis and 45 degrees off-axis diverged above 500 Hz and were 6 to 10 dB apart over most of the audio range on one side of the speaker's axis, but

TEST REPORTS

only between 3,000 and 6,000 Hz on the other side. The tweeter and midrange driver are placed side by side, which virtually insures some cancellation effects in the horizontal plane as well as the observed offaxis asymmetry.

The axial response showed narrow peaks of 5 or 6 dB at approximately 5,000 and 8,000 Hz. At some angles there were deep cancellations, or combinations of holes and peaks, at these frequencies, and most of the time there was a hole at 8,000 Hz. Since these effects occurred only in a few narrow frequency bands and at specific angles, they did not show up in the room response, which measures essentially the total output of the speaker in many directions.

A three-dimensional or "waterfall" plot of the speaker's response, displaying the interrelations of time, frequency, and amplitude, clearly showed four distinct resonances—at approximately 5,000, 8,000, 14,000, and 18,000 Hzwhich "rang" for several milliseconds after being excited. Although none of these resonances were evident in the room-response measurements, and the two highest ones would probably not be excited by most program material or be audible to most people, they were real and, we think, accounted for much of what we heard from the Compact 120 system.

In spite of the resonances, the Compact 120 had generally good group-delay characteristics. Except for narrow deviations at 8,000 and 18,000 Hz, the group delay was constant within 0.4 millisecond from 360 to 22,000 Hz. A separate lowfrequency measurement showed a delay variation of 6 or 7 milliseconds from 100 to 1,000 Hz.

The speaker was able to handle large pulse-power inputs without distortion or damage. At 100 Hz, the woofer emitted a slight rattle at 220 watts into its 9-ohm impedance. At 1,000 Hz the amplifier clipped at 500 watts into 14.5 ohms with no sign of distortion from the midrange driver, and at 10,000 Hz the tweeter absorbed 825 watts (into its 8-ohm impedance) without difficulty before the amplifier clipped.

Comments

The Jamo Compact 120 had a surprisingly good subjective bass response. Initially we placed the speakers against a wall ("bookshelf" mounting), and although we expected a slightly "thin" sound because of their size, the overall balance was good. The speakers were obviously much more sensitive than the others in our listening array at the time. Our early impression was of a rather good, listenable sound that seemed consistent with the size of the speakers.

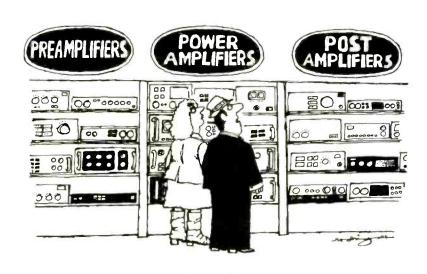
More extended listening revealed

occasional tendency toward hardness, or a somewhat "forward" and strident sound in the treble and upper midrange. Tone controls were not very effective in correcting for this effect. These experiences, before we had made any measurements on the speakers, led us to expect a peaked, or emphasized, treble response. Our measurements, however, showed quite the opposite characteristic

Some of those measurements suggested a possible explanation for this seeming inconsistency. The combination of several resonances-and, perhaps, the skewed polar pattern—appears to give these speakers their distinctive sound character. Also, much of our later listening was done with the speakers on pedestals, several feet from a wall. Although such a placement is usually beneficial (and frequently required) for speakers of this size, it did not improve the sound or imaging qualities of the Compact 120's. In fact, it seemed to emphasize their treble hardness, possibly because the lower frequencies are not augmented in a free-standing installation compared with wall or shelf mounting.

An illustrated Jamo brochure describing the Compact speakers leaves no doubt that they are meant for shelf or wall mounting, although they should probably be at least a couple of inches from the wall for the bass port to function properly. It is also plain from our experience, as well as the manufacturer's literature, that the speakers are not aimed at the typical hi-fi enthusiast but at a much broader market. Their very high sensitivity, small size, and attractive styling should make them a logical choice for improving the sound of TV sets, for example, as well as for less demanding audio applications. While their sound is not the equal of many high-quality speakers, it is unquestionably superior to that of the mass-market 'hi-fi" units sold in department stores. Furthermore, as we verified when listening to CD's having exceptional dynamic range, these speakers can handle very large program peaks without audible compression or distortion.

Circle 146 on reader service card



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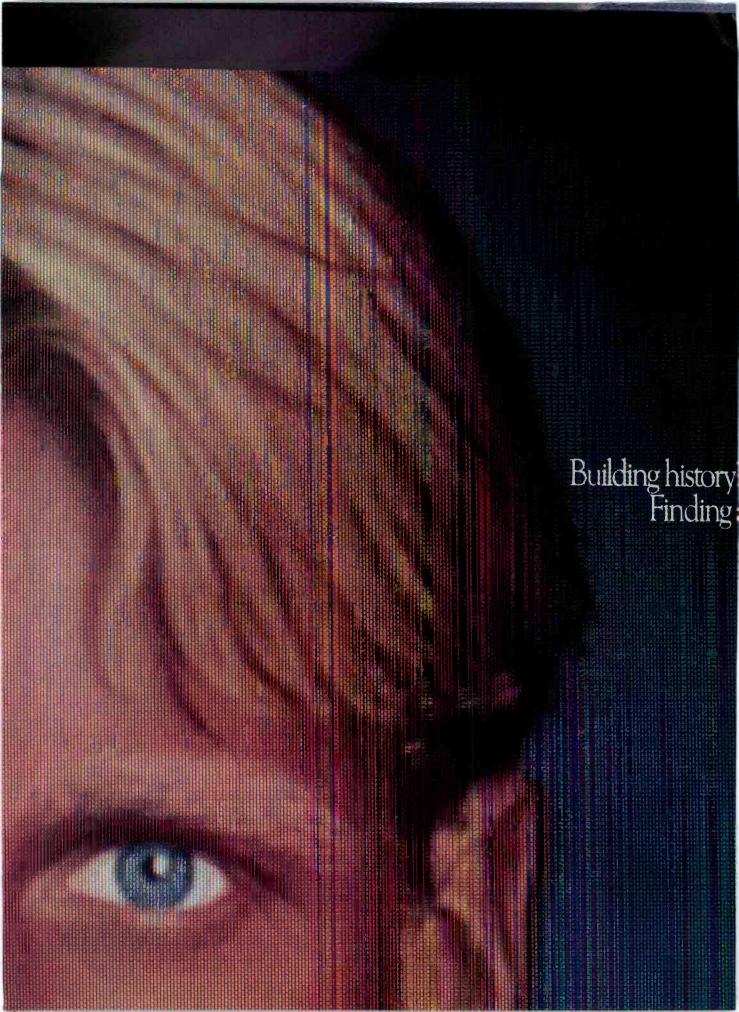


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THE NEW SIPARATIS







NTERING the realm of high-end audio by making the transition from a basic receiver or integrated-amplifier/tuner system to separates can be one of the most satisfying chapters you can add to your hi-fi history. Since integrated systems were first introduced, many audiophiles—and engineers as well—have argued that the more you take out of one box, the better a system will sound. That conviction is reflected in the large number and extraordinary quality of separates available today.

There are many reasons for building a system around separate components. In general, separates present the opportunity to buy an extremely powerful stereo system for a relatively low cost—200-watt amplifiers can be purchased for as little as \$450, full-featured preamplifiers for \$200, and tuners for \$130—leaving more in your budget for a high-end speaker system. Separates allow you to mix and match components from almost any manufacturer so you can cus-

Soundstream Technologies' C-1 audio/v-deo preamplifier (\$1,250) comes with a programmable re-note control that can learn over 350 commands for virtually any component.

tomize your stereo system to satisfy your every audio dream. And, in the end, separates will run longer, cooler, quieter, and with fewer acoustic or electronic irregularities than practically any integrated system.

Ano her nice aspect of owning separates is that in the event some part of the system fails, you only need to get one piece repaired. And usually there is some way of making the rest of system usable while the ailing component is being serviced. With a receiver, if the turier breaks the whole unit—amp, preamp, and tuner—has to go to the shop.

Although the digital amplifier has yet to find its way into the marketplace—an unknown company claimed to have one at the Winter Consumer Electronics Show, but it has since disappeared—some interesting things have been going on in the power-amplifier field. On the pure-clean-unadulterated-power front, Denon has introduced its new 250-watt (into 8 ohms) POA-6600. Designed to take advantage of the remarkable stereo separation provided by digital sources, the POA-6500 is a pure mono amplifier effectively eliminating interchangel crosstalk during amplification.

Yamaha has built some serious technological advances into its MX10000 Limited Centennial Edition



enon's POA-6600 is a mono power amplifier rated for 250 watts continuous rms into 8 ohms from 20 to 20,000 Hz with no more than 0.02 percent THD. Circuit features include Denon's proprietary Dual Super Non NFB circuitry, which has a rated slew rate of ±500 volts per microsecond. To prevent input-cable losses if the amp is located next to the speaker, balanced Cannon XLR connectors are provided. Price: \$700 each.

lass AA design is available from Technics in the SE-A100 power amplifier (left, \$1,600) and SU-A200 control amplifier (\$1,150). The power amp provides up to 170 watts per channel (8 ohms, 20 to 20,000 Hz) and has an oxygen-freecopper bus ground and LC-OFC wiring. The versatile preamp offers twelve gold-plated inputs for full audio/video system control.





he MX-10000 Limited Centennial Edition power amplifier from Yamaha weighs in excess of 94 pounds and costs \$7,000. But for the money and moving strain you get 250 watts per channel into 8 ohms or 1,200 watts per channel of dynamic power into 1 ohm, Class A operation, and a rated S/N of 132 dB.

amplifier. It features a newly de-Hyperbolic Conversion signed Class A operation circuit that provides pure Class A power without switching and without cutoff for all power domains and into all loads from zero to infinity. There's also a new direct error-correction amplifier said to cancel out any nonlinearity in the speaker relays or output coils.

The dbx BX1 amplifier is a highcurrent design that supplies up to 800 watts per channel into 2 ohms and can be configured by the user to drive two, three, or four channels. Its load-invariant frequency-response rating of 20 to 20,000 Hz ±0.05 dB and its noise rating of -123 dB (into 8 ohms, two channels driven, A-weighted) also set it apart from most home amplifiers. Other outstanding power amplifiers are available from a/d/s/, Soundcraftsmen, Hafler, Pioneer, Technics, Kenwood, Onkyo, Perreaux, Nakamichi, and many more.

Total Control

Digital technology has finally entered the world of preamplifiers, with notable introductions from Denon and Sony. Sony's TA-E77ESD has three inputs for direct with connections digital players, digital audio tape (DAT) decks, and PCM processors using 32-, 44.1-, or 48-kHz sampling rates. Its dual 16-bit, quadruple-oversampling digital-to-analog (D/A) converters are said to eliminate phase distortions. Somewhat more conventional but technically intriguing nevertheless, Soundstream's C-1 audio/video preamp is a dual-mono Class A design with a wireless remote that can control more than 350 programmable functions from virtually any component.

The high-end gurus at Audio Research Corporation delighted the audio world with their new SP9 preamplifier, which employs just two vacuum tubes, for lower maintenance costs, and has a down-toearth price of just \$1,695—quite a step from the company's famous (and magnificent) SP11 preamp, which lists for \$4,900. Other strides in preamplifier design are being made by such manufacturers as Bryston, Counterpoint, Luxman, Meridian, and SAE.

A leader in a new breed of quasi-





Voltage Interface Gate-Dynamic Linear Drive circuit highlights Kenwood's 125-watt Basic MID power amp (\$410). The circuit is said to reduce power-supply-induced distortion and to increase the amp's power-supply capacity. The matching Basic C1 preamp retails for \$240.

he a/d/s/ PA4 power amplifier is rated for 150 watts per channel into 8 ohms from 20 to 20,000 Hz with less than 0.02 percent THD, and it is bridgeable for mono use. It is expected to retail for about \$1,000, and so is the matching CC4 preamplifier/tuner shown above it.





dcom has brought a stylish new look to the world of separates by introducing an optional white finish for its products. Shown here are the 100-watt per channel GFA-545 power amplifier (\$525) and the GTP-500 preamplifier/tuner (\$575), which has a wireless remote control and both AC- and DC-coupled outputs.



he Acoustic Research P-10 power amplifier (\$800) boasts massive transient power reserves, with IHF dynamic power ratings of 1,200 watts per channel into 2 ohms, 800 watts into 4 ohms, and 400 watts into 8 ohms. The matching C-06 preamp (\$360) has a rated frequency response of 13 to 50,000 $Hz \pm 3 dB$.



nkyo's highly regarded Integra series of components includes the 165-watt M-504 amplifier (\$800). with dual-mono construction and Linear Switching to prevent crossover notch and switching distortion, and the P-304 preamplifier (\$500), which features a dual recording selector and can handle up to seven inputs.



cIntosh makes the bold claim that because its amplifiers run cool, more than 80 percent of those produced since 1949 are still in service today. The MC 7270 provides up to 270 watts per channel, both channels operating, into 1, 2, 4, or 8 ohms. Price: \$2,295.



oundcraftsmen's Pro-Power Four power amplifier is rated to deliver 205 watts per channel into 8 ohms from 20 to 20,000 Hz with less than 0.05 percent THD. It features MOSFET amplification stages. Price: \$749.



afler's XL-280 power amplifier (\$600) is rated for 145 watts per channel into 8 ohms and features a new Excelinear circuit with twelve output MOSFET's. The Hasler DH-110 preamplifier shown in front retails for \$450.



he signal-processing geniuses at dbx rocked the audio world with the announcement of a full line of high-end components. Shown, from top, are the TX-1 tuner (\$600), the CXI audio/video preamplifier (\$1,500), and the unusual BX1 power amplifier (\$2,500), which can be switched to drive either two, three, or four channels.



ony's TA-E77ESD digital preamplifier offers three digital input terminals, a built-in D/A converter, a digital processing loop, gold-plated contacts, and totally separate audio and video signal paths. Price: \$1,100.

he SP9 Hybrid stereo preamplifier from Audio Research (\$1.695) adapts some of the patented hybrid tube-transistor technology used in the company's famous SP11 model to a simpler, more economical singlechassis unit. The SP9 uses just two 6DJ8 vacuum tubes.



separate, the preamplifier/tuner, is Adcom's GTP-500, which combines a highly flexible control preamplifier with a quartz-synthesis AM/FM tuner. While this goes against the pure-separates approach, it is well worth consideration if you have limited space.

Radio Waves

Harnessing the airwaves is becoming a simpler task thanks to advances in tuner technology. For example, Harman Kardon's new Citation Twenty-Three (see test report on page 25) offers a unique, patented Active Tracking High Selectivity circuit that is claimed to deliver two aspects of FM performance that were previously considered mutually exclusive: high selectivity and high fidelity in both mono and stereo. The Active Tracking system uses a phase-locked-loop (PLL) circuit to drive a high-speed, voltage-controlled oscillator so that it accurately follows the broadcast signal. This careful control of the tracking range is said to make the oscillator virtually immune to strong broadcasts on both alternate and adjacent channels. Superior tuner separates are also available from Accuphase, Carver, NAD, NEC, Revox, Sansui, Sumo, and others,

From this brief look at technological advances in the new separates, along with the other examples shown and described on these pages, it should be clear that these components are intriguing and often very affordable. If you use the same careful procedures that you did when buying your current system-research, listening, and comparative shopping-upgrading to separates can be a breeze.

But the best thing about upgrading to separates is taking home a new piece and installing it in your system. It will make a noticeable difference. Sometimes the change will be strongly audible, and sometimes it will be very subtle. At still other times, you will hear no change at all. Audible changes will not always be for the better-it may be time to re-examine sources, interconnects, hook-up methods, and source material. On the other hand, a positive change will always take place in terms of your system's flexibility and your own pride of ownership. And you can't beat that.

by Peter W. Mitchell

Where you live and how you listen will determine which tuner specs and features are most important for you.

HEN you are setting out to shop for a tuner, the first step-as with any purchase—is to think about how you will use it. Will you listen attentively and critically to broadcasts, trying to get the best sound possible? Or is radio a lowpriority medium for you, less important than discs or tapes? Will you, perhaps, use the tuner only as a source of background music?

Will the tuner have strong, interference-free signals to work with? Or are you in a difficult location for radio signals (in the steel-and-concrete canyons of a large city, or close to an airport, or in a rural valley far from any transmitters)? Will you listen only to major local stations, or will you also seek out low-power college stations and broadcasts from distant towns? Will you use a directional outdoor antenna to boost signal strength and to overcome the disadvantages of your location, or are you limited to using a simple indoor antenna?

If you use radio for background music, if you don't live within reach of one of the handful of FM stations that offer both superlative programming and consistently fine sound, and if you have a rotatable roof antenna or intend to listen only to strong local stations, then selecting a tuner is easy. Tuners that are fed strong and interference-free signals usually exhibit fairly small differences in reception and sound quality, so you may as well choose a tuner that looks good, is easy to use, and fits your budget.

But if your reception conditions are not ideal, or if you are lucky enough to be able to listen to a station whose wide-range signals push the limits of broadcast technology, then the effort of selecting the right tuner can make a big difference in long-term listening pleasure.

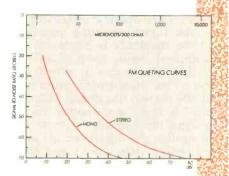
Analog or Digital?

In "analog" tuners, station selection is accomplished mechanically. usually by turning a knob that opens and closes the plates of a variable capacitor, and the tuned frequency is indicated by a pointer on a "slide-rule" dial (named after the obsolete instrument that preceded the pocket calculator). At the opposite extreme of technical sophistication is the "digital" tuner, in which the tuned frequency is synthesized by means of a quartz-crystal oscillator and digital counting circuits, and the frequency is displayed in illuminated digits. Frequencies of favorite stations can be stored in memory for instant pushbutton recall. (By the way, the phrase "digital tuner" is really a misnomer since the signal being tuned, AM or FM, is still analog; the digital circuits are used only to select the tuned frequency. True digital radio is not far away, however.)

Analog tuning is simple and inexpensive, and it allows easy fine-tuning to optimize reception of closely spaced stations. Its principal disad-

ioneer's F-91 tuner (\$550) has two exclusive processing circuits: the Active Real-Time Tracking System and the Direct Digital Decoder Type III. The tracking system's IF filter actively follows the broadcast signal for lower distortion and higher selectivity. and the decoder converts the IF signal to digital form to reduce degradation at later

stages.



FM quieting curves show how noise levels go down as the strength of the input signal increases.



vantage is that a miscalibrated tuning meter or careless tuning by a user may increase distortion.

Digital tuning has become more popular because of its precision, the convenience of pushbutton presets for favorite stations, and its suitability for remote control. The principal drawback of digital tuning is the possibility that noise from the digital circuits may contaminate the audio signal; designers must pay special attention to internal shielding and filtering.

Between these two classes are tuners that may look digital, with a numeric display, but employ non-digital tuning methods. Varactor tuning, for example, is neither mechanical nor digital; changes in a DC voltage alter the capacitance of varactor diodes, thus changing the tuned frequency, and presets can be provided for favorite stations.

Sensitivity

Sensitivity ratings are often expressed in microvolts (millionths of a volt); the lower the number the better. But antennas and lead-in cables can have either of two characteristic impedances, 75 or 300 ohms, and the microvolt (μV) rating will be doubled or halved depending on the impedance used for the measurement. To avoid this confusion, a rating scale is coming into use that expresses signal levels in dBf (decibels relative to 1 femtowatt, or a million-billionth of a watt), independent of impedance. If one tuner is rated at 1.8 μ V with a 300-ohm impedance while a second tuner is rated at $0.9 \mu V$ (impedance unspecified), odds are that the latter reading was obtained with a 75-ohm impedance and both tuners have the same real sensitivity. The dBf rating (10.3 in both cases) would confirm this.

But FM reception is not a simple go/no-go proposition. A tuner's effective sensitivity is expressed not by a single number but by a "quieting" curve: The stronger the signal, the quieter the background hiss. Actually, as the accompanying graph

shows, there are two quieting curves, one for mono and the other for stereo, since a stereo signal must be ten to twenty times stronger to achieve comparable quieting.

How much quieting do you need? That depends on the dynamic range of the music. If you are listening to Top-40 rock that is being played from a cartridge tape and being compressed by the station to a constantly high volume level, 40 dB of quieting may be ample. But if you are listening to a wide-range station playing a CD of the quiet final notes of the Mahler Ninth, you need all the quieting you can get.

The often-quoted IHF sensitivity figure for tuners, usually less than 11.2 dBf (2.0 μ V at 300 ohms), is only for mono and corresponds to a 30-dB level of total harmonic distortion plus noise (THD + N), which corresponds to 3.2 percent distortion with a fully modulated FM signal—a signal you wouldn't enjoy listening to for very long. If you are comparing tuners, the best figure to compare is that for 50-dB quieting in stereo, since it corresponds to a typical real-world listening situation. At 50-dB quieting the tuner's hiss is only 0.3 percent of the sound you hear, and in a good tuner that will be obtained with no more than 37 dBf of signal (39 μ V at 300 ohms). The lower the number, the better.

How strong a signal do you need to obtain the tuner's advertised signal-to-noise ratio (the maximum quieting that the tuner can deliver)? As the FM quieting graph shows, in stereo it takes several hundred microvolts (55 to 60 dBf), which is why the signal-to-noise ratio of a tuner is usually measured at 65 dBf (1,000 µV at 300 ohms). High-performance tuners that achieve S/N figures in the 80-dB range (better than any FM station can broadcast) do so only with thousands of microvolts of input signal.

How Much Signal?

How do these numbers compare with the signals you actually receive



from the stations you listen to? In a nutshell, the signal depends on your location, your antenna's design and height, and on the power that the stations transmit.

The most important factor is distance. FM signal strengths follow an inverse-square law: Move ten times farther away and signal strength drops by a factor of 100. A listener three miles from a transmitter may receive 10,000 microvolts of signal, while a listener 30 miles away must make do with 100 microvolts. The second factor is your antenna. A highly directional outdoor antenna may pull in ten times as much signal as the ribbon-wire dipole that came with your tuner. The higher the antenna is mounted, the better, up to 100 feet or so; a listener on the top floor of a high-rise apartment complex may receive a signal ten times stronger than his neighbor in a one-story house. Finally, while major commercial FM stations typically transmit 50 kilowatts of effective radiated power, many college stations operate with 5 kilowatts.

Taking all these factors together, an outdoor antenna on the roof of a high-rise condo a half-mile from a major station could overload your tuner with a million microvolts of signal. But if your favorite station is 60 miles away, you may be receiving 30 μ V (or only 3 μ V with a poor antenna). In the "normal" suburban situation, using a dipole antenna to receive a major commercial station ten miles away (or a roof antenna to pull in a college station), a signal strength of several hundred microvolts is typical, not far from the 65dBf signal used in the test lab for measuring tuner specifications.

The Multipath Problem

For some FM listeners the main problem is not too little signal but too many versions of the signal. Ideally FM should travel in a straight line from the transmitter to your antenna, but often it bounces off buildings, hills, airplanes, and other objects, presenting your tuner with a clutter instead of a clean signal. In

TV such multipath (multiple-path) reception causes ghost images, but in FM it produces noise, distortion, and impaired stereo imaging.

The best treatment for multipath is a highly directional antenna that can be aimed to enhance the direct signal and reject reflections arriving from other directions; roof-mounting places the antenna above many reflecting objects. Indoors, a rabbitears antenna is better than a limp ribbon-wire dipole because it can be rotated to tune out multipath.

Two specifications indicate how well a tuner may resist multipath interference. The "AM rejection," originally a measure of a tuner's immunity to static (lightning, car ignitions), also tells you how well the tuner ignores the amplitude modulation caused by interfering reflections. A rating of 60 dB is good; 70 dB is excellent. The "capture ratio" indicates the tuner's skill at locking onto one signal and ignoring others (including reflections) at the same frequency. The smaller the number, the better.

Selectivity and Fidelity

"Selectivity" refers to a tuner's ability to pull in a weak station without interference from stronger stations at slightly higher or lower frequencies. You needn't worry about selectivity if you listen only to the major stations in your town. because they are normally spaced at least 0.8 MHz apart. But if you want to pick up a small college station at 90.5, sandwiched between strong stations at 90.1 and 90.9, you need good selectivity. And if you live in central New Jersey and want to listen to signals from both Philadelphia and New York, you may need good selectivity to separate them.

Selectivity is not free, however. Sharp filter circuits not only cost money but also involve compromises in performance. This is because frequency-modulation broadcasting produces "sidebands" at frequencies above and below the station's center frequency. Filters that alter the phase and strength of these

roton's Model 440 digital tuner features Schotz noise-reduction circuits, presets for twelve AM or FM stations, and easy-to-use controls. Specifications include a stereo 50-dB quieting sensitivity of 33.2 dBf and a stereo signal-to-noise ratio of 70 dB. Suggested retail price is \$250.



sidebands will affect capture ratio, distortion, and stereo separation.

A designer can reduce these ef-

A designer can reduce these effects by using more elaborate "linear-phase" filters, but if you really need sharp selectivity the practical answer is to buy a tuner with switchable bandwidth—narrow for when you need to pull in a difficult station, wide to get the best sound from well-separated stations. Some designers go further by adding circuits that switch the filter bandwidth automatically according to the amount of adjacent-station interference present in the signal.

nkyo's Integra

T-4087 tuner

sensitivity, blend-

mode for optimum re-

The Nakamichi ST-7

features Schotz noise reduction, sixteen

presents, and indica-

tors that show signal

strength and multi-

path effects. Price:

\$275.

ception. Price: \$400.

tuner (facing page)

ing, IF bandwidth.

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(this page) auto-

matically switches

Conventional selectivity measurements express the tuner's ability to suppress interference from signals in the "alternate" channel, 0.4 MHz away from the tuned frequency. A rating of 60 dB is good; 80 dB is excellent. A spec may also be given for the "adjacent" channel, 0.2 MHz away; at this close spacing, selectivity figures above 10 dB are unusual except in the narrow-band mode.

Specs for Special Situations

Since the same parts and subassemblies (IC's, ceramic filters, and tuning modules) are available to all tuner manufacturers, the different brands of tuners are much more consistent in performance than they were a generation ago. One result is that many of the numbers in tuner specifications have no relationship to audible performance in normal use. Total harmonic distortion, for example, is adequately low in all modern tuners; if you hear a difference in sound, it isn't likely to be because of the THD spec.

But some of the specs become important in special situations. For example, the "image rejection" figure indicates how well the tuner will keep tower-to-pilot conversations out of your music if you live next to an airport, while the "IF rejection" number indicates the tuner's immunity to interference from other FM tuners operating nearby. The "SCA rejection" indicates a tuner's

THE ANTENNA PROBLEM

The best tuner in the world is only twice as sensitive as an average tuner. A properly aimed roof antenna can make a much larger difference, pulling in a signal ten times as strong as a ribbon-wire dipole. Before you invest in a high-performance tuner, consider spending \$50 to \$100 on a directional high-gain roof antenna, installed as high as you can safely manage.

People who want high-quality FM sound badly enough to invest in a high-priced tuner are usually the first to install a large roof antenna, while low-cost tuners are often used with the simple ribbon-wire antenna that comes in the box. Logically, it ought to be the other way around. With a simple indoor antenna, you may need a high-end tuner's elaborate interference-rejection and dynamic noise-reduction circuits to achieve satisfactory sound, but with a roof antenna that pulls in a strong, clean signal, even a budget tuner may sound splendid.

The options for better FM reception, in order of increasing cost, are:

☐ A basic "rabbit-ears" indoor TV antenna without auxiliary coils or tuning switches. Electrically this is just another dipole (similar to the ribbonwire antenna) with elements made of solid metal, but it is easy to rotate.

☐ A more elaborate rabbit-ears indoor TV antenna with a tuning switch. This type of antenna does *not* have greater sensitivity than the simpler rabbit-ears units, so if your problem is that the signals you want to receive are weak and noisy, this won't help. But in cities and high-rise buildings where signals are strong but are contaminated with reflected "multipath" signals, the tuning switch may reduce the interference.

☐ An electrically tuned indoor antenna, such as the Parsec or Technics Wing. Again, such antennas may not provide an advantage over the simplest type of rabbit-ears unit for pulling in weak signals. But where strong signals are contaminated, the aiming and tuning controls can reject interference and yield cleaner reception.



suppression of interference (buzzes and high-pitched burbling sounds) from the subsidiary signals that stations use for private broadcasts to customers—sending commercial background music to stores, stockmarket data to computers, and paging signals to beepers. Since the rules governing SCA transmissions were liberalized three years ago, this type of interference is becoming more prevalent, increasing the importance of good SCA rejection in the tuner. The higher the number the better.

Some of the features in tuner circuits have become so commonplace that they no longer serve to distinguish one tuner from another. For instance, dual-gate MOSFET's are used in most modern tuners because they operate linearly over a wide range of signal strengths, and most stereo decoders contain a PLL (phase-locked loop) that synchronizes the decoder with the broadcast signal to insure consistently wide stereo separation.

Noise Reduction

An FM stereo broadcast consists of a monophonic "plus" signal (left channel plus right channel, or L+R) and an ultrasonic subcarrier containing an L-R stereo "difference" signal. After decoding, the two signals are combined at equal levels to produce the individual L and R outputs. Most of the background noise in FM stereo is in the L-R portion of the signal, as is much of the distortion caused by multipath reception. Consequently, many tuners have circuits that reduce the level of the noisy L-R signal, giving up stereo separation to suppress the noise. The simplest versions of this idea are just highblend circuits. More elaborate methods, such as the Schotz dynamic noise-reduction circuit, vary the blend to retain a subjectively normal stereo image, while Carver's system employs a time-delay circuit to restore the spatial ambience lost when the L-R signal is suppressed.

An outdoor antenna. A roof-mounted antenna has three fundamental advantages. Its large size pulls in a stronger signal, while its directional pattern provides effective rejection of multipath reflections arriving from other directions. Its location on a roof or tall mast places it above many sources of interference—passing cars and buses, other buildings, etc. Finally, the strength of received FM signals is proportional to the height of the antenna above the ground.

If you already have an outdoor television antenna, you may get good results by using a splitter to extract FM signals from it. However, many Tv antennas are deliberately made weak at FM frequencies in order to minimize potential interference with Channel 6. (Trying to extract FM signals from an apartment building's master antenna usually yields poor results because these systems often have FM "traps.")

The best choice is a directional FMonly antenna, mounted high above ground and separated by at least 2 meters (7 feet) from other antennas, vertically and horizontally. If transmitters of the stations you listen to are located in different directions (more than 60 degrees apart), the antenna should be mounted on a rotor. Excellent FM antennas are made by Jerrold, Finco, Wineguard, and Archer (Radio Shack). For help with purchasing and installation, see a TV antenna specialist.

Connect the antenna with either 75ohm coaxial cable or a 300-ohm shielded lead-in cable to minimize interference and to preserve strong signals during years of weathering. If you install an outdoor antenna yourself, observe these important cautions:

—Do not mount the antenna close to electric power lines. Plan the installation so that the antenna mast cannot fall into contact with power lines, either while you are installing it or later.

—Include a lightning arrester in the installation to protect both yourself and the tuner circuit from potential danger during electrical storms.

-P.W.M.

These noise-reduction techniques are especially useful for apartment dwellers without a roof antenna.

The FMX system is a noisereduction system that promises to extend the reach of FM by making stereo nearly as quiet as mono. It employs a second subcarrier whose L-R signal is compressed at the transmitter and re-expanded to normal in the tuner. Although FMX was announced nearly two years ago, implementation was delayed by the closing of the CBS Technology Center, where the circuit was developed, and by multipath problems in early demonstrations. Coinventor Emil Torick has reportedly solved the multipath noise problem, and FMX-decoding IC's are ready for production. Should you wait and buy an FMX-ready tuner? That will depend on how many stations adopt FMX encoding.

In-Store Testing

Few hi-fi stores are set up to permit accurate comparisons of FM tuner performance. In addition to the usual comparison problems (matching volume levels to insure that one tuner won't sound better just because it is louder, for example), it is difficult to insure that all of the tuners being compared are getting an identical input signal. They must all be fed from the same master antenna, through a matched splitter, using 75-ohm coaxial cable. (If they are connected using 300ohm ribbon wire, each length of ribbon wire acts as an additional antenna, confusing the comparison.)

As a practical matter, in-store comparisons should focus on overall sound quality, features, and ease of use. If you want your new tuner to cope with a special problem—pulling in a weak station or resisting a bad multipath situation—the only effective test is to arrange a trial purchase, take the tuner home, connect it to your antenna, and try it.

And don't neglect "ergonomics"—user friendliness. Are all the displays readable over a broad angle? Do the controls behave logically? Can you tune stations easily using pushbuttons, or would you rather have a round knob? (Several companies make digital tuners with tuning knobs.) Are there enough presets? Do you want remote control? With some careful shopping and a little bit of luck you'll find a tuner that is a pleasure to use as well as to hear.

Patty Loveless

A PROMISING NAME IN COUNTRY MUSIC'S NEW TRADITIONALISM

HEN singer Patty
Loveless left her
adopted North Carolina for Nashville in
1985, she knew it was her last shot
at pursuing a recording career. Two
previous attempts at breaking into
the big time had fallen flat as a Tennessee hoecake. On top of it, her
husband was pressuring her to have
a child.

"I cried my eyes out," says the petite, blond singer. "I told him, 'Please, just give me one more year.' "If she still didn't get a record contract, she'd settle down and either become a housewife or go back to school.

Today, two years later, Loveless is one of the most promising names in country music's "new traditionalism," the wave of musicians returning to the "old-time" country sounds. With her first MCA album, "Patty Loveless"—containing the already proved singles Lonely Days, Lonely Nights, Wicked Ways, and I Did—the thirty-year-old singer proves herself a worthy challenger to Reba McEntire's hold as "the only true country-styled new-generation female vocalist."

Some, in fact, see Loveless as a throwback to the "girl singers" of old, when every popular countrymusic road show featured a female vocalist: Loretta Lynn with the Wilburn Brothers, for example, and Dolly Parton with Porter Wagoner. If so, Loveless received her training first hand.

Like Loretta Lynn, Loveless was a genuine coal miner's daughter. Born Patty Ramey, she spent her early years in the tiny Appalachian community of Belcher Holler, Kentucky, near the town of Pikeville (birthplace of fellow new traditionalist Dwight Yoakam). With eight children in the house and a father who suffered from black-lung and heart disease ("We weren't 'dirt poor,' but before Daddy got blacklung benefits, we lived off of Social Security"), the family moved to Louisville when Patty was ten. She had started singing at the age of four, whenever her mother had company over, but things turned serious when, at eleven, she accompanied her older sister, Dottie, an amateur singer, to Fort Knox, Kentucky, for a USO show.

"When Dottie sang in front of all those Army boys," remembers Loveless, sitting in an office at MCA Records in Nashville, "it just floored me. It was like, 'God, look at what she's doin' to 'em!' That's the first time I knew I really wanted to get up on stage and sing."

The following year, at age twelve, Patty made her professional singing debut ("I got paid five bucks") at a small hall in Louisville. A year later she started writing songs, in part as a retreat from the city kids who made fun of her rural ways.

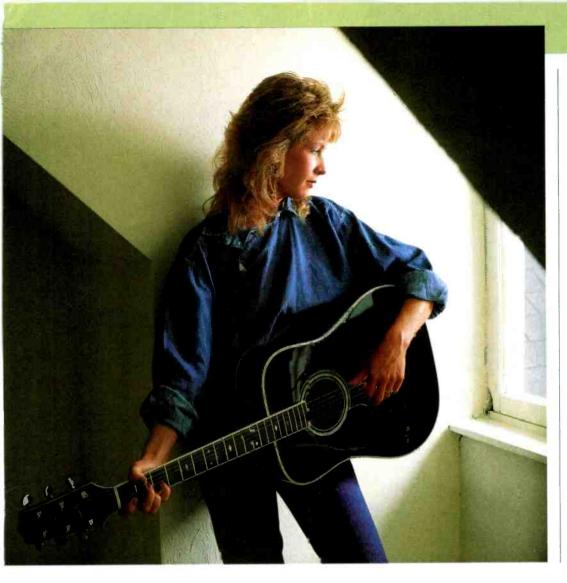
All of that is fairly routine for a young, aspiring performer, but from here on the Loveless story turns unique. In 1971, at the age of fourteen, Patty and her older brother, Roger, with whom she often sang, traveled to Nashville to seek their fortune. Armed with thirty original songs, she walked into Porter Wagoner's office and asked him for help. Impressed with what he heard, Wagoner made a master recording of one of the tunes, Sounds of Loneliness, a song that showed up on Loveless's MCA album sixteen years later. Wagoner also helped Patty and her brother with bookings and introduced them to his "girl singer," Dolly Parton.

"Dolly was just so warm and friendly, and we became really good friends," Loveless says. "We ran around together a lot. She used to say, 'Keep up your writing.' And then when I was back in Louisville and she and Porter would pass through, they'd stop and call my house and say, 'Come over and eat with us.' It was sort of like a dream."

Loveless did keep up her writing—and her singing. In 1974, she and her brother opened a package show for country-music stalwarts Bill Anderson, Jan Howard, and the Wilburn Brothers in Louisville. Patty, who had already written *I Did*, a tune in the classic country vein, was seventeen.

"Loretta [Lynn] had left them to go out on her own," says Loveless, who has since been told that Lynn is a distant cousin, "and I think they were looking for someone to replace her. When I was singing my solo, Doyle [Wilburn] pulled [his brother] Teddy out to hear me. Afterwards, Doyle came up and started talking to me about how long I'd been in music and asked if I was a writer. I told him I was, but that Porter was trying to help me. Doyle asked me to come by his office anyway."

Three weeks later, she drove to Nashville with her songs. When



Doyle Wilburn heard I Did, "he went crazy," Loveless remembers. Like her friend Dolly Parton, she moved to Nashville the day after she graduated from high school. She subsequently signed a publishing contract with the Wilburns' Sure Fire Music ("Porter seemed kind of hurt, even though I wasn't signed to his company"), and she looked forward to appearing on the Wilburns' tours and popular syndicated television show.

The upshot of it all, however, was that after a number of road dates, the singers mutually agreed that Patty was simply too young for the rigors of professional singing. By this time, she had fallen in love with the Wilburns' drummer, Terry Lovelace. (She changed the name, which she says the family always pronounced "Loveless," to avoid confusion with Linda Lovelace, the former pornographic film star.) The two moved to North Carolina, married, formed a band, and hit the club circuit playing rock-and-roll.

They balanced the usual strip joints and dives with occasional dates with Pure Prairie League and Hank Williams, Jr.

Patty Loveless might have remained an obscure club performer had her life not taken a turn for the worse—a severe bout with drugs and alcohol, aggravated by the latenight hours, an over-protective familv, and the death of her father in 1979. "I was taking a lot of uppers and downers, and it was nothing for me to finish a fifth of straight bourbon in a day," she admits. "From about 1978 to 1982, I was just destroying myself. I looked twenty years older than I really was. Finally, I took ahold of myself and said, 'I'm not letting this happen to me.

The final catalyst for change came in 1984, when Loveless got a call asking her to do a club date. "It was for country, not rock-and-roll," she recalls. "It really felt good, and the aud ence went nuts over it-listening and dancing. Next thing I knew,

I called my brother Roger and told him I felt like my life had come back together. I said, 'I feel like it's where I belong."

With her brother acting as her manager, Loveless returned to Nashville in 1985 and made a five-song demo. MCA's vice-president of artists and repertoire, Tony Brown, who coproduced her LP with Gordy, Jr., **Emory** signed the new artist weeks. within and Acuff-Rose produced a publishing contract. But professional gain has also brought personal loss-Loveless and her husband were divorced early this year.

Loveless's debut album has been praised both for its passion and production-traditional instrumentation backed by the heavy beat of rock music-and the easy way she alternates ballads. Texas dancehall music, uptempo shuffles, and, with Some Blue Moons Ago, written by Steve Earle and guitarist Richard Ben-

nett, contemporary country-rock. Her "wild and wounded" delivery of After All, the song of a spurned mistress, has drawn comparisons with Emmylou Harris, and her strong vocal quality invites comparison with Patsy Cline. Loveless has also inherited Cline's gay-male follewing. In one West Coast club, Loveless reports, the clientele sings along en masse when the jukebox plays the torchy I Did, a song of dejected love.

Although Loveless is soft-spoken, with a quiet humility to her manner, she admits to a vaulting ambition. With a qualifier.

"Somebody says, 'You're heading to be a star.' And I say, 'But that's not really what I want to be.' Some people want to put you into a glamorous role. I just want to be known for my music, have people appreciate me for what I'm doing, and know that it makes people feel good inside." Country's newest "girl singer" breaks into a smile. "I get off on that kind of thing."



PUTTING TOGETHER AN AUDIO NETWORK FOR GOOD, CLEAN SOUND THROUGHOUT THE HOUSE

NE rainy March evening several years ago, I inadvertently bought almost a thousand feet of wire. It was attached to a house my wife and I had fallen in love with, and as we were admiring the window casements and asking what we hoped were pertinent questions about the plumbing, the owner casually

mentioned that he had had the whole place wired for audio. We bought the house, of course, and one of my projects was to find out just how it had been wired—there were bits of zipcord protruding from holes in every room, but nothing was labeled. Even the former owner had no idea what was connected to what; a nephew had strung the wires, but since he had failed to provide any indication as to where any of them came from or went, the system had never been used.

Like many households, ours has audio of some sort in several rooms. There's a full-blown system in the living room, complete with CD player, open-reel tape deck, turntables of several varieties, and a range of mostly useless signal processors. The family room houses an audio/video setup, while an old receiver and a pair of speakers in the bedroom serve as a clock radio, thanks to a handy little electronic timer. And occasionally we listen to a boombox on the patio when we want to drive our neighbors crazy.

These are all independent systems, with different functions, and normally we use only one at a time. There are occasions, however, when it is useful to tie all of them together. Some of our parties tend to meander from room to room, inside and outside, for instance, and the idea of having musical consistency has some

ILLUSTRATION BY ANTHONY RUS

appeal (particularly as our house's seventy-five-year-old acoustic isolation is not very efficient—the various systems tend to compete when playing simultaneously). Even when we're alone, the idea of occasionally piping music from a CD or tape in the living room to the patio or the family room is attractive, especially since a network already exists.

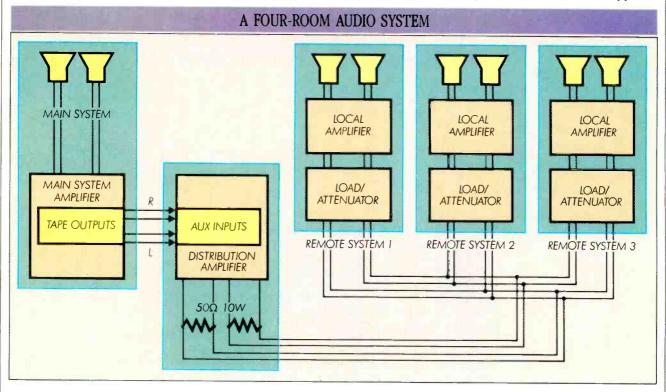
Using What's There

Obviously the original purpose of all that wire was to feed a number of extension speakers from a central amplifier, as 16-gauge lamp cord

other parts of the house were as much as 100 feet; runs of that length require much heavier cable than had been installed.

An even bigger drawback to driving all the speakers from a central amplifier, however, is that such an arrangement offers no opportunity to control the sound at the remote locations. Speakers vary in efficiency and balance, rooms vary in size and acoustic characteristics, and listeners have different preferences, so it is essential to be able to set both level and tone controls in each room, independent of the settings of with a flat, line-level signal fed from the central system, so that it could be selected and adjusted on the spot.

One way to do this would be to replace the existing wiring with balanced, shielded cable that simply took a flat, line-level signal from the main preamplifier (from a tapemonitor output, for instance) and fed it to the other systems. This, however, would involve a fairly heavy investment in high-quality cable and possibly matching transformers, and it would not necessarily guarantee success—the opportu-



had been used throughout the house. That would certainly be the simplest method of distributing the sound, but there are good reasons not to do it that way.

One major danger is that hooking a bunch of speakers together in parallel could result in an overall impedance low enough to damage all but a very few amplifiers. Four 8-ohm speakers, for example, would present a nominal 2-ohm load to the amplifier, and the actual impedance would probably be much lower at some frequencies. Anyway, even if my amplifier were stable enough to handle such a load, the wires I inherited were definitely unsuitable. In some cases, the distances from the main system to the outlets in

the main system. The ability to switch the distributed signal off is useful as well.

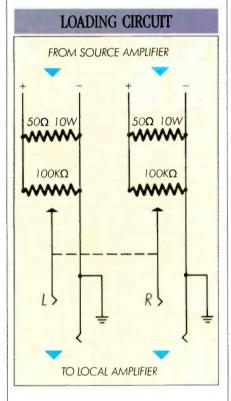
N any event, we would normally continue to use each system independently, feeding music from the living room only on rare occasions. It would be possible in each location to switch the speakers from the local amplifier to the central one, but that seemed to be an inconvenient way to go about it, and it would also result in different total impedances depending on how many pairs of speakers were connected at any one time. The alternative was somehow to present the inputs of each remote amplifier nities for interference, hum, and line losses, particularly at high frequencies, would be very great with so much cable.

At any rate, I was unwilling to rip my walls apart to replace wiring that was already there, so I decided to devise a system in which the lessthan-ideal nature of my built-in cable would not matter, but which would still deliver a clean signal, at an appropriate level, to each remote location. In the process, I thought I might be able to economize by employing some old audio equipment that had been gathering dust for years. As it turned out, the total cost of the system I came up with, excluding the wire and the attached house, was something like \$20.

The Theoretical System

Without really knowing what was hidden behind the walls, I thought it prudent to design a system that should work rather than to proceed by trial and error and risk damaging something if I made a mistake.

I reasoned that two things were required to coax a high-fidelity signal through my zip-cord labyrinth. First, the system's impedance had to be very low to prevent line losses; second, the signal level between the master system and the remote locations had to be high enough to over-



ride any interference or hum (the wires run parallel to power lines in many places, so hum would be a serious possibility), but not so high that it would overload the high-level inputs of the local amplifiers.

The solution was to use a small power amplifier to drive the system, and I pressed an ancient 15-watt receiver into service for this purpose. While that amount of power would not be enough to drive very many speakers satisfactorily, which is why the unit was retired, it would be more than ample for my purpose; even with the output kept to the lower part of its operating range (to avoid clipping), the signal would be many decibels higher than any spurious noise likely to be picked up along the way. To drop the signal to an appropriate level in each remote location would involve no more than inserting a small resistor. Also, because the receiver's output would rarely exceed a watt or two, the system's performance would not be adversely affected by the thinness of the wires connecting the main system to the other rooms. In fact, even smaller-gauge wire could be used without ill effects; if I had been wiring the system from scratch, I probably would have used very thin four-conductor telephone or intercom wire, which could have been tacked along baseboards under the molding and poked through small holes, making it unnecessary to put cables inside the walls.

MPLIFIER output sections are designed to drive loads of very low compared impedance with other circuits in audio-microphones, for instance, will ordinarily

have impedances of 50 to 150 ohms if long cables are to be used, while speakers may present loads of 4 ohms or even less. The receiver in my projected system would not be called upon to drive speakers, of course; instead, at each remote locaheavy-duty load resistors would be substituted, with a high enough total wattage rating to absorb the distribution amplifier's output (10 watts in each room would be adequate, I decided, although higher values would certainly do no harm). My system would reach four areas-I added one when I discovered more wires there—so I chose to use load resistors of 50 ohms each, which would result in a combined resistance of just over 12 ohms, a load high enough to make the amplifier happy but low enough to keep distortion low and frequency response flat. This value is somewhat higher than the 8 ohms the receiver is designed to drive, but the mismatch would be irrelevant in this application. While most audio circuits are quite intolerant of driving impedances that are too low, ones that are too high-"upward mismatches"-simply reduce the efficiency of the circuit. Using an amplifier the way I envisioned, however, would make much more power available than could ever be used, so such inefficiency wouldn't really matter; any losses could be overcome simply by turning the amplifier up a bit.

The combination of the receiver's output stage, the wiring, and the load resistors would be a complete circuit in itself, capable of delivering a high-quality signal to each remote location. The next step would be to connect this "house system" to the individual remote amplifiers; for that purpose, additional resistance would be needed to drop the few watts produced by the central amplifier to a level acceptable to the local system's line inputs.

Connecting a resistor of fairly high value in series with the remote system's input and then conecting that combination in parallel with the resistor loading the house system would have several effects. The overall resistance of the attenuation circuit would be high, which means that the bulk of the signal coming from the central amplifier would still be absorbed by the load resistor (the phrase "path of least resistance" has real meaning in electricity), and so the overall performance of the distribution system would not be disturbed. Also, because only a small amount of current would pass through the attenuator, it could be quite small.

You could perhaps experiment with numerous fixed resistors to find one with the right value, but using a variable resistor (a "volume control") would not only have the advantage of cutting the signal to a manageable level, but would also allow it to be matched to other input levels at each location. Nothing is more irritating than having to adjust an amplifier's level every time a different input is selected. The specific rating of such a control would be fairly arbitrary because it could easily be adjusted to an appropriate value; when experimenting with my system I used 100kilohm wire-wound variable resistors because I had several on hand, and they worked well. Again, the impedance mismatch in this circuit might be fairly gross, but because it would be upward, it wouldn't matter. If the combination were too inefficient, more power from the distribution amplifier would fix it.

Putting It into Practice

Several evenings of tinkering assured me that the system should work in theory, but I had yet to determine where the various wires sticking out of the walls went to, or whether there may have been breaks or—worse—short circuits in them. Because the cables were in the walls, I had little hope of fixing any irregularities I might find.

The first step in turning my theoretical circuit into reality was simply to find all the outlets; the notorious nephew who had installed the wire had been very thorough, even including such places as the kitchen and laundry room as potential listening areas, as well as providing multiple outlets in the major rooms. Then, once I had located all the wires, I untangled them to make sure there were no visible short circuits and stripped those ends that required it. To identify any shorts hidden in the walls, I devised a simple test.

Had one been available, I could have used an ohmmeter for this: A shorted wire would show no resistance, a clear one infinite resistance. An alternative would have been to use a battery and a flashlight bulb: One battery terminal would be wired to the bulb permanently, the other attached to one conductor of the cable under test; if the bulb lit when the other conductor was connected to it, that would indicate a short circuit in the cable.

In the end, I put together a rig that used a portable cassette player and a pair of headphones. I made a short extension for the headphones' cable and cut one of the conductors. By attaching the two severed ends to the two conductors of a wire under test, in an attempt to complete the headphone circuit through the wire in question, I would be able to find any short circuits—I would hear sound if there were a short, silence if not. By testing each cable in this manner, I satisfied myself that there were no shorts.

Next, in a single series of tests, I identified which wire went where and made sure none of them had breaks along the way. One by one, I temporarily shorted each cable at the remote end by twisting its conductors together. When my short-circuit test was repeated, the only cable that passed a signal was the shorted one. Each wire was tested in this fashion until I had marked the destinations of all of them and had determined there were no breaks.

Now I knew which cable in the living room led to which remote location, and I arbitrarily decided which of each pair would carry the left channel and which the right (I marked the right-channel lead in each case with a bit of white tape;

my mnemonic in such cases is "white is right").

Having done that, I set out to make sure the whole system was in phase. Some cables had their polarity identified, and some did not, but even the ones that did might well have contained reversals caused by splices in the walls. At the various remote locations. I arbitrarily chose one conductor of each cable to be "hot" and tied a knot in it (mnemonic: "knot is hot"); then I connected the left and right "hot" conductors together and left the others free. Back at the master system, using my short-circuit detector on the pairs of cables going to each room, I was able to determine which were the "hot" leads in each case-of the four conductors leading to a particular remote location, only the two "hot" ones would now pass a signal if attached to the test rig. Again, these were identified by knots

To this point, the setup would in theory have been capable of sending different signals to each of the remote systems because they were all connected separately to the living room. While this might have some appeal later, either for me or for a future owner of the house, I decided that I would rarely use it, so I simply connected all the leads for each channel together, reducing the cables that would be attached to the distribution amplifier to two.

Setting It Up

With some assurance that my inherited wires did in fact constitute the basis for a workable system, and that my resuscitated receiver would drive it satisfactorily, the time came to see if everything worked.

At each remote location, I installed the load resistors and attenuators, taking care to observe correct polarity throughout. For aesthetic reasons, I mounted these components, plus a pair of phono jacks, in wall plates and connected them to the individual systems with a normal pair of RCA patch cords. Because the high-level inputs of some of the remote amplifiers are designed to short when not in use-a possible disaster when connected to the output of an amplifier—I fed the distributed signal leads to suitably marked tape-monitor inputs.

In the living room, I connected one of the main system's tape-monitor outputs to a high-level input on the distribution amplifier, the tone controls of which were set to their flat position. The volume control was set to its minimum so that the system would in effect be fed silence, and the speaker terminals were connected to the wires leading to the rest of the house. Then I switched the power on. I connected each remote amplifier to the system in turn, with the proper input selected but the level down. Very gradualy, I turned the level up and noted any peculiar noises-hum, crackles, radio interference. Fortunately, even with the attenuators turned all the way up, I heard no disturbing sounds. Finally, with each of the attenuators set at their approximate middle points and levels turned all the way down, it came time to feed a real signal through the system.

Very gingerly, I advanced the level on the distribution amplifier a notch or two, then checked at each remote location to see what was coming through. Somewhat to my surprise, the signal was virtually perfect. All that was necessary to balance the whole system was a bit of juggling of the central amplifier's level control and the local attenuators. I discovered that an almost perfect match both of level and of tonal balance could be achieved by feeding an FM signal through the system and comparing it in each room to the sound of the local tuner, set to the same station.

Two simple final checks completed the setup process. In spite of the care I had taken to identify all the wires in the system, I might still have transposed right and left channels or wired something out of phase. To make sure left was left and right was right, I turned the balance control on the distribution amplifier all the way to the left and checked each remote location to insure that sound was being produced only by the left speaker. For phase, I played a mono signal and switched each remote system to mono; if there had been any phase problems, the signal would have canceled out almost entirely.

It is almost axiomatic that an audio system as complicated as this will initially be riddled with bugs, glitches, and other similarly unpleasant things. To my great relief—and surprise—everything worked perfectly right off the bat, which encourages me now to tackle the house's attic-to-cellar video system . . . oh, did I forget to mention that?



MAJOR MUSICAL STYLES



he Calendar of Classical Composers provides a framework to show how a particular composer fits into the overall scheme of music history. But a creative artist's imagination never fits exactly into any pigeonhole, and the calendar also shows that classical music is not a series

of isolated incidents, but a dynamic continuum that flows onward, always evolving.

To help readers keep their bearings while they look at the calendar, dates are placed at regular intervals along the top. A few outstanding events in history are also singled out

and motets, continued to flour- predecessors. French seeds of ish, music began to reach a the Rococo, planted early by 6 LATE ROMANTIC, wider secular audience, Many Lully, began to flower in the 1875-1950. in the leisured class began to work of Rameau. The piano Introducing elements of dark- ern composers, particularly perform polyphonic vocal became the most important ness into their music, Berlioz Milhaud and Gershwin. Modmusic in the form of madrigals keyboard instrument, and and Chopin were precursors of ern dance has drawn on music or instrumental music on viols, the symphony was further later developments in Romantic as different as that of the conlutes, or harpsichords. The gal- developed. Bach's sons Johann music, which led to the wal- servative Schuman and the liard and other dance forms | Christian and Carl Philipp | loping, sometimes neurotic | "chance" compositions of Cage. were cultivated by such com- Emanuel are quintessential symphonies of Mahler. All posers as William Byrd. Rococo composers. Giovanni Gabrieli wrote the first sonatas. Music publishing 4 CLASSIC, 1750-1850.

2 BAROOUE, 1600-1750. when Vivaldi developed the Mozart. Italian violin sonata and con-

3 ROCOCO, 1700-1800. Composers in the Rococo style, such as Paganini and Liszt were a variety of styles, frequently A major concern at this time an elegant outgrowth of the prominent. Orchestras became allied to dance. Modern nationwas matching the mood of Baroque, stressed lightness and larger, and operas became alists include Bartók, Janáček, music to words. Although clarity and rejected polyphony longer, culminating in the Rodrigo, Ives (and American sacred forms, such as masses and the academic forms of their music dramas of Wagner.

the Baroque Era is the invention of opera in Italy, which heralded principal instrumental genres.

symphony, which were the of opera in Italy, which heralded principal instrumental genres.

symphony, which were the overall instrumental genres.

symphony, which were the operation in the principal instrumental genres. the beginning of monody (and | Order and clarity, much prized decline of polyphony) in vocal during this period, are evident 7 IMPRESSIONISM, music. Emphasis on form and in the music of its greatest 1875-1925. decoration is a strong element geniuses, Haydn and Mozart. The pictorial element that is an Stravinsky, and Virgil Thomof Baroque style. The use of The earliest operas of our easily identifiable aspect of son, who (at least some of the continuo was widespread. The standard repertoire were com- Impressionism can be traced time) have shown Classic era reached its musical peaks posed at this time by Gluck and back to works of Liszt that restraint in the content of their

certo, Handel popularized 5 ROMANTIC, 1800-1900. church music its most beautiful typify the Romantic tempera- Neo-Classicist. expression. The orchestra took | ment. Forms grew both smaller

along the way to serve as landmarks or guideposts.

The width of the labels of the major stylistic periods indicates their approximate duration. Bear in mind, however, that exact dates cannot be assigned to the beginning or end of any artistic style and that most of the periods overlap a bit.

A number before the name of each composer refers to the definitions below, which describe some salient characteristics of the major styles. Several composers have been assigned two numbers because their music does not fit neatly into one category or the other. A few, such as Camille Saint-Saëns, have two numbers because they began working in one style but later moved to another.

virtuoso composer/performers Stravinsky, who has worked in

emotional restraint was aban- 2 NEO-CLASSIC doned in Richard Strauss's 1920-Present. operas Salome and Elektra. A desire for balance and a wish Sonata form determined the Nationalism became a strong to impose order on the chaos of shape of chamber composi- force through the music of life is evident in undercurrents tions, the three-movement con- Dvořák, Smetana, and numer- throughout music history. It can A convenient starting point for certo, and the four-movement ous Russians. Ballet had its be seen in the work of Lully dur-

describe weather and water. music, lighter texture than the Harmonic experimentation and Romantics, and a return to cera taste for the exotic are other tain Classic forms. opera and oratorio in England, Romantic composers were features of this style. It bore its Domenico Scarlatti wrote the principally concerned with the greatest fruit in the music of 100 POST-MODERN harpsichord sonatas that are the emotional content of music and Debussy, who was closely allied foundation of modern piano expressing their own (sometechnique, and Johann Sebastimes ecstatic) feelings. A transitive recycling common in the

tian Bach brought to German tional figure, Beethoven came to an Impressionist, became a visual arts can be seen in the work of contemporary tonal composers like David Del Treon a standard shape, and larger, and Schubert & MODERN, 1900-Present. dici. Op Art and Minimalism in polyphony remained strong in worked in miniature in the Ger- Compositions by the devel- painting have their musical instrumental music. The fugue, French overture, Italian sinfo- in expanded symphonies for serial music are getting a bit composers like Reich and Glass. nia, and concerto grosso were large orchestra. Bel canto opera popular forms, and Bach flourished in the work of "modern," but that style perexcelled in all of them. His Rossini, Bellini, and Donizetti. sists in such recent work as that ics may see unifying traits in the death, along with that of Han- Forms became looser (tone of Boulez. A quite different work of the disparate comdel, marked the end of the era. poems, ballades, fantasies), and modern strain is represented by posers of the present.

neo-Romantics, such as Bar-

ber), and Vaughan Williams and

other English symphonists.

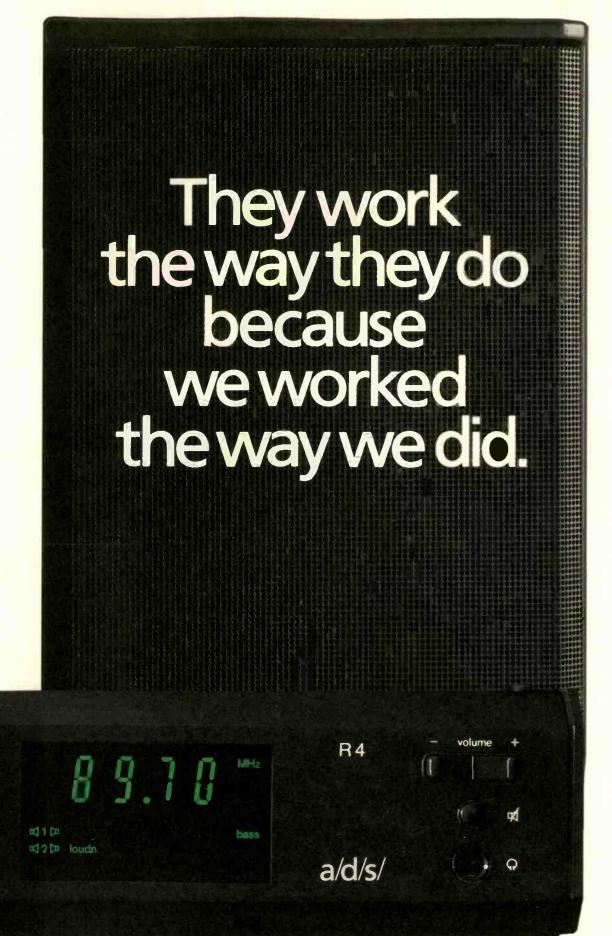
Jazz has influenced many mod-

period. In twentieth-century

music it comes to the surface

in the work of Hindemith.

DESIGNED BY SUE LLEWELLYN .



After four years at the keyboard of a Hewlett-Packard, we were ready for a Steinway.

In 1983, Dr. Godehard Guenther, President of a/d/s/, issued an injunction to our engineers and designers. "Guys," he said, "somebody's got to come up with a new loudspeaker standard. Let's make sure it's us."

Understand: he wasn't suggest ing our existing loudspeakers weren't good. Rather, he was challenging us to address the shortcomings present even in the very best speakers, ours included. Shortcomings made all the more apparent by the sonic demands of the compact disc.

What we sought to build were speakers that didn't sound like a set of drivers stuffed in a box Our goal was to create speakers characterized by a stable sound stage, pinpoint imaging and sound that seemed to emanate from free space.

It was a tall order. But the technology that has resulted—Unison™ ... of one voice—is the kind other speaker makers will be emulating for years to come.





We finally had the tools to be as critical as we were inclined to be.

Our first task was to take a long. hard look at the limitations inherent in loudspeaker drivers. That required a powerful "microscope." And, fortunately, we had onea high-resolution, super-fast computer from Hewlett-Packard supported by a sophisticated mathematical program of our own devise.

Housed in a specially designed a/d/s/ acoustics laboratory, the computer gave us the ability to generate and analyze driver performance data with an accuracy, thoroughness and detail never attainable before.



enclosure materials enable us to make the new CM7 (left) and CM5 extremely compact interior volume. Hov compact? Consider that the CM5 measures a

nison is a trademark of Analog

the voice coil formers in our

In this veritable mountain of information, acoustic truths resided.



The CM7's 4th-order, 24dB/octave crossover network. Complex, sophisticated and expensive to manufacture, it's a major reason why the speaker produces such a stable image.

One fact was obvious: the tradi-

If the drivers aren't flawless, no amount of camouflaging will hide the flaws.

tional materials used to construct woofers, tweeters and midranges —polypropylene, metal, cellulose compounds—were simply inadequate. So we set about to discover new ones ideally suited at the molecular level to the jobs they're required to do.

For the domes of our tweeters, we selected a proprietary copolymer that's exceedingly rigid, vet has superb internal damping and freedom from ringing. For midranges, we adopted stainless

steel. Strong and non-magnetic, it enabled us to produce a motor quick enough to resolve the finest detail, even at the highest volume level. And so our research went. until our drivers were as perfect as the laws of physics allow.

The crossover network. You don't see it. You shouldn't hear it, either.

When most speaker makers design crossover networks, their primary concern is the interaction of the drivers. We were more ambitious. We sought crossovers that optimize the relationship between the drivers and their

The M12 is the instrument on the right.

enclosure, even with the room in which the system is played.

And we had an advantage: the excellence of our drivers allowed us to use ideal crossover points. Using these points, all the fundamental tones of the human voice can be reproduced by a single driver. With the computer, we evaluated countless prototypes of crossovers. A 4th-order network of the Linkwitz-Riley type proved the most appropriate. This type alone yields the response that satisfied our requirements for neutrality and realistic imaging. On a frequency response plot, the crossover points aren't even detectable

How good it ultimately sounds depends on the box you put it in.

That's why we employed a polymer material filled with an



With its stainless steel coil former and copolymer cone, the Unison midrange does something a cone midrange has never done before: span the fundamental range of the human voice—from 200 to 2,000 Hz



Our tweeters' domes are made of yet another proprietary copolymer, giving them the unique ability to provide smooth, detailed, high frequency response at even

extremely high mass compound to produce the rigid, aurally "invisible" enclosures of our Compact Monitor Series. You'll be amazed by the weight of these little beautiesthey're heavy. You'll be floored by the sound.

To our ears, our new speakers the M Series and compact CM Series—offer convincing proof that Unison technology does indeed define a new era in speaker performance. All that remains is for you to take ears of your own to one of the dealers listed on page 193 of this issue.

a/d/s/

CALENDAR OF CLASSICAL COMPOSERS

BY WILLIAM LIVINGSTONE



ne history of Western classical nusic can be compared to a large iver system whose various origins lie hidden in distant misty hills. Modern scholars keep producing performable editions of older and lder compositions, but it is still

impossible to pinpoint an exact time or place and say that here is where classical music begins: It is difficult to draw sharp boundaries between

stylistic periods. During some periods different styles of music exist side by side in the same way that a tributary stream sometimes maintains its separate identity in a larger river long past the point of confluence.

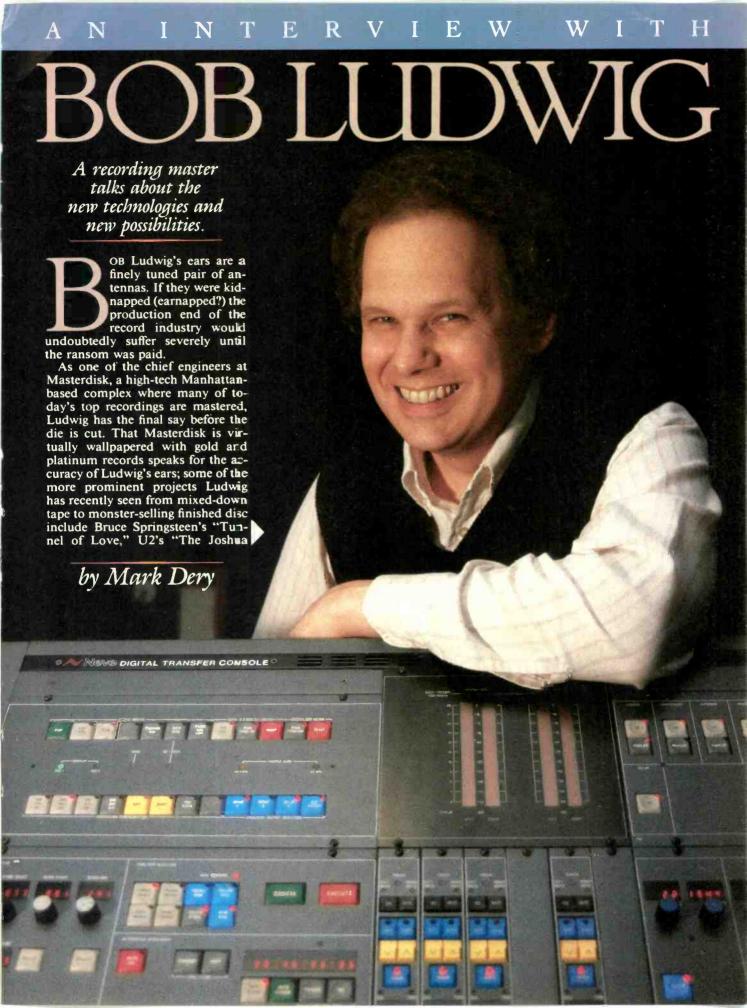
In attempting a graphic representation of musical history I have chosen the year 1500 as an arbitrary

beginning point because earlier Renaissance composers, such as Ockeghem and Josquin des Prez, are of little more than historical interest to most modern record collectors. Similarly, in choosing which composers to include as representatives of important styles, I have been guided by the number of each one's currently available recordings and their distribution in the United States. This means that I have had to leave out such interesting composers as Giordano, Carlos Chávez, and Ellen Taaffe Zwilich Obviously, I have also made some choices on the basis of personal taste.

The composers calendar on the following pages is not encyclopedic in scope. It is simply an overview in chart form, a guide for those who wish to navigate with ease among the currents of classical music.



♦ ILLUSTRATED BY MICHELLE BARNES ♦



Tree," Bryan Adams's "Into the Fire," Phil Collins's "No Jacket Required," and Boston's "Third Stage."

Ludwig was trained at the Eastman School of Music and pursued an engineering career at New York City's A&R Recording and Sterling Sound, a mastering studio he helped found, before winding up at Masterdisk. As he is fond of saying, "Mastering is the final creative step and the first manufacturing step." Consumers remain largely ignorant of the role mastering engineers play, however, despite the profound efffect Ludwig and others like him have on the state of audio art.

Computerized Mastering

The newly developed technology Ludwig is using right now is just beginning to trickle down to the consumer market, and it's opening up all kinds of possibilities. Take, for example, Masterdisk's new Neve DTC-1 digital transfer console, a computerized mastering console that accomplishes the last steps (before pressing) in the first-ever completely digital record-making process.

"This is the first time in the Western Hemisphere [that] there's been a console that has a memory tied to the SMPTE time code," Ludwig told me, running his hand over a sleek, dark, vaguely Darth Vaderish machine like a proud father. "There are only two of them in the whole world right now. The equalizers are brand new; these curves have never existed before. They sound really good-more phase coherent [than analog]. There's a digital limiter and compressor, and the console has 250 snapshot memories. In other words, every time you do a mastering change, you record it as a snapshot of the whole console. It'll memorize fades for you, and things like that. They're recorded on Maxell floppy disks.'

Needless to say, the Neve has turned Ludwig's end of the business upside down. As he put it, "It's a big deal to be able to stay digital the whole way. It's been too bad in the past when we'd have to go into the analog domain to do the equalization and level changes, and then go back to digital. This way, we're able to do all of those changes and stay digital.

"We were just doing an all-digital project yesterday for a new group, and they called back and said, 'Yeah, everything sounds fine, except this one band needs to be up a couple of dB's.' Now, all I do is just take that floppy disk, put it in the computer, recall it, and update +2 dB on it. That has never been possible before. It's a tremendous help."

Audible Improvements

But what are the ramifications of Ludwig's new toy for me and my CD player? Will this new breed of recording really sound that much better than the howling Hendrix CD that's been burning my woofers?

"Yes," Ludwig assured me. "The fact that you're not going through

Tt's a big deal to be able to stay digital the whole way. It's been too bad in the past when we'd have to go into the analog domain to do equalization and level changes."

the digital-to-analog/analog-to-digital conversions means that there will be less noise.

"With a lot of pop music, the artistic use of a compressor is really a good thing. It brings it more to life, makes it more like rock-and-roll. And this compressor in the digital domain is so much quieter than any analog compressor that ever existed, there's really no comparison."

But what about that CD of Bach's Brandenburg Concertos I've grown to love?

"Most well-done classical recordings don't need to have a great deal of equalization or level changes," Ludwig acknowledged, "but a lot of times there'll be rumble. For instance, there's this famous studio in New York where a lot of classical recordings are made, and there's rumble from an elevator that they always have to edit around. Sometimes, their best take happens to

have a little elevator rumble in it. Or the recording's really perfect, but it could really use maybe one more dB of air added to it around 12,000 cycles.

"Now, in the past, the only way to equalize that was to go from the digital tape into the analog domain, do a little filtering, and then go back. Some classical producers have felt that the rumble or the lack of brilliance was more acceptable than going through that conversion stage to get rid of it. So a lot of things that the producers have wanted to correct, they haven't bothered to correct. Now, staying in the digital domain, there's no reason whatsoever not to do that. The DTC-1 has a 12-cycle high-pass filter; you can roll off everything below 20 cycles. We could listen to the tape, starting very low and moving up to a higher crossover point, to determine what the lowest frequency was that eliminated the elevator rumble without hurting the music."

Enter DAT

Besides the Neve DTC-1, there are other technological break-throughs about to turn the audio world on its ear. DAT (digital audio tape) is one of them. Ludwig offers an insider's point of view on everybody's favorite topic of debate.

"I first heard a DAT machine at the Power Station Studio in New York City," he recalled. "Now we have our own—a Sony 1000. It sounds at least as good as a good CD player. The first machines are going to be over a thousand dollars, and they're going to be well designed. The lab tests that have been done have produced excellent quality DAT cassettes with very few errors.

"I'm a DAT advocate on nonarchival things. For instance, right now, if you put out a promotional single on a CD, it's a very expensive proposition. We have the fairly ludicrous situation of cutting an analog promotional disc for something that a radio station could play off a CD player. The CD production is still so backed up that it's a costly thing to make a small run of CD's.

"DAT is the perfect solution to this problem. You could make several hundred copies of a promotional item in not too great a period of time, send it to radio stations, and

Вов LUDWIG

they'd be able to play it in the digital domain. Most promotional items are not going to be played for more than a few weeks anyway.

"But if it's something that's archival. CD is the most reliable datastorage system that we have. It's very, very durable. The question that remains to be answered is how reliable a DAT is going to be over a period of time. I've got this great CD of Rubinstein piano recordings, made in the early Sixties, and if there was a question of buying a DAT cassette or a CD of it, I wouldn't dream of buying a DAT! I couldn't think of a reason in the world why I'd want to buy something that could jam or wear out or be susceptible to problems in the future. And while there'll be fast access times on the DAT—you'll be able to access any part of the tape within ten seconds, or something like that—it's certainly not the instantaneous access you can get with a CD. The CD is more convenient to use, and it's durable."

Admittedly, CD's are-for the moment-longer-lasting and a bit more user-friendly than DAT's. The DAT's selling point is the fact that it opens the door to digital home recording by consumers. This Pandora's box of possibilities has industry watchdogs up in arms.

A proposed solution to the rampant CD piracy they predict is the CBS "Copycode" filter, a doubleended copy-prevention system developed by the CBS Records Technology Center. The elimination of certain frequencies in the original recording, in combination with a complementary detector chip in specially outfitted DAT decks, would make it impossible for any encoded CD's, LP's, or cassettes to be dubbed. The hitch is that the effects of this encoding process are all too audible, according to some experts. Ludwig agrees.

"I, as well as my wife and other people who were with me the day I tested an encoded CD, could definitely hear the notch filter. The system is predicated on everybody being tuned to A=440. Look at this project I did yesterday, where out of ten tunes, five were slightly varisped one way or another [sped up or slowed down] so that they weren't in the A=440 tuning any more. God knows that some of those

notches are going to be smack on the fundamental!

"I appreciate record companies wanting to protect themselves from bootlegging. The companies say they lose 1.5 billion dollars a year. The tape manufacturers say that the actual amount of bootlegging is very, very small.

"I'm in no position to know which one of those sources is right. If it is as bad as the record companies say it is, and by using this copyprevention chip they're suddenly going to be 1.5 billion dollars richer every year, then maybe they'll be able to sign more experimental artists every year! That'd be nice, y'know?"

ost of the major pop music that we do is recorded both ways, on digital and analog tape, and the selection of which to use is an artistic decision."

Appreciating Analog

Although he doesn't mind joining the knock-down-drag-outs DAT and notch-filter encoding, Ludwig has mixed feelings about the old analog-versus-digital chestnut. Sure, he'd be the first to agree that "a well-done CD, played back on a good player, is the most accurate playback that we have today.'

On the other hand, he suggests, art cannot live by accuracy alone. "A lot of pop producers still, for artistic reasons, choose to record in analog form because analog tape is, in effect, a very soft compressor. That is a valid tool to use on some pop music. There's no hard line here. Some stuff definitely sounds better digital, and some stuff definitely sounds better analog.

"I know a lot of producers who highly resent those comments that some record companies put on CD's, implying that because it was done from an analog source it's inferior, which couldn't be further from the truth. Most of the major pop music that we do is recorded both ways, and the selection of which sounds better is an artistic decision. If, for that particular project, the analog sounds better, obviously that's what they should use, if that is closer to the artist's

"To have the CD come out and say that [the original master was] made on analog equipment, and that the resolution on the CD will show up 'inferiorities,' or however they word that, is bad. Certainly the consumer has a right to know; it's just that the consumer ought to know that there's nothing wrong with using an analog tape source for a pop record."

Pressed for a bit of crystal-ball gazing about the future of vinyl, Ludwig hazarded a prediction or two. "Do I see records disappearing within the next fifty years? Yeah, but every time we've predicted when it was going to be, it ends up not being that. I think the advent of DMM [Direct Metal Mastering] has helped stave off the LP's demise. Private Music, which is a New Age music label, began by issuing just CD's, but they found that there are so many people in colleges still buying LP's that they had to start putting them out."

So there is some validity in spinning those LP's from your college days, with their nostalgic skips, pops, and crackles?

"Absolutely!" said Ludwig. "I don't ever foresee getting rid of my turntable. If I listen to an old Robert Johnson or a Blind Willie McTell record, I can't imagine what those guys would sound like on a digital recording! Part of the whole vibe of the record is having to kind of listen through the noise to hear the soulful mutterings, y'know? The Bessie Smith records that CBS put out, where they very carefully de-clicked them all, were wonderful because they still have that sound of the Twenties in them. What [Marshall] McLuhan said, that the medium is the message, is so true. Bessie Smith just wouldn't have the same vibe if you heard her with a 96-dB signalto-noise ratio in modern digital."

Which is just another way of saying that there's still room for a little soul in this digital world, Bessie.



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Direct Digital Output: A Sony first that connects the present to the future.

In 1985, Sony pioneered the concept of processing data through an outboard D/A converter, to avoid the



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The Sony 705ESD CD Player: 4X oversampling digital filter; 16-bit dual D/A converters; deglitcher stage; Unilinear Converter 'master clock'; linear phase filters; Error Prediction Logic; aspheric optical lens; Linear Motor tracking; low-resonance G-Chassis; dual power transformers; Optical Transfer stage; digital output.

normal restrictions imposed by chassis size, signal path integration and heat degradation.

Now, any digital music source can be reproduced with more depth, detail and imaging than ever before.

The TA-E77ESD: The future of digital signal processing.

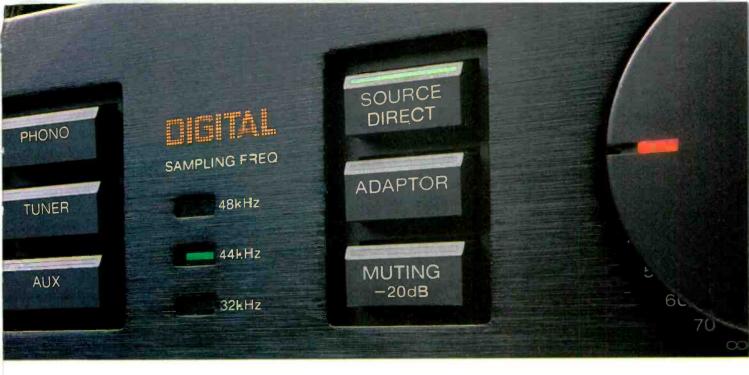
The TA-E77ESD Preamplifier provides three digital inputs for direct

interfacing with both current and future digital components, plus decoding at three different sampling rates. It also has a digital processing loop for high-quality recording.

The 4X oversampling, 16-bit, dual D/A converters are totally shielded in a copper subchassis that prevents spurious noise from



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you the future of digital audio just did.

affecting the analog circuits. Direct coupling of the D/A converter simplifies the signal path and minimizes internal interference.

The TA-E77ESD includes many features that are difficult to find on other preamplifiers at any price. Even a programmable infrared Remote Commander® that controls any brand of audio and video component with infrared operation.

The TA-N77ES: A power amplifier worthy of the Sony ES name.

Even the most advanced components require superior amplifier performance. The TA-N77ES delivers 200 watts of continuous power per channel into 8 ohms and has the operating stability to deliver 660 watts of dynamic power into a 1 ohm load.

A Spontaneous Twin Drive design with separate voltage and current stages helps reduce cross-interference. And the oversized power transformer and high-current non-switching discrete output



The Sony TA-E77ESD Preamplifier: Decodes 32kHz/44.1kHz/48kHz sampling rates; 3 digital inputs; digital output stage; digital processing loop; 4X oversampling digital filter; 16-bit dual D/A converters; copper-shielded subchassis; direct-coupled D/A stage; low-resonance G-Chassis; separate audio/video signal paths; high-resolution (S-video) input/output terminals; REC OUT selector.



The Sony TA-N77ES Amplifier: 200 watts per channel, both channels driven into 8 ohms; 270 watts per channel, into 4 ohms; Spontaneous Twin Drive (STD) design; 520 VA power transformer; non-conductive, low-resonance G-Chassis; high-current, non-switching discrete output stage.

stage provide additional power on demand.

The ES Series: Proof positive that Sony is still the leader in digital audio.

When the ES engineers created the ES Series, they had permanence in mind. These components will please their owners for years to come.

Áll ES components, including our integrated amplifiers, tuners, cassette

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you've seen the components of the future.



THE LEADER IN DIGITAL AUDIO™

SYSTEMS

When the surf's not up, a pair of fully equipped audio/video systems help an advertising executive enjoy his Malibu beach house.

by William Burton

HE Malibu home of Jack Roth is right on the beach, but when the endless summer ends, he can relax with either the audio/video system in his game room, shown on these two pages, or another one in the bedroom (next two pages). Roth is the founder and chief executive of AdMarketing, one of California's largest ad agencies, and the systems he designed reflect his media interests.

As shown in the closeup below, the game-room system includes a Bryston 1B preamplifier, a Tandberg 3011A FM tuner, a Sony VTX1000R TV tuner, a Nakamichi 670ZX cassette deck, a Sony CDP-101 compact disc player, and a Scientific Atlanta cable box. A Bang & Olufsen Beogram 8000-2 turntable with a B&O MMCL-20 cartridge slides out from underneath the Sony KX2501A video monitor at right. Other video sources are a Pioneer LD-700 videodisc player and a Sony SL27-10 Beta Hi-Fi VCR.

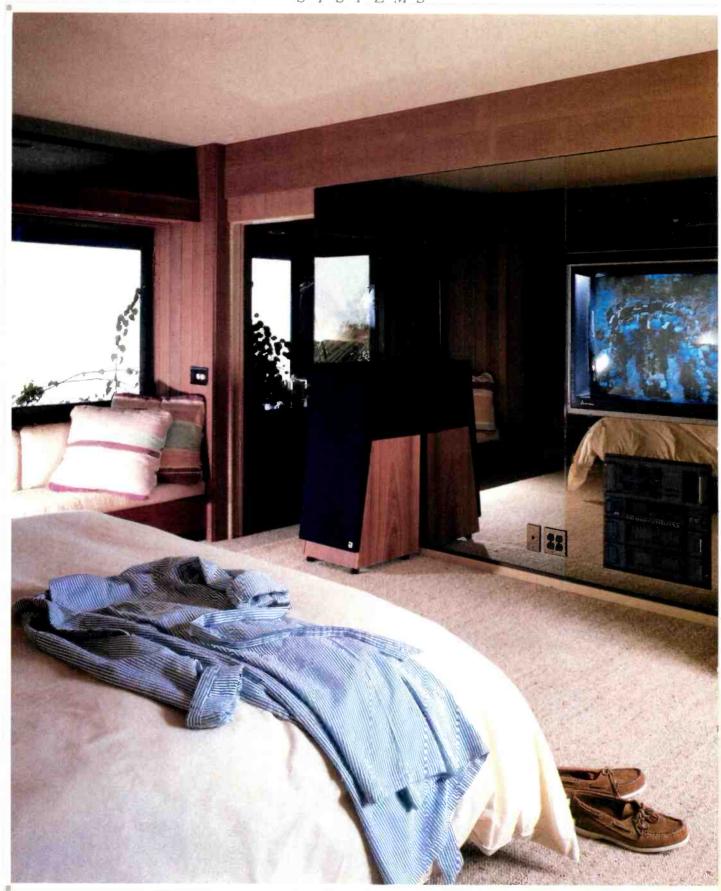
What appear to be two folding screens in the large photo of the game room are actually Magnepan Tympani speakers. Each has two bass panels and a bipolar ribbon





DITOS BY RUSSFILL ABRAHAM







The bedroom has a view of the Pacific Ocean on one side, a wall of mirrors reflecting it on the other, and a window on the world through a 35-inch Mitsubishi TV set flanked by KEF speakers.

tweeter panel, and they are driven by a concealed Mark Levinson ML-3 power amplifier.

Mr. Roth's bedroom has a view of the Pacific Ocean on the left and a 35-foot mirrored wall on the right that reflects the beach. Another mirrored wall at the foot of the bed provides a window on the world through the 35-inch direct-view screen of a Mitsubishi CK3501R television set in a custom-made teak cabinet below the Scientific Atlanta cable box.

The speakers are KEF 105.2's, driven by two Carver M-500t power amplifiers in the rack beneath the TV set (see closeup below right). The lower rack also holds two other Carver components, the Model 4000t Surround-Sound Control Console and the TX-11a AM/FM tuner.

The upper rack contains an Aphex ESP-7000 Enhanced Separation Processor, a Nakamichi CR-7A cassette deck, a Pioneer CLD-909 CD/LaserDisc player, and a Mitsubishi 430UR VHS Hi-Fi VCR. A GE Control Central universal remote control is programmed to operate these components and the TV set.

The rear panels of the components in the cabinet are accessible from an adjoining closet, which also stores several thousand LP's, CD's, and tapes. In the game-room system, recordings are stored in cabinets mounted flush with the walls. In both systems cables run under the floor from the power amplifiers to the speakers.

When it's too cold for surfing, it's nice to snuggle up and watch a good movie on videotape, videodisc, or cable, or listen to great music on compact disc, cassette, LP, or radio. This beach house is set up to give its lucky inhabitants views of other worlds—from alien planets to Mozart's Vienna—as well as the ocean view.





OPEN-REEL RECORDING

WO decades ago there were no cassette decks, and audiophiles would have dismissed the very idea of digital recording as delirium. An openreel tape deck-rather, a "professional" open-reel deck-was the hallmark of the truly advanced audiophile system.

Many of today's audiophiles have never used an open-reel deck and would not even recognize many of the names familiar to those who lived through hi-fi's recording adolescence: Berlant, Presto, Bogen, Viking, Webcor, Pentron, Ferrograph, Magnecord, and others. Year by year the list of manufacturers of open-reel audiophile decks has grown a bit shorter: Crown, whose

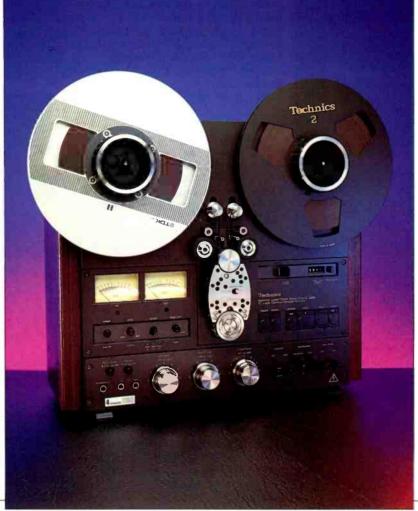
822CX is still a jewel in my system, dropped out a few years back, as did Akai and Pioneer. And only recently Tandberg ceased production of its grand old TD-20A SE.

There are still open-reel decks being made, however. Studer-Revox is still with us, and Teac continues to manufacture open-reel machines, as does Technics, with its smooth "isoloop" drive system. From the professional side, selling mostly to small studios yet still affordable by many audiophiles, Tascam, Uher, Soundcraft, Sony, and Otari remain, joined by an outstanding new entry from Fostex with excellent editing facilities.

These machines are more than substance for mid-life nostalgia. They show that a purpose remains-and will continue to remain-for the open-reel format. But understanding why so many open-reel decks are gone will perhaps give perspective to why others survive.

Professional open-reel machines became a reality shortly after World War II, when John Mullin (later of Ampex) reassembled two pirated German Magnetophon recorders. (Sir Thomas Beecham had recorded on such a machine in 1936.) The 3M company was persuaded to make a suitable tape for the format, and Bing Crosby "made" the medium when he put his nationally syndicated radio program on tape in 1948.

One of the most feature-packed open-reel machines left on the market, the \$1,800 Technics RS-1506US features an isolatedloop, three-motor, direct-drive transport system; four heads; quartz phase-locked servo control; pitch control; and full-IC logic control for electronic braking, quick-play, and transport functions. Other professional features include three speeds (15, 71/2, and 33/4 ips), a realtime tape counter, and special editing functions such as cue control, a reversing roller, and "mix" recording so you can combine microphone and line inputs. At 15 ips, the rated frequency response is 30 to $30,000 \; Hz \; \pm 3 \; dB.$



PHOTOS BY JOOK LEUNG

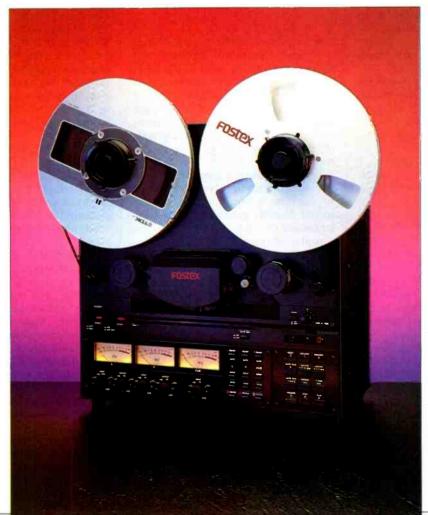
There's life in the old format yet. by Craig Stark

But studio recorders, then as now. were too costly for all but a few of the many passionate music lovers who brought about the hi-fi revolution of the Fifties and Sixties. With few exceptions, the "home" or, sometimes, the "semi-professional" open-reel machines generally available were pale copies of the professional product.

The convenience of the new cassette format and the genuine difficulty many people experienced in threading and handling open-reel tapes on big, bulky machines were obviously important factors in the decline of open-reel home recording. If cassettes could offer very nearly equivalent sound quality, most people would obviously prefer them. Achieving that near-equivalent quality, however, has been a Herculean task.

The advantages of open-reel decks are definitely audible. The width of a recorded track on a cassette deck is 0.021 inch; a quartertrack open-reel machine uses a 0.041-inch track, and a half-track open-reel deck has a track width of 0.082. For each doubling of width, the net gain in signal-to-noise ratio (S/N) is 3 dB. The effect of higher speeds is also important. From 17/8 inches per second (ips), the cassette speed, to open-reel's 334 ips is a theoretical 3-dB difference in S/N, and the higher open-reel speeds of 71/2 and 15 ips theoretically afford 6and 9-dB improvements.

I say "theoretical" in these cases because another factor, equalization, must be considered. As tape speed is lowered it becomes much more difficult to record and reproduce the upper end of the audio spectrum successfully. If a frequency response up to 20,000 Hz (or even near that) is required at tape speeds below 71/2 ips, large amounts of treble boost must be used, directly in recording and indirectly in playback. But a treble boost during recording can easily cause high-frequency tape saturation, and during playback it can increase hiss. So the original advantage of open-reel tape widths and speeds was even greater than the theoretical minimum of 3 dB for each doubling.



The Fostex E-2 (\$3,000) exemplifies the kind of open-reel deck for which there is a continuing need. A 15- or 71/2-ips, half-track stereo deck with a frequency response extending to 26,000 Hz at 15 ips, it features pitch control, three-channel professional VU meters, and a rated signal-to-noise ratio of 70 dB. The E-2 also includes facilities for synchronizing two separately recorded tracks.

It was one man, Etsuro Nakamichi, and one machine, the Nakamichi 1000 (it took its model number from its price) that, in 1973, forced even the most skeptical and uncompromising audiophile recordist of the day to admit that a cassette deck could truly be a high-fidelity component. Once this had been proved, the floodgates of competition soon opened and others could come in with their own advances, which are so familiar to us today.

The Place for Open-Reel

Nevertheless, there still is, and will continue to be, a place for the open-reel audiophile recorder. The most obvious such place would seem to be as replacements for aging open-reel decks so the owners can continue to play old but treasured tapes. For most people in this situation, however, I think buying a new open-reel deck would be a mistake. A good cassette dub of most old open-reel tapes will not only be easier to handle but will almost always add no significant degradation to the original. Bear in mind that few old homemade tapes are sonically close to what we would call "high fidelity" today.

I would make an exception to this general rule for tapes of live music recorded with great care on topquality equipment, tapes that sounded considerably better when they were new than most commercial LP's—and probably still do. I have a large number of such halftrack stereo "master" tapes, and not even my superb Nakamichi ZX-9 reference deck with metal cassettes can make indistinguishable dubs of them. The copies certainly sound wonderful, but they are audibly copies.

Open-reel is the natural medium for live recording, in part because in live performances the tape is hit with the untamed edges-the mo-"onset transients"-of notes. The first few milliseconds of a sound require many times more amplifier power to be reproduced than the steady portion of the note does, as advocates of "superpower" amplifiers have long contended. These first few milliseconds generate the overtone structure that lets you distinguish between a flute and a cornet, for example.

Since frequency and time are reciprocally related, short-term acous-



A perennial home and studio favorite, the Revox B77 MKII (\$2,450) can be configured with any two consecutive running speeds between 0.938 and 15 ips. The deck's rated frequency response at 15 ips is 30 to 22,000 Hz +2, -3 dB.

tical events—like the onset sound of a piano hammer striking the string-are made up of high frequencies, though they may not be perceived as such. And it is in the ability to capture high-amplitude high frequencies that the limitations of the cassette, and the corresponding advantages of open-reel, are most obvious.

Live recording, unless it is done in a studio, also involves an attempt to capture a combination of the sound directly generated by the instrument(s) and the reverberant sound contributed by the hall. Invariably, this requires placing microphones farther from the performers than is customary in studio recording, which, in turn, requires some sacrifice in the signal-to-noise ratio obtainable on the master tape. Open-reel tapes can stand this often significant loss better than cassettes

The Art of Editing

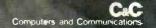
The greatest advantage of openreel recording, however, is the format's editing capability. flubbed note that may cause only a momentary wince during the live performance takes on much greater significance on a tape played many times. But the musician(s) in a recording session can lay down several takes of a section, and if you're using an open-reel machine, you can splice together the error-free parts, coming up with a single flawless recorded "performance."

Good tape editing, of course, is an art, but what it demands mechanically is the ability to rock the tape back and forth across the playback head to find the exact locations of recorded segments to be marked and replaced. This procedure is simply impractical with a cassette deck. where the best you can do is to rerecord whole sections of music or separate selections with gaps between them large enough to be found easily on the cassette. And every generation of rerecording lowers the sound quality.

The future of open-reel audiophile recording is principally dependent on those for whom tape and live sound are directly connected. This includes more than recording the local organist's recitals or editing together an audibly flawless garage-band performance from a series of takes. It also includes such things as putting together sound effects for a stage production. If thunderclaps must be synchronized with on-stage dialogue, you have to be able to put together timed sections of tape, separated by leaders for visibility, and to cue up and play sequences with an accuracy that you would never be able to achieve using cassettes.

Editing, live recording, and theater work are not, of course, appealing to more than a small minority of audiophiles-though these people tend to be fanatical about quality standards. Can open-reel, then, withstand the upcoming challenge of digital audio tape (DAT), which promises genuine CD quality on a cartridge that will hold 2 hours of music in less than half the space of a standard audio cassette? For straightforward recording purposes, where no editing (or only editing on the scale available with cassettes) is required, DAT will unquestionably render open-reel obsolete. But until digital editing devices become economical enough for nonprofessional users, my guess is that the open-reel format will continue to survive to serve those who don't just dub, but who themselves contribute to the success of a musical performance or recording.





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CERTAIN THINGS IN LIFE SIMPLY CANNOT BE COMPROMISED,

ON pop radio today, where the songs are often nearly interchangeable, the music of an artist with an off-center approach stands out. But Suzanne Vega never set out to be a big star with heavy airplay. "Having a hit wasn't something I was aiming for all my life." she told me when I interviewed her last summer during a world tour following the release of her second A&M album, "Solitude Standing."

Vega's tour, ending next month, will take her to Japam, Australia, New Zealand, and parts of Europe as well as the U.S. and Canada. Meanwhile, the hit single from "Solitude," Luka, rides high on the charts and is often featured in broadcast music blocks along with Left of Center, which

BY ELIZABETH COSTELLO

she contributed to the soundtrack of last year's popular movie Pretty in Pink, and Marlene on the Wall, a hit from her 1985 debut album, "Su-

zanne Vega."

Critic Steve Simels hailed Vega's "spectacular debut" in these pages, calling her "a younger, cooler Joni Mitchell for the Eighties," and she received a STEREO REVIEW Record of the Year Award a few months later. With two internationally successful albums on a major label, four videos on MTV, and a couple of hit singles, the twenty-eight-yearold Vega has come a long way from being "the freshest and clearest new voice on the New York folk music scene," as the New York Times described her in 1984. She seems a little taken aback by her success-"It's surprising when I'm recognized in airports," she said.

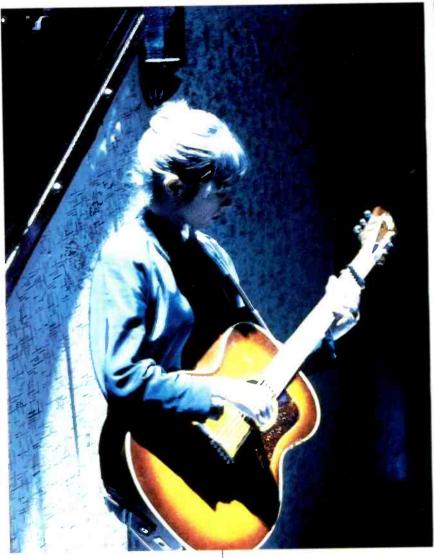
EGA recalls that her career took off very casually. The turning point came in 1983 when she met Ron Fierstein and Steve Addabbo, who became her managers and advised her to get a record deal. "At that point I was thinking more like Rounder or Flying Fish," she said. But Fierstein and Addabbo went after the major labels anyway.

"Steve took a tape and worked it around, and I think he had the impression that there were some people who were interested, but they were afraid of it because it was a folk album. Then I started to get some good reviews, and we ended up with A&M. I thought, well, if we

can go for it, why not?"

Vega said she did not see herself as fitting the mold of pop stardom. "I wasn't someone like Madonna, who calculatedly went after being a big star. She's cheerful, she's bright, she's energetic, she shows a lot of skin in her videos. I felt like I was doing the exact opposite thing." She did admit, however, that doing Left of Center for Pretty in Pink was something of a calculated move toward commercial success. "And it went nowhere on the charts," she said. "I figured, 'Well, I've done my one pop tune, now I'll go back to doing what I like."

She doesn't expect pressure from her managers or A&M to keep putting out Top 10 hits. "I get very stubborn under pressure like that, and my record company was not



really expecting Top 10 hits from me. They turned me down twice before they signed me. They knew what they were getting. And A&M has a reputation for really sticking by people, like Joan Armatrading, who has had twelve or thirteen albums without a Top 10 hit."

Having a Top 10 record like Luka can even be a nuisance, Vega said. "It's meant that I've spent more time promoting and talking about what I do and I spend less time doing it."

Despite all that has already happened in her career and all the public exposure, Vega doesn't think she has changed very much. "I feel there's a part of me that's extremely private no matter how many interviews I do. I don't feel like I've given myself away or that I'm overexposed." And, since she rarely writes about herself, her songs don't reveal that private side. She does consider "I wasn't someone like Madonna, who went after being a big star. She's cheerful, she's bright, she shows a Int of skin in her videos. I felt I was doing the exact opposite thing."

them personal, however. "I think I write about subjects that mean a lot to people," she said.

Vega's lyrics are very contemporary, often about the darker side of everyday life. They are shadowy, solitary, and image provoking, which may be why Philip Glass chose her to provide lyrics for two tracks on "Songs of Liquid Days."

Reviewing "Solitude Standing" here in August's "Best Recordings of the Month," Mark Peel described Vega's lyrics as "real poetry, not just street poetry or pop-music poetry.' Cracking, from her first album, is about a woman walking in a park in the dead of winter who is emotionally falling apart as the ice cracks under her feet. In Ironbound/Fancy Poultry from "Solitude Standing," she describes a Portuguese woman on her way to a poultry market who is passing a school yard: "Kids will grow like weeds on a fence/She says they look for the light/They try to make sense/They come up through the cracks/Like grass on the tracks. . . .

Her songs seem to work in the same way she does, Vega said. "Even with myself it's hard to tell what I'm feeling sometimes. It's more like I have to deduce it. For example, if I'm hungry I think to myself, 'Oh, my stomach is growling, I'm feeling sort of lightheaded, therefore I must be hungry.' It's not like, 'Give me that hamburger.' It's an assessment of facts."

Ithough Vega has taken vocal lessons, her voice has a direct, untrained quality. "I've always disliked a lot of vibrato," she said, "so I've always kept it out of my voice. And the people whose voices I really love tend to be clear and straight, like Astrud Gilberto, Lou Reed, or Lotte Lenya. All of those have pure voices that sort of just spring out of their mouths—almost like speaking voices.'

A straightforward singing style makes the characters in her songs more believable, she feels. In Luka, for instance, the protagonist is an abused boy. "I can sing Luka convincingly," she said, "because I don't sound like a twenty-eight-year-old woman. I sound like something else, something pure."

Vega puts great emphasis on making her music work with her lyrics

to shape the mood of her songs and give them emotional weight. Meaning is important to her. The music in Luka comes across as very spirited, almost triumphant. "I really did not want it to be about a boy sitting on the stoop feeling sorry for himself," Vega said. "What I tried to do was take a tone that was matter of fact. So I used major chords, and when I had the band play it, I didn't want them to sort of wimp out. I wanted them to play really hard."

The music behind Luka and a lot of the other songs in her second album is more rock oriented than most of her first album, in which an acoustic guitar served as the musical base and studio musicians played back-up. Vega now works with her own full-time band, and its members helped write some of the music in "Solitude Standing." Steve Addabbo said that although the focus is still on Vega, the arrangements rely on the band a little more, and as a result the songs in the second album have a "stronger feel to them" than the ones in the first.

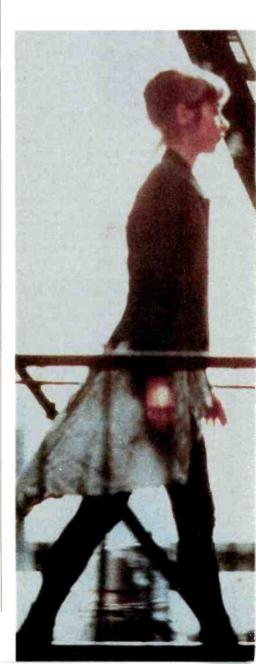
Vega said that her songwriting has changed as well. "I think it is becoming more streamlined, more abstract, and more condensed. And I think it's becoming more melodic. I'm more likely to change a melody now, whereas before I would just take whatever came out naturally."

Working with a band, Vega said, relieves some of the pressure she previously felt trying to do everything. "Instead of covering the rhythm and the bass and everything myself, I can just say, 'Look, I'm having trouble with this bridge. Why don't you guys just fool around with it and see what you can come up with?' But I'm still the editor of the piece. I still have to decide whether I like it or whether it says what I want it to say."

After Vega finishes up her tour in December, she plans to start working on a third album. "I'd like to keep mixing elements and mixing different styles. To begin the last album a cappella with Tom's Diner was a lot of fun for me, and I'd like to keep on that kind of a trend."

However she mixes elements and styles on her next album, though, we can be pretty sure it will say what Suzanne Vega wants it to say. "If they want to play me on the radio, I'll be happy for that," she said. "But I'm not going to change my style to suit the format."

"Instead of covering everything myself, I can just say to the band, 'Why don't you gays see what you can come up with?'
But I still decide whether it says what I want it to say."





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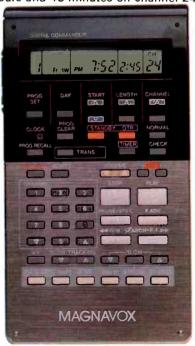
It's much more than just the finest VCR I've ever used. With its TV and video digital effects, you'll use it all the time.

Even its regular VCR features are mind boggling. For example, it tunes in up to 155 stereo cable or antenna channels without programming or presetting them.

Just touch 'Auto Find' and this VCR will automatically find and memorize all active channels on all bands, instantly. And, its digital fine tuning will give new meaning to the concept of fine tuning.

Programming is another normal feature for VCRs. But you won't have to fuss with complicated controls at the deck for recording up to 8 events over 3 weeks.

Look at the LCD window on the remote and you'll see I've selected program 1 for Friday at 7:52pm to record for 2 hours and 45 minutes on channel 24.



Just sit down with your TV guide. When you've entered everything you want to record, just touch transmit and DIGITAL MAGIC

The frequency synthesized tuning really captures superb reception. The 4 head HQ deck uses digital tracking to digitally match this deck to the recorded tape.

It even matches the HiFi track so you'll always experience the incredible 20-20,000hz frequency response and 80db plus, signal to noise ratio of VHS HiFi.

But, it's the awesome remote control and the digital capabilities which this deck gives you that make it thrilling to use.

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Stop the action digitally on tape or on live TV. You'll see still frame clarity and stability that's awesome. When you're watching a live ball game, just touch TV still, and you can freeze a baseball as it crosses the plate.

Then you can add picture in picture which lets you watch the continuing action while you study the still picture.



When you're playing back a tape, you can also press Still and get the same digital still frame. Plus you can add incredible digital fine slow motion.

You'll have infinite control of the speed of the slow motion playback. There's even slow motion tracking on the remote for totally noise free action.

Of course, there's picture in picture so you can monitor TV while you watch a tape, and a button shifts the small window with the full screen.

TV WONDER

Imagine that you're watching channel 2. Touch 'Channel Search' and the screen will break into 4 windows. You'll see still images of channels 3, 4, and 5 as well as a live image of channel 6. What a wonderful way to keep track of all your options.

The volume is controlled from the remote so you really can forget about

There's also 'Strobe' which breaks the incoming picture on TV or tape into a series of moving stills. It's great for studying the action.

And, you can break the screen into 4 windows, each showing a still of the ongoing action. When you pick up the awesome remote control for Magnavox's digital system, you'll thrill to your newfound video experiences.



DOES IT ALL

Everything, from one touch timed record to the time remaining to be recorded on a video cassette, is included.

Space limits the description, but I haven't found a single feature that I've ever seen on any other deck that isn't included or enhanced on this new deck.

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THE POWER OF VIDEO WINDOWS RISK FREE

I simply can't put down the remote control. It's given me a whole new view of TV and video recording. It's amazing.

If you're not 100% thrilled and frankly knocked off your feet by the picture quality and the unbelievable (until now) control, simply return it in its original box within 30 days to DAK for a courteous refund.

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You'll streak through the heavens of disbelief the first time you put on the earphones or connect this AC/DC programmable CD player to your **Stereo system** At home or away, your music will explode with 5hz to 20,000hz life.

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There's no warning. There's no record noise, no tape hiss. Vibrant but finely detailed music just explodes from your earphones and stere o system.

Citizen's 3-Beam Laser Servo CD is as at home, plugged into our stereo system (AC and patch cord included), as it is on the move with you (battery case, shoulder strap and earphones included).

The sound is like a shock wave reverberating through your home. It's like the blazing flash and violence released by a lightning bolt as it streaks to the earth. This is the experience you can expect when you first hear digital audio sound.

Forget any experience you've ever had before with stereo. CD audio is an awesome advance that dwarfs the switch we made years ago from 78s to LPs.

Imagine listening to music with a frequency response from 5hz to 20,000hz. And, flutter and wow is "unmeasurable".

The sound quality, and yes, the sonic violence will thrill you. I've spent over 15 years on the test bench and in the studios, and the only equal I've heard to this sound is 'live sound'.

And, live sound doesn't mean the sound you hear at a concert where you are simply listening to the auditorium's PA system. Live sound means sitting right in the middle of the orchestra.

I know, I'm a cellist. And, there's just no sound experience like the sound we hear in 'the pit'.

BUT WHY A PORTABLE?

Forget conventional audio components. CD players are computers. There's no reason a portable can't be 100% equal to a 'sit-on-the-shelf' CD. It uses the same heavy over-sampling. It uses the same type of 16 bit linear digital to analog converters. And, it could be smaller if it didn't have to accommodate the CD disc.

Since CDs are new, a portable lets you make the most out of your collection.

You can simply plug it into different stereos in different rooms, or take it with you wherever you go.

you wherever you go.
It's just 5" X 5" X 1¼". And It comes complete with all the accessories you will need (pictured to the right). Just program up to 16 selections and prepare for a sonic adventure.



NO SOUND AT ALL

CD gives you a signal to noise ratio of 90db. There is, for all intents and purposes, absolutely no hiss, no scratch, and best of all, no surface noise.

You've got to experience the silence during very quiet passages to comprehend the sonic adventure of the music. It's as if your stereo wasn't even on, and then suddenly, a thunderclap explodes!

Conventional records and tapes have a dynamic range of perhaps 50 db. Dy-



namic range is simply the difference in sound level (volume) between the softest and loudest recorded sounds.

CD gives you a 90db dynamic range, which is roughly equivalent to the difference between absolute silence and standing next to a jet engine.

Your music will be dramatically more exciting. You won't have to carefully compare CD to conventional sound. From the very first note, you'll be in shock.

ROARING ON

This Japanese made, 3-beam, laser servo system with heavy sampling, supplies superb sound. Plus, it's loaded.

You can select up to 16 tracks in any order you like. There's even a repeat pad. So, you can repeat selected tracks or the entire disc, forever.

Just touch a pad and you can skip to

than an awesome price. It's backed by Citizen's standard limited warranty.

A SONIC SOUND STREAKER RISK FREE

Experience music with a thrilling frequency response and sonic range. Plus, you'll be thrilled by the hiss and background noise you won't hear.

If you're not 100% satisfied, simply return it to DAK within 30 days in its original box for a courteous refund.

To order Citizen's Top Of The Line Portable and Home AC/DC Compact Disc Player with 16 program capability, complete with Battery Case, Strap, AC adaptor, Earphones, and Stereo System Cable risk free with your credit card, call toll free, or send your check for DAK's Sound Streaking price of just \$169% (\$4 P&H). Order No. 4703. CA res add tax.



the next track during play, or repeat the track you are listening to.

An LCD display shows you the track that is playing, the elapsed time, or the total time of the disc.

To use it on the move, just drop 4 AA batteries into its included battery pack, slide in the CD, put the shoulder strap over your shoulder and the earphones into your ears, for a sonic odyssey.

Installation at home consists of simply plugging the included patch cord into any 'Aux' input in your stereo system and plugging in the AC adaptor.

Whether this programmable CD becomes a permanent part of your stereo system or moves with you, or both, you'll enjoy awesome sound at incredibly less

It may strain my credibility to describe any device, let alone a portable that I'm offering for only \$16990, as providing sound many times better than anything you've ever heard before. But, use DAK's risk free trial to experience this bigger than life sound for yourself.

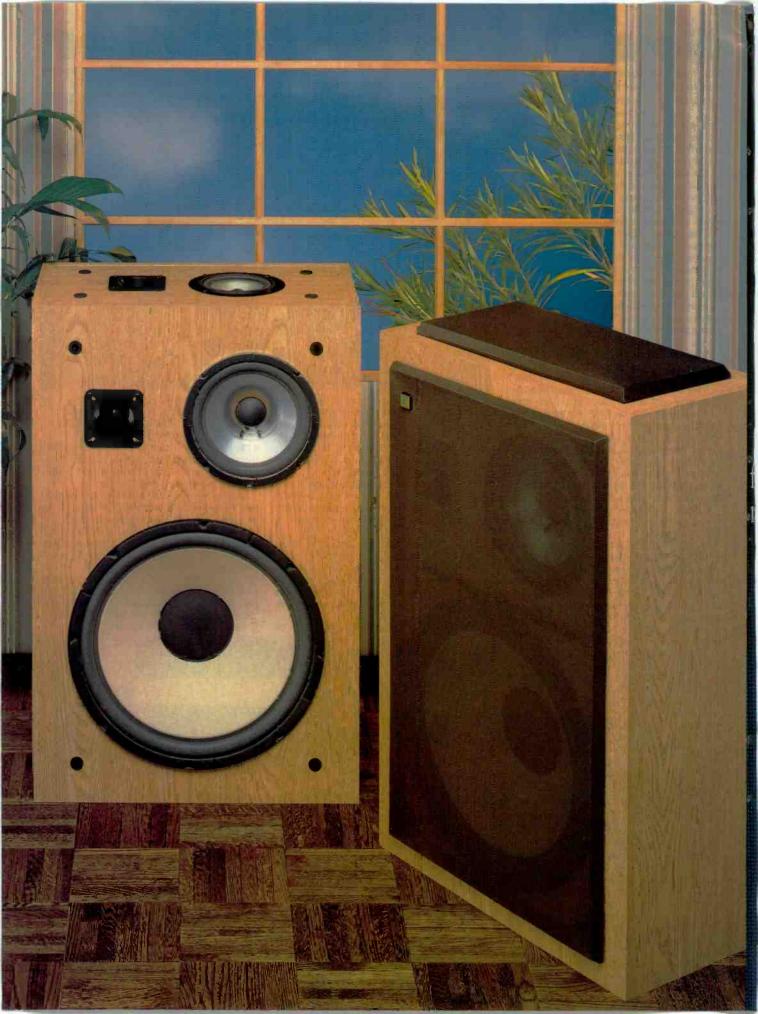
And, CDs are really tough. Take them with you and enjoy dramatically alive sound virtually anywhere you go.



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BSR's Endangered Colossus

Prepare for bone jarring bass and dramatically clear highs from these newly developed 15"3-way 5 speaker systems that nearly missed their chance to charm an audiophile's ear. BSR moved its dbx and ADC divisions into one facility and these speakers almost became orphans. So now, they're yours at a close-out price.

low clean bass.

By Drew Kaplan

It's a shame. But, it's also a great opportunity to get a pair of 15" audiophile loudspeakers with the newest in stereo imaging at a market-breaking price.

Imagine a precisely matched mirror image pair of top-of-the-line BSR speakers that can effortlessly recreate the cataclysmic impact of a full orchestral crescendo at full volume and yet offer flawlessly subtle sound detail to 21,500hz.

You'll thrill to thunderous bass all the way down to 26hz. Incredibly rich, full, vibrant sound at low volume will explode with life as you increase the volume.

But before we examine the front speaker complement, the twin overlapping crossovers and the top mounted sonic placement and ambiance speakers, let's see why they were almost orphaned.

You see, BSR, the half billion dollar electronics giant, is the parent company of two of the best names in up-scale

audio, dbx and ADC.

Last year dbx developed a new multithousand dollar speaker system called the Soundfield One which lets you sit virtually anywhere in your room and have full stereo imaging and terrific sound.

BSR decided to consolidate ADC and dbx into one building (still 2 companies) and put all its speaker efforts into dbx.

POOR JACK

Well, while dbx's engineers were off designing their multi-thousand dollar masterpieces, BSR's Senior Acoustical Engineer (he had been Fisher's Chief Engineer for 10 years during its top end component stereo days), was designing BSR's radically new speaker line.

The revolutionary top of the line 15" stereo imaging pair pictured above will let you enjoy superb stereo imaging without sitting directly in front of your speakers.

But unfortunately, in the consolidation move, BSR's speakers went by the

wayside, and so did Jack.

Enter DAK. After a few fearful negotiations and considering the engineering costs BSR had already expended, they agreed to make the speakers just for DAK.

Because there's virtually no BSR overhead left on these speakers, and the R&D was all but complete, we've gotten these speakers for virtually the component costs plus a little BSR labor.

And don't worry about Jack. BSR had him finish the engineering (they really are great people) and they'll pay him a royalty on each speaker we sell. Besides, by the time you read this, Jack is sure to be snapped up as the Chief Engineer at another esoteric audio company.

WHAT'S STEREO IMAGING?

Stereo imagery is the logical separation and interaction between channels. It's the successful creation of a panoramic wall or stage of music rather than the confined, easily located 2 speaker sound. IT'S WHAT'S INSIDE THAT COUNTS

Imagine the full thunder of a kettle drum, or the pluck of a string bass being explosively recreated in your living room. BSR's 15" sub-bass acoustic suspension driver will revolutionize your concept of Its magnetic structure weighs a thundering 48 ounces. But that's not all. The magnetic field is developed by the rare earth metal Strontium for state of the art massive but flawlessly controlled bass.

A 38mm voice coil with a 200° centigrade temperature capacity, will handle the most demanding digital or analog recordings. And, a new super rigid cabinet design virtually eliminates coloration due to uncontrolled cabinet resonance.

At low volume, the bass will fill in and envelop you. At high volume, your room, your walls and your neighbors will shake. (Not for apartment dwellers please.)



MATCHED PAIRS

The mid-range and high end of BSR's speakers are truly unique. Front mounted 8" polypropylene mid-range drivers provide rich sound while top mounted 5" polypropylene mid-range drivers provide an open, lifelike ambiance.

Front mounted exponential horn tweeters provide awesome brilliance to 21,500 hz, while top mounted tweeters enhance separation because they are mounted to the outside edge of each speaker.

So, this system has a specific left and a specific right speaker. You'll find wide, but interactive separation that will vastly widen your ideal listening area.

The imagery will give the illusion of musicians actually playing in front of you. Your music will take on a three dimensional quality. You'll enjoy superb stereo imagery regardless of each speaker's specific placement in your room.

MORE SPECIFICS

The exponential horn tweeters, both in front and on the top of these systems, employ 25mm rigid phenol diaphragms for stability and accurate response.

Polyamid-imid binders and ferro-fluid coolant allow for a 300% increase in heat dissipation so you can drive the voice coils up to 200° centigrade.

Now, the mid-range. Both the 8" front firing and the 5" top firing polypropylene drivers reproduce the mid-range frequencies like no ordinary speakers.

It's amazing that so many speaker manufacturers simply slap in 5" paper mid-ranges to reproduce what's really the major portion of the sound spectrum.

BSR's 8" and 5" polypropylene midranges are rigid, exacting drivers that deliver incredibly pure uncolored sound. They have matched 25mm voice coils, also protected by ferro-fluid and polyamidimid to 200° centigrade. They are driven by powerful barium ferrite magnetic fields.

NOT QUITE FINISHED YET

To prevent phase shift and cancellation, two totally separate crossover networks are employed in these speakers.

All frequencies below 800 hz are directed to the 15" woofer. The front system routes frequencies above 800hz to the 8" mid-range to take full advantage of its superb reproduction capabilities. Frequencies above 3400hz are routed to the horn tweeter.

The top mounted system routes only frequencies above 1200hz to the 5" polypropylene ambiance mid-range driver, and frequencies above 3400hz are routed to the top sonic placement tweeter.

There are level controls for both the top and front mounted speakers so that you can voice the speakers to match your musical taste and environment.

Note: Only the top tweeters are mounted at the the edges. The front mounted tweeters are conventionally mounted for acoustical symmetry.

Each speaker is fuse protected for up to 200 watts peak, 150 watts continuous power. You can operate these super efficient speakers with as little as 20 watts.

AND OH WHAT A PRETTY FACE
The speaker systems are 30" tall, 19%"
wide and 10%" deep. Their lovely oak
wood-grain appearance is enhanced by
the dark removable grill cloths that beautifully contrast with the rich wood-grain
tones. They're a statement of audio elegance when placed in any room. They're
backed by BSR's 2 year limited warranty.

A COLOSSAL DREAM COMES TRUE
RISK FREE

You'll hear depth of sound at low levels that was previously unobtainable. And yes, when you crank up the volume, your music will explode with realism and drama.

Try these speakers in your own system. Then compare them at any Hi-Fi Store with any pair of speakers up to \$1000. If they don't beat all the competition hands down, simply return them to DAK in their original boxes within 30 days for a courteous refund.

To order your matched pair of BSR top-of-the-line 15" 3-way 5 speaker systems with unique stereo imaging risk free with your credit card, call toll free or send your check for DAK's market-breaking price of just \$299 for the MATCHED PAIR plus \$34 for Postage and Handling, Order No. 4868. CA res add tax.

It's a dream system for an audiophile. Sonically pure, thunderously powerful, these BSR speakers will make your future listening years an on-going fabulous, if not earthshaking experience.



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plosive Auto

Your stereo system's sound will explode with life and you'll thrill to the ultimate in automation. Imagine 6 discs played in any order you choose, or totally randomly. Imagine computer timed dubbing. And, wait till you see DAK's price. By Drew Kaplan

It's shocking. From the awesome digital sound produced by this 16 bit, 3beam laser pick up system to its 6 disc capability, this new multi-disc CD player will explode any perception of sound quality and automation you've ever had.

Before we explore the sound you'll hear with a 5hz to 20,000hz frequency response, 96db signal to noise ratio and 96 db dynamic range, let's look at automation like you've never seen before.

AWESOME CAPABILITIES

OK, it plays 6 discs automatically.

That's pretty impressive. You can program up to 32 choices (including complete discs) to play in any order.

Well, that's impressive, but it's more than the rest, not different.

But this is. This CD player can randomly choose selections from 1) a single disc, 2) from the 32 selections you have chosen, or 3) from all 6 discs.

Now you can enjoy your favorite music without fa-

tigue. Now you won't know which song is coming next. But you'll still have total control of the randomized songs.

But there's more. If you want to copy songs onto cassettes, not only do you have complete programmability, this incredible machine even pauses at the end of each side of your cassette.

Since it knows how long each song is, at 45 minutes (half a 90 minute cassette), this machine will pause. So, you'll never have to calculate which songs will fit on a cassette again.

So, for an hour, an evening or a lifetime of music, this machine will never stop.

EVERY IDEA INCLUDED

OK, you've got 6 discs loaded, the memory programmed but you want to listen to another disc. Well, there's no problem. 5 of the discs fit into an instantly removable changeable magazine. The 6th disc is held in a conventional tray.

So, you can change the 6th disc at will without ever losing your programming. **OUTER SPACE**

No expense was spared in the design and manufacture of this 'beyond the top

of the line' player from Sharp Everything you'll want to do is accomplished by pushing direct action buttons. And, every function is duplicated on the remote and the player itself.

You can select any of the 6 discs. You can randomly select tracks. You can enter all programming, Random Play, Programmed Play or Repeat Play. Wow!

You can even enter the dubbing mode for timed cassette record and you can bring up any of the displays, including Selection, Track Time and Total Time.

You can control Play, Pause, Stop. High Speed Search, Next and Previous Track, and virtually any function that I've ever seen on a CD. But, don't forget to



add a 6 behind each of these controls. BUT IT'S THE SOUND

CD gives you a signal to noise ratio of 96db. There is absolutely no hiss, no scratch, and best of all, no surface noise.



Conventional records and tapes have a dynamic range of perhaps 50db. Dynamic range is simply the difference in sound level (volume) between the softest and loudest recorded sounds.

CD gives you a 96db dynamic range, which is roughly equivalent to the difference between absolute silence and standing next to a jet engine.

Your music will be dramatically more exciting. You won't have to carefully compare CD to conventional sound. From the very first note, you'll be in shock. It's as if the the world was just created and you are listening to newly born, virgin sound.

Imagine listening to music with a frequency response from 5hz to 20,000hz +0.5db -1db. Wow! Imagine sound so pure that harmonic distortion is just 0.004%. And, if you're into zeros, flutter and wow is "unmeasurable"

THE TRUTH ABOUT CD SOUND

This is the finest CD player I've ever used. But, honestly, any good \$150 CD sounds perfect. The specs are so far beyond human hearing that, short of the cheap unknowns that may be badly assembled, all CDs will knock your socks off.

The chief advantage of this remarkable machine is its superb construction which should give you years of superb entertainment, and it's incredible ability to manipulate 6 discs to let you enjoy your music like never before.

There's no question in my mind that this incredible new Sharp CD has found a permanent home in my system. It's backed by Sharp's limited warranty.

EXPLOSIVE AUTOMATION RISK FREE

Wait till you experience the sound. Wait till you record cassettes automatically. And, wait till you hear your favorite songs randomly played for you. It's all an incredibly thrilling experience.

If you're not 100% thrilled, simply return it in its original box to DAK within 30 days for a courteous refund.

To order your Multi-Play Sharp 6 CD Player with 3-Beam Laser Pick Up System, Heavy Sampling, Random Play, 32 Program Selected Play, Automatic Timed Dubbing Capability and MORE, risk free with your credit card, call toll free, or send your check for DAK's market breaking price of just \$349 (\$8 P&H). Order No. 4841. CA res add tax.

It's smarter than most computers. It sounds better than a symphony orchestra producing a full crescendo, and DAK's price should shake up the industry. Wait till you experience all that this superb 'feat of engineering' has to offer.



Stealth Bomber Plus

The Pentagon may pay billions for the new Stealth Bomber that flies automatically and is invisible to enemy radar. But, you can have Teac's Stealth Reversing Automated Cassette Deck with dbx that can even record the full 105db dynamic range of CDs at an incredible breakthrough price.

Stealth's invisible. Enemy radar can't see it. And, it's the newest electronic marvel to come off the drawing board.

Now, you may be thinking that there's not much in common between a Stealth Bomber and an auto reversing recording and playing cassette deck.

After all, a Stealth Bomber sure can't fly backward. But wait before you decide.

This automated, auto reverse deck has a 'radar avoidance system' called dbx. No, it's not an MX missile. But, if the Stealth Bomber is invisible to radar, wait till you hear how 'invisible' tape hiss will become to your ears with this dbx deck.

RADAR AVOIDANCE PLUS

The sound quality, and yes, the sonic violence will thrill you. The only equal to this sound is 'live sound'.

There is absolutely no hiss, no scratch, and best of all, no surface noise.

You've got to experience the silence during very quiet passages to comprehend the sonic adventure of the music.

Conventional records and tapes have a dynamic range of perhaps 50db. Dynamic range is very simply the difference in sound level (volume) between the softest and loudest recorded sounds.

CDs and dbx can give you 105db of dynamic range, which is roughly equivalent to the difference between absolute silence and standing next to a jet engine.

Of course it has other 'radar avoidance' in the form of Dolby B & C, but dbx does much more than noise reduction.

When you record using dbx, this deck gives you a 90db signal to noise ratio and an amazing 105db dynamic range. This is one of the few decks that can copy the brilliant impact of CD discs.

AUTOMATIC PILOT PLUS

The Stealth similarity doesn't end at 'radar avoidance'. While the Bomber controls are still top secret, I can tell you a lot about this deck's controls.

From the first button you touch, you'll appreciate this deck's superb stability. A precise DC servo controlled motor drives the dual capstans for low flutter and wow.

With record mute, you'll have clean intros and exits to your recordings. And, what recordings you'll get!

You'll make perfect recordings on both sides of your cassettes without stopping. This deck automatically records in both directions. And, when you use the linear input level controls and sensitive peak reading LED VU meters, you'll easily make flawless recordings.

WRONG WAY CORRIGAN

This autopilot can take you backwards, forwards or around the world again. You can play and record in both directions.

And finally, without even worrying about refueling, you can have your music totally uninterrupted.

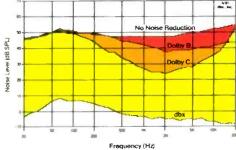
You can play either side of the cassette or repeat the entire cassette, over and over again for continuous music. This is the feature that gives you a day, or an evening of uninterrupted music.

Now you only need to get up to change cassettes when you feel like it, not when the cassette ends. It's the best way to enjoy your music, your way.

BUT IT'S THE dbx

While dbx is the ultimate noise reduction system, complete with its vibrant 105db dynamic range, this deck also lets you record and play with Dolby B and C.

But, you just can't get the full-range dynamic hiss free response across the entire frequency range without dbx.



This graph supplied by dbx clearly shows just how good recording with dbx can be. You can easily test the day and night difference for yourself. The test is described in the next column.

The graph above says it all. dbx will give you cassette recordings that are virtually free from surface noise across the entire frequency range, not just the highs.

Plus, you'll have the incredible vibrance of 105db dynamic range. With this deck, you're ready for CD or any

possible recording need.

Dolby C will give you a 70db signal to noise ratio. There are Left/Right Mike inputs as well as a headphone output.

And, look at this: There's an output level control that lets you perfectly match the output of this deck to the other components in your system.

Plus, you can control the headphone volume. This is the type of added extra attention to detail and quality that makes Teac decks stand out from the pack.

You'll have a conservative frequency response of 30-17,000hz with CrO² and Metal, and 30-16,000hz with normal bias tapes. It's a top quality deck. And, it's backed by Teac's limited warranty.

it's backed by Teac's limited warranty. TRY REVERSING STEALTH RISK FREE

Set your tape counter at 000. Record some blank tape with no input and without noise reduction. At 020, switch in the Dolby B. At 040 switch in Dolby C. At 060, switch in dbx. Then play it back.

You're sure to be astounded. It's a great deck for a lot of reasons. But dbx makes it phenomenal. If you aren't 100% satisfied, simply return it within 30 days in its original box to DAK for a refund.

To order your Teac Stealth Auto Reverse Cassette Deck with Dolby B, Dolby C and dbx risk free with your credit card, call toll free, or send your check for DAK's blockbuster price of just \$149** (\$7 P&H). Order No. 4737. CA res add tax.

The Stealth Bomber is still on the drawing board. And don't forget, it still won't fly backwards. But, you can get your own Stealth Deck and be ready to record CDs, live music or just fabulous sounding copies of records.

Of course, the bomber may be able to fly around the planet in the picture above, but the deck can only make it ring with thrilling music.



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Beardroid Phone

Now you can own a robot creature that moves and talks just like you'd see at an amusement park. Get ready to interact with a Beardroid at home, at the office, or whenever you talk on the phone.

By Drew Kaplan

Forget cute. Forget cuddly. While this is certainly the cutest most cuddly bear phone I've ever seen, DAK was chosen to introduce him, not because he's cute, but because of the sophisticated technology that makes him robotic.

Yes, he's a hands free speakerphone. And, his new, advanced speakerphone capabilities rival his robotics.

But, before we explore why he can sound better than an industrial office speakerphone, let's see why he's so much more than a 'talking bear phone'.

VOICE ANIMATED

First a warning. If you're a really serious person, this animated phone isn't for you. Oh, not because the sound or features aren't perfect, because they are. But frankly, he's really distracting.

I simply can't carry on a serious business conversation with an animated talking bear. Let me tell you why.

When you're on the phone, you can talk and the Beardroid simply listens.

But, whatever the person at the other end of the line says is lip-synced by Beardroid. His mouth 'mouths' each syllable of each word as it's spoken to you.

Just imagine sitting in your corporate boardroom, negotiating a big deal while this bear's muzzle 'mouths' out the words.

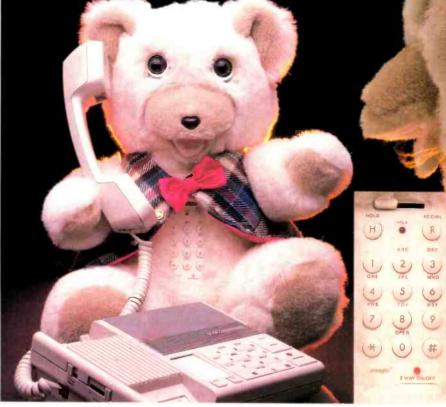
Frankly, whoever you're listening to looks hysterically funny. And they look funny, but sound great in your den, kitchen, bedroom (hands free is great) or office.

K.C. Beardroid (we call him K.C.) doesn't just open and close his mouth. Both his mouth and eye movements are synchronized to the voice coming over the line. He can chew gum. He can yawn. He can 'mouth' each word as it's spoken.

K.C.'s movements appear so accurate to me that I'd love to have someone who

can read lips try him out.

And, as I said above, if you think you can carry on a serious conversation while this adorable bear 'mouths' the incoming words, you're in for a real challenge.



you roam around the room while you talk on the phone, he's loaded with features.

By the way, you won't want to roam too far. K.C. is soft and cuddly, and very plush. He is really happy sitting in your lap while you talk on the phone or when you just want a 'warm fuzzy' to hold.

You'll have Tone/Pulse switching, True Hold, so you can pick up your call in another room, and Last Number Redial.

BUT IT'S THE ROBOTICS

K.C. reacts to the exact sounds coming over the phone line, and his mouth moves in reaction to the pronunciation

actual conversation. (By the way, the phone he's talking on isn't included.)

He's 14" tall, sitting, and he's powered by 4 D cell batteries (not included). He simply plugs into any standard modular phone jack. There's a Hi/Lo/Off ringer:

He's backed by TeleConcepts standard limited warranty. (They have a K.C. Health Care Clinic, really.)

ANIMATE YOUR CONVERSATIONS RISK FREE

I don't market cute. I'm a technology junkie. But I don't carry non-productive gadgets. K.C. Beardroid is a superb speakerphone with all the extras. And, everyone at DAK is lined up outside my office trying to steal my sample (I love this bear).

If you're not 100% enchanted with K.C.'s antics or with his superb sound quality, simply reject him (he may cry), and return him within 30 days in his original home (box) to DAK for a refund.

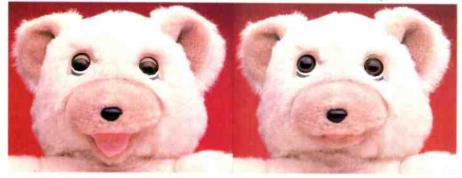
To snuggle up to (order) your Tele-Concepts K.C. Beardroid Phone with Animated Mouth/Muzzle and Eyes, and superb full featured Hands Free speaker-phone risk free with your credit card, call toll free or send your check for just \$129.0 (\$6 P&H). Order No. 4497.

An AC adaptor for K.C. is just \$9% (\$1 P&H). Order No. 4824. CA res add tax.

Talking about a 'conversation piece', K.C. will make every phone call an event.

PRICE SLASHED NOW JUST \$99%

Use Order No. 4497. Plus (\$6 P&H)
Everyone who sees K.C. in person wants one. I'm thrilled to have negotiated a superb new price. What a gift!



But, you won't be in for a challenge understanding or talking on this remarkable phone. It's made by TeleConcepts, a company well respected for its industrial telecommunication products.

The truth is that the speakerphone developed for Beardroid is so advanced that it's going to be used in their industrial phones. It's lightning fast simplex, so there's no echo and no delay.

And, in addition to his incomparable hands free speakerphone which will let

based on volume and frequency.

So, his movement is totally different for the word 'Hello' than for the word 'Good Bear', and so on throughout the entire English Language. As a matter of fact, K.C. is so smart that we've had him speaking in 4 foreign languages. But, I don't think his French is very good.

I wish I could show you a video of his cuteness' in action, but look above in the main picture and you can see a multiple exposure side view of his mouth in

oices from The Other Sid

Now you can get the Russian side direct from Russia. Tune in on Afghanistan. Or get the latest from Libya, Get it in English or native languages, all for DAK's breakthrough price of just \$49%. Wow!

Drew Kaplan

It's awesome. Tune in the world's ideas from where they come. Listen to the Russians talking about America (vuk).

Hear the Canadian side of trade disputes. And, get the local views from virtually every country in the world.

This new 10 band miracle radio pulls in Short Wave stations from all over the world. Within 5 minutes of opening the box, I had listened to Radio Moscow in English and Radio Cuba in Spanish.

There are countless broadcasts in dozens of languages. So, if you speak a foreign language, now you can enjoy broadcasts in almost any language.

But, don't worry. Virtually all stations broadcast in English for many hours a day. And in addition, you'll have AM and FM stereo (stereophones are included).

This one pocket sized radio will provide an almost endless number of radio broadcasts from all over the world, for you to enjoy and learn from.

It's really exciting to hear England's views of what's happening in America and also, what's happening in Europe.

The English have a very cosmopolitan view of the world and I've really been enjoying their commentaries.

I can't say I've enjoyed some of the broadcasts I've heard from some nonfriendly countries.

But, other than the total frustration I feel that anyone would believe these people, it's almost addicting to listen to these would be world conquerors.

WHAT SHORT WAVE IS

You'll enjoy some of the best sounding FM stereo you've ever heard from this remarkable radio. Its circuitry is extremely advanced. And, you'll receive great sounding AM as well.

But, it's the 8 bands of shortwave that make this 634" X 31/2" X 11/4" radio receiver really unique. You'll use its builtin, rich sounding speaker or the included stereophones to tune in the world.

Short Waves have the remarkable property of being able to cover great distances by using an invisible layer in the upper atmosphere to 'bounce' radio signals back and forth to reach the earth.

This wave-range (10-100 meter wavelength) is therefore highly significant for all sorts of telecommunications in widely separated locations, such as: Aeronautical, Maritime, National Broadcasting, Amateur and Commercial Traffic.

With this receiver you can pick up a great number of transmissions over distances that cover thousands of miles.

This world-wide reception is especially fascinating for those of us who are interested in other cultures, in straightfrom-the-source news, in learning languages, exotic music, world affairs as viewed from angles of other cultures, and for those living abroad who want to keep in contact with their home country, in their own language or in English.

There are about 850 Short Wave radio transmitters designed for international operation, and another 600 for regional or local use.

Only Short Wave gives you the world



at the turn of a knob. And it's only possible because, by bouncing off the outer atmosphere layer, called the F-layer stations can broadcast around the curve of the earth. So, you don't receive Short Wave as a straight signal, you receive a signal reflected from space.

The F-layer is located between 130 to 300 miles above the earth, depending upon the time of day or night, the season and the latitude of the earth.

Also, a Short Wave broadcast may make several 'hops' between the earth and atmosphere before it's received.

Frankly, you'll find the quality of the broadcasts will vary. Sometimes they'll be crystal clear, and other times the volume will vary as you listen.

So, if you want FM stereo quality all the time, the Short Wave medium isn't for you. But, you'll miss out on some of the most exciting broadcasts.

Short Waves can literally travel around the world giving you access to broadcasts from almost any country.

ALL THE VIEWS

Imagine the thrill of sitting in your living room and listening to a live broadcast from Moscow. Imagine hearing the Argentinian view of the Falklands War.

During the Chernobyl affair you would have heard broadcasts from all the neighboring countries.

When you hear the news that the Russians don't like our arms proposals, wait till you hear what they are saying. You'll gain insights into the mentality of all the cultures of the world.

From South America, to Africa to Europe, you'll listen to broadcasts as easily as you listen to AM radio.

Of course, the quality won't always be perfect, but there's nothing complicated to tuning in to short wave.



There's a large easy to read vertical

dial with all 10 bands. Switch to any band and turn the dial. A tuning LED shows when you have a station tuned in. That's all there is to listening to Short Wave.

For FM stereo and AM, tuning is identical. But, there's a Stereo LED as well. It operates on 3 AA batteries (not included) or a 4.5V DC adaptor (not in-

cluded). It's made by Emerson and backed by their limited warranty.

VOICES FROM THE WORLD RISK FREE

From South Africa to Singapore to East Germany or Egypt, you'll get a new perspective of the cultures of the world. Plus, you'll be entertained by the world's music when you tune in on Short Wave.

Of course, in time of world crisis (God forbid), short wave has all the details. Gone are the days when it took a room full of equipment to receive these incredible broadcasts. Now you'll have the world's information in the palm of your hand.

If you're not 100% satisfied, simply return it in its original box within 30 days to DAK for a courteous refund.

To order Emerson's 10 Band Short Wave, AM, and FM Stereo Radio complete with Stereophones, Carrying Strap and Soft Carrying Case risk free with your credit card, call toll free or send your check for DAK's world breaking price of just \$4990 (\$3 P&H). Order No. 4839. CA res add tax.

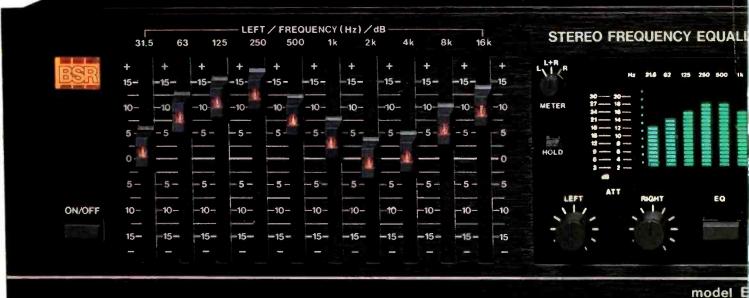
I tuned in fascinating stations within minutes. But, we'll include a booklet that will help you find specific stations in specific countries all over the world.

You'll be amazed at the incredible wealth of information and entertainment that can be yours for just \$4990.



1-800-325-0800 For Toll Free Information, Call 6AM-5PM Monday-Friday PST

Technical Information. . . . 1-800-272-3200 Any Other Inquiries. 1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304



Smart Sound Detonator

Obliterate the wall between you and the individual instruments in your music. Infuse your own stereo system's sound with a breathtakingly vibrant 30 to 50% improvement in sound quality that you can measure with this superb BSR Equalizer/Spectrum Analyzer limited \$149 close-out.

By Drew Kaplan

Close your eyes. Touch a button. And you'll hear your stereo system literally explode with life.

You'll hear the gentle brushes on a snare drum, the startling bone-jarring realism of a thunder clap, or the excitement of a full cymbal crash.

You'll hear string basses and other deep low instruments emerge from bass (that will sound murky by comparison), with such clarity and such definition that you'll feel you can almost touch each instrument.

This astoundingly distinct yet powerful bass adds such a full bodied warm feeling to your music, you'll feel as if you've been lovingly wrapped in a warm soft blanket on a cold winter's night.

But don't take my word for the sound quality improvement. With the Pink Noise Generator, Calibrated Electret Condenser Mike and the 220 Element Spectrum Analyzer, you can instantly measure each and every improvement you make.

Plus, there's more. A subsonic filter effectively adds the equivalent of many watts onto the power of your amplifier.

Plus, with its provision for two separate tape decks including two way dubbing, you'll have much more than just greatly improved sound.

You can count on great sound from this top of the line Equalizer/Analyzer. It has a frequency response from 5hz to 100,000hz ± 1db. And, it has an incredible 100db signal to noise ratio.

BSR, the ADC equalizer people, make this super Equalizer/Analyzer and back it with a 2 year standard limited warranty. Our \$149 close-out price is just a fraction of its true \$379 retail value.

FIRST THE EQUALIZER
YOUR STEREO'S HIDDEN SOUNDS
Your stereo can sound incredibly bet-

ter. Just a 5db roll-off at the high end, up around 14,000hz to 16,000hz, can just decimate the harmonics that give you the open feeling you'd experience at a live concert. A similar roll-off at 60hz, causes the fundamental bass notes to just fade away into the 'murk'.

An equalizer isn't some magical device that manufactures sounds that don't exist. Most of the frequencies that will make your music really vibrant, are actually already recorded in your music.

You'll be able to prove this with a few simple tests we'll try when we discuss the Spectrum Analyzer.

You see, certain frequencies are simply not reproduced with as much volume as are the mid-range frequencies which stretch from about 800hz to 2,000hz.

An equalizer simply lets you establish accurate control of all frequencies to fit your equipment, your recordings, your taste, and your listening environment.

TOTAL MUSICAL CONTROL

And, what a job it can do. It's totally unlike bass and treble controls which simply boost everything from the midrange down for bass, or everything up for treble. You can boost the low-bass at 31.5hz, 63hz and/or 125hz to animate specific areas or instruments.

And, when you boost the part of the bass you like, you don't disturb the midrange frequencies and make your favorite singer sound like he has a sore throat.

The high frequencies really determine the clarity and brilliance of your music. The problem is that highs are very directional. Wherever you move in your listening room, you'll find a big difference in high end response, as you'll see when we test the Analyzer.

No recording engineer or equipment manufacturer can even begin to control your listening environment.

You can control the highs at 4,000hz, 8,000hz and/or 16,000hz, to bring crashing cymbals to life at 16,000hz while at the same time you can cut tape hiss or annoying record scratches at 8,000hz.

But there's more. Don't leave out the mid-range. You can boost trumpets at 300 to 500hz or a clarinet at 1000hz. You can boost or cut any part of the frequency spectrum a full ±15db.

TAPE DECK HEAVEN

You can push a button and transfer all the equalization power to the inputs of two tape decks. Now you can pre-equalize your cassettes as you record them and get all the dramatically enhanced sound recorded right on your cassettes.

This is an especially great feature when you play your cassettes on bass-starved portables or high-end starved car stereos.



SIMPLY PLUG IT IN

Use your tape monitor circuit, but don't lose it. Now your one tape monitor circuit lets you connect two tape decks.

Just plug the equalizer into the tape in and out jacks on your receiver or preamp. We even supply the cables.

As you listen to your records, FM or any 'Aux', any time you push the tape monitor switch on your receiver you'll hear your music jump to life.

The output from your receiver is always fed directly to your tape deck(s) for recording, and with the touch of a button, you can choose to send equalized or nonequalized signal to your deck(s).

When you want to listen to a tape deck, just select which tape deck you want, turn the switch on the equalizer,



and your tape deck will work exactly as it did before. Except, now you can listen with or without equalization.

Look at this. You can dub tapes from deck 1 to deck 2, or from deck 2 to deck 1 with or without equalization.

THE SUBSONIC FILTER

Much of the power drawn from your amplifer is used to drive your woofers. When you drive the amplifier too hard, it clips and you end up with distortion.

A subsonic filter removes a lot of nonmusical material you can't hear that exists below 20hz. So, it relieves your amplifier of a lot of work. It doesn't actually create more watts (Please, no letters from my 'technical' friends) for your amplifier.

But, it's like turning off the air conditioning in your car. It saves you using about 7 hp of what you have. And therefore, you'll have more watts for clean powerful sounding music.

THE SPECTRUM ANALYZER

Now you can scientifically analyze your stereo listening room and test your equipment by using BSR's Real Time Frequency Spectrum Analyzer.

Plus, you'll see your music not as a single level on a VU meter, but as a kaleidoscopic parade of 10 individual 20 element VU meters.

Each is tuned to a specific octave of the sound spectrum. An eleventh 20 element meter averages all levels.

The effect is awesome. You can visually isolate a string bass or cymbal, and actually see each individual instrument almost as a wave moving across the 220 individual florescent elements.

THE MOUTH AND EARS

It talks. The Analyzer speaks with a voice of pure calibrated Pink Noise. Pink Noise is the standard composite sound of all frequencies used for testing in labs around the world. All frequencies from 20hz to 20,000hz are generated at the exact same level at the exact same time.

It listens too. If you are testing a cassette or a component in your system, use the 'Line Button'. If you're testing your whole system with speakers, use the matched calibrated electret condenser microphone (included). Either way, you'll have a quick, easy and accurate way to evaluate the total sound of your system.

HOW TO TEST SPEAKERS, EQUIPMENT AND TAPE

Testing your speakers in your listening room is the really crucial test. Simply place the calibrated microphone where you normally sit to listen to your stereo.



At the end of an 18 foot cord is the ear of the system. Just clip the mike wherever you sit and test your room.

Turn on the Pink Noise. You can switch to Left Channel, Right Channel or both. There's a meter range button, a sensitivity control, and even a switch that lets you freeze the meter.

Just sit down at the equalizer. Start with one channel. You'll see all 10 octave bands on the meter. Just slide the corresponding controls to increase or decrease any area that needs help.

You have now set up your system to its maximum capability. But as you'll see, location is very important. Move the microphone 5 feet to the left or right.

Then turn on the Pink Noise and check the Spectrum Analyzer. Now you can see why the specifications that come with your system are only a starting point.

Here's a way to test your tape deck and tape. First record Pink Noise for 3 minutes at -20VU. Then play it back and note the readings on the meters.

Now, record the Pink Noise again at OVU or +3. Wait till you see how much the high end falls off. Now you'll see why all specifications are listed at -20VU.

With the Equalizer/Analyzer you can enjoy the finest stereo sound from your system and be a test lab too.

WHY SO CHEAP

BSR now only sells equalizers under their ADC name. Well, as Detroit comes out with new cars each year, ADC comes out with new equalizers. We got them to supply us with just 30,000 of last year's ADC model before they shut it down.

They had already paid for all the tooling, all the research and design, so we were able to buy these for less than half the normal price, for cold hard cash.

THE FINAL FACTS

There are 20 slide controls, each with a bright LED to clearly show its position. Each control will add or subtract up to 15db. (That's a 30db range!)

There are separate sound detonation slide controls for each channel at 31.5hz, 63hz, 125hz, 250hz, 500hz, 1,000hz, 2000hz, 4000hz, 8000hz, and 16,000hz.

BSR backs this top of the line Graphic Equalizer/Spectrum Analyzer with a 2 year standard limited warranty. It is 17%" wide, 3½" tall and 8¾" deep.

MAKE YOUR MUSIC EXPLODE RISK FREE

It's startling. Music so vibrant with life you'll swear it's 3 dimensional. Sculpture your music any way you want it. If you're not 100% satisfied for any reason, simply return it to DAK within 30 days in its original box for a courteous refund.

To order your BSR EQ3000 Smart Sound Detonator 10 Band Graphic Equalizer with Real Time Spectrum Analyzer and Calibrated Mike, with Subsonic Filter and Two Way Tape Dubbing risk free with your credit card, call toll free, or send your check, not for the \$379 retail value. Don't even send the \$227.97 dealer cost. Send just \$149 plus \$8 for postage and handling. Order No. 4100. CA res add sales tax.

The sound of your stereo will explode with life as you detonate each frequency band with new musical life. And, you can see and measure exactly what you've done.



TOLL-FREE ORDER LINE
For credit card orders call 24 hours a day 7 days a week
CALL TOLL-FREE. . .1-800-325-0800
8200 Remmet Ave., Canoga Park, CA 91304



The Day The Earth Shook

You can set off seismographs with the enormous power of this 300 watt (150 X 2) audiophile integrated amplifier and digital tuner, or reproduce the sound of a pin dropping, flawlessly, at a really earthshaking price!

By Drew Kaplan

The excitement is back. After 5 years of boring 20 to 50 watt per channel non-dramatic sounding amplifiers, Scott is igniting your music again!

Of course, with the avalanche of CDs being sold, Scott doesn't have much choice. High power and super fast slew rates are needed just to keep up.

So, Scott has attacked distortion and dynamic restriction at its source with these new, top of the line, components.

With CDs your sound can go from Odb to 90db instantly. And, while CDs can even make an old tube amplifier sound terrific, wait till you hear them through this enormously powerful amplifier.

In fact, wait till you hear any source material open up and become free and vibrant with new life.

But, before we explore the nuts and bolts of Scott's 300 watt (150 watts per channel from 20hz to 20,000hz with no more than 0.009% THD) amplifier, let's look at the special extras.

SCULPTURE YOUR SOUND

There's a built in 7 band graphic equalizer. With an equalizer, you can bring crashing cymbals to life or energize the sound of a string bass without destroying any of the mid-range.

With the aid of this equalizer, you won't just hear a string bass, you'll feel it. It will become a living, breathing, resonant part of the music. There's so much life, you'll be amazed.

And, you'll thrill to the impact of a cymbal crash or the gentle nuance of brushes on a snare drum. With the clean power of this amp and the ability to 'detonate' the high and low frequencies, you'll simply be thrilled by your music.

MORE CONTROLS

With this 150 watt per channel integrated amp, you can operate 2 pairs of stereo speakers with power to spare. And speaking of power, there's a Bass Boost which adds 9.5db at 50hz.

There's an electronic volume control which isn't subject to mechanical aging

that causes clicks, pops and static in traditional controls. Just touch the bar to raise or lower the volume.

You'll have individual buttons to choose between Tape, Phono, Video, CD or Tuner inputs. And an Icon you can see from even across the room, lights to show what you've chosen.



And, you'll want to know what's selected, because you'll control power, up/down volume, and mute plus, select Phono, Tuner (AM or FM with 8 Presets each), CD, Video/Aux, or Tape Monitor from the included infrared remote control.

Now you can sit back

and switch stations or inputs, or adjust volume whenever the phone rings.

QUARTZ-LOCK TUNING

It's Scott's new top of the line tuner. And, as you'd expect, you're going to get great AM and FM stereo reception.

Tuning is controlled by an advanced quartz PLL (Phase Locked Loop) digital synthesizer tuning system. The system compensates for any change, assuring you of a crystal clear, stable signal.

In addition to the 16 presets (8 AM and 8FM), you can 'Scan' stations manually, or you can automatically seek the next broadcasting station.

There's a Mute/Stereo/Mono button which effectively mutes out weak stations and noise. You can defeat Mute/Stereo and lock in on even the weakest stations in Mono if you wish.

I've always found that AM tuners in receivers weren't very good. Well, Scott has improved AM reception.

First, the power supply for this separate tuner is actually in the integrated amplifier. Although the tuner is a separate component, only low, non-interfering voltage is supplied to the tuner.

LEDs show when a station is 1)'locked in', 2)broadcasting in Stereo, and

3)the signal strength. If you tape a lot off FM as I do, this synthesized tuner's capability to lock in stations is remarkable.

BUT IT'S THE POWER

Sensitive LED power meters display 0.01 to 200 watts of power. But, you won't have to see the output power to experience its awesome effects.

Whether you have a CD or not, more power doesn't mean louder. It means cleaner, unconstricted sound that is transparent and literally exploding with life.

With 150 watts per channel, your soft listening will gain depth and fullness. And, your loud levels will not suffer clipping and dynamic restriction. Of course, you may be restricted by your neighbors, but that's not Scott's problem.

CHECK THE SPECS

Scott was a household name in the 60s while I was growing up. Let's see how they've grown up too.

The frequency response of this amp stretches from 10hz to 60,000hz. It has a 90db signal to noise ratio. And the equalizer can alter the frequency response by ±10db at 63hz, 160hz, 400hz, 1000hz, 2500 hz, 6300hz and 16,000hz. It's backed by Scott's limited warranty.

MAKE THE EARTH MOVE RISK FREE

Awesome power will make your music throb with life. Now you can enjoy the true impact of CDs and make any music you listen to, a thrilling experience.

If you're not 100% satisfied, simply return it in its original box to DAK within 30 days for a courteous refund.

To order Scott's Top Of The Line 150 Watt Per Channel Integrated Amplifier and Tuner with 7 Band Equalizer risk free with your credit card, call toll free, or send your check for DAK's breakthrough price of just \$399 (\$14 P&H). Order No. 4885. CA res add tax.

150 watts per channel of pure power and a quartz locked digital tuner will make your future years of music listening an on going fabulous, if not earth-shaking, experience.



For your stereo system (it plugs in), or for anywhere you go, now you can have thrilling digital sound. Plus, it's fully programmable (great for recording cassettes) and you'll enjoy Cassettes, AM and FM stereo, at a breakthrough price. and FM stereo tuners is breathtaking. By Drew Kaplan

It's a thrill a minute. CDs simply reproduce the best sound I've ever heard. And, I'm building a great collection.

Between the great classical music and all the 50s and 60s recordings that are now coming out on CDs (finally at decent prices), I'm really buying a lot of them.

Of course, I'm still listening to my cassettes and AM and FM stereo with this new Crown music center, but frankly, cassettes made from records or off FM simply don't have the sonic drama and impact that CDs deliver.

If you're like me, you already own lots of great albums. And, you've probably been listening to them for years.

Well, I saw no reason to buy a CD if I already owned the album. Besides, they just started re-releasing albums on CD.

Well, was I wrong. The first time I compared a CD release to an album release, the sound knocked my socks off. SHOULDN'T HAVE BEEN SURPRISED

Well. I should have known that the difference would be staggering because the masters for the albums were recorded at 15 inches per second on 2" tape.

So, buy a CD of one of your favorite albums and compare the difference. I think you'll be as awed as I have been.

VERY DEMANDING

To adequately reproduce the capabilities of a CD without a full size stereo system isn't easy. But, Crown's powerful amplifiers and full range speakers really deliver thunderously powerful sound.

Plus, its equalizer lets you sculpture your sound. And with CDs, there's a lot of sound to sculpture. You can make low bass explosive and the high end dramatically alive.

INCREDIBLE BENEFITS

Before we look at the actual features of the CD, there's something you should know. Because of the demanding requirements that Crown had to meet to reproduce CDs, the sound quality you're going to hear from the cassette deck and AM

You'll have the same equalization, amplification and superb speaker systems to reproduce your cassette recordings and your favorite AM and FM broadcasts.

Of course, you can make incredible sounding recordings directly from the CD, and the AM or FM Stereo tuners. Plus, there's a built-in condenser mike.

And look at this. There's a CD output. So, if you don't have a CD in your main stereo system, now you can use this as a component CD when you're home and a portable when you're out.

Plus, if you have a stereo system in your den, bedroom or office, just plug in its included cable and you can use this CD portable as a fully programmable CD deck for any system you own.

or back to the last. In fact, you can skip to

any song you want, whenever you want. It's 22" long, 6½" tall and 5½" deep. It operates from AC (cord included), or D cell batteries. It's backed by Crown's standard limited warranty.

MAGNIFICENT MUSIC RISK FREE

About the only thing that proves this is a portable is its handle. When you hear the sound, especially in your stereo system, you won't believe it's a portable.

If you're not 100% awed by the incredible sound quality, simply return it to DAK within 30 days in its original box for a courteous refund.

To order Crown's Portable Music Center with 16 Random Access Program Capability, and 3 Beam Laser CD Player,

CINE /ALL



You'll be able to use this system wherever you want great sounding music from CDs, Cassettes, or AM/FM Stereo.

CD MAGIC

Prepare for an incredible 16-20,000hz audio experience. It uses the latest 3beam laser system for flawless tracking.

You can really control this CD system. You can play a CD. You can program up to 16 tracks in any order you wish.

And, you can repeat the whole CD, a single track, or the up to 16 tracks you've programmed, to play for an hour, an evening or forever.

Important Note: Now you can effortlessly record cassettes with just the songs you want in just the order you want them with this new programmable deck. Wow!

If you're listening to a song, you can have it start over again or skip to the next



superb Cassette Deck, AM/FM Stereo Tuners plus Graphic Equalizer and Stereo System Connecting Cable risk free with your credit card, call toll free, or send your check for DAK's market breaking price of just \$17990 (\$8 P&H) Order No. 4886. CA res add tax.

Make each CD you own perform double duty. Play it in your main stereo (this makes a perfect component), play it in any other stereos you own, and play it on the road. Wait till you hear the sound.



For Toll Free Information, Call 6AM-5PM Monday-Friday Technical Information. . . . 1-800-272-3200 Any Other Inquiries......1-800-423-2866 8200 Remmet Ave., Canoga Park, CA 91304

Instant You, Digitally

Forget complicated answering machines. Forget worn out announcement tapes. Now you can simply touch a button and record your voice digitally on computer RAM. It's an incredibly easy to use breakthrough, for just \$49.00.

By Drew Kaplan

It's hassle free. And, its flawless digital reproduction of your voice is almost scary.

Now you can record your own voice on computer chips by simply touching a single button. Now you'll never again have to match your message to a continuous loop cassette.

If you're like me, recording a message on an answering machine is really an

intimidating hassle.

Besides all the buttons you have to push, you have to rewind the tape, wait, and then play it back to see how your message sounds.

Well, with this all new digital breakthrough, simply push one button to record any outgoing announcement up to 15 seconds long.

Then, push another button to instantly play it back. It's totally hassle free.

In fact, it's so easy that you'll feel comfortable changing your flawlessly recorded announcement to suit your hourly needs. And, talk about flexibility, wow!

Now you can effortlessly change your message whenever you wish. So, if you're only out in the yard, you can tell callers you'll be available at 2:20PM. With a normal machine, they wouldn't know if you'd be back in 20 minutes or 20 days, so they might not leave a message.

So, in addition to standard answering machine features, you can instantly catch calls if you're down the street, in the shower, taking a nap, or getting the mail.

PRIVACY AND SANITY PLUS

Now you can really protect your privacy. Never before has an answering machine been so easy to use that you'll use it when you're at home too.

When you're home, you can 'screen' calls. Your new answering machine will answer the phone and you'll hear who's leaving a message. If you want to talk to the caller, just pick up the phone.

Now you can answer only when you want without missing important calls. This is a superb necessity, not just a convenience at the Kaplan household.

It seems that as soon as we sit down to dinner, the phone starts ringing. Now, we can hear who's calling (of course we can turn down the volume if we wish) and take only urgent calls.

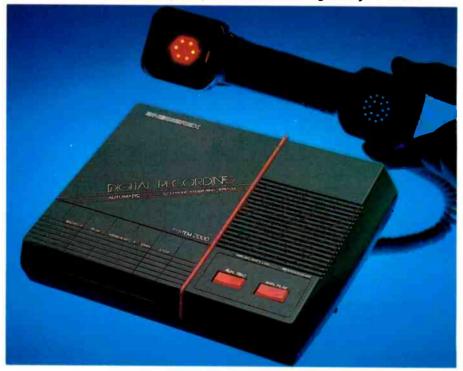
I used to take the phone off the hook during dinner, but aside from the danger of missing an emergency call from someone, I've been told it's really rude.

If someone tries to call and gets a busy signal, they tend to keep dialing, thinking that we're talking. Well, have I got them fooled! Anyway, now we can have the best of both worlds with this incredible new answering machine.

GREAT SOUND PLUS

OK, it's really just like a conventional answering machine. But, it's incredibly easier to use than any machine I've seen.

When you touch the ANN. REC. (Announcement Record) button, you instantly record your voice on the machine's computer chips. So there are no moving parts to wear out, or tape to hiss or mess up the incredible fidelity.



Anyone calling you hears your message and then a beep. This answerer will then record onto a standard cassette the message the caller leaves.

The exact second they hang up, the cassette stops. So, you'll never have to listen to any blank tape.

You'll only hear messages, because your outgoing announcement isn't recorded on the tape. And, there's even a flashing message light to tell you when someone has left a message.



EASIEST EVER

There are no complicated controls. Installation consists of simply plugging in its standard modular phone jack and its AC plug (both included).

There's even a modular jack on the back of the answerer for your phone. And, a 9V battery (not included) backs up your announcement.

But, it's virtually control free. There are no complicated controls, no sequences to remember. Just record your announcement or play back your messages.

Of course, there's a volume control for playback. And, a built-in condenser mike lets you record your messages without anything to plug in.

Push the answer button to activate the machine. You can save or erase messages or fast forward or rewind to rehear a message. It's all incredibly simple.

To make it really easy, there's no remote pick-up, and the pretty colored handset I used in the picture isn't included. It simply answers your phone with the best fidelity you've ever heard

and with the least effort ever.

ALL THE USES

For an hour, a day, or a month, this new answering breakthrough will faithfully record your incoming messages. And with its lifelike digital fidelity, your callers are sure to be awed.

With its full size standard cassette, it will take up to 30 minutes of your messages with no minimum length for each. Now you'll have total phone freedom and privacy at a breakthrough price.

It's made by Answerex and with its digital announcement and standard cassette drive, it's built to last. It's backed by Answerex's standard limited warranty.

YOUR VOICE IN LIGHTS RISK FREE

It's eerie. Wait till your callers hear your voice. They'll be amazed. Wait till you see how easy it really is to use this incredible new machine.

If you're not 100% satisfied, simply return it in its original box to DAK within 30 days for a courteous refund.

To order your Answerex Digital Answering Machine that answers in your own voice digitally and takes your variable length messages on a standard audio cassette, risk free with your credit card, call toll free or send your check for DAK's breakthrough price of just \$49% (\$6 P&H). Order No. 4871. CA res add tax.

Now you can instantly change your announcement and thrill your callers with the digital fidelity of your voice.



DAK IMPUSTRIES

Call Toll Free For Credit Card Orders Only 24 Hours A Day 7 Days A Week

1-800-325-0800
For Toll Free Information, Call 6AM-5PM Monday-Friday PST
Technical Information. . . . 1-800-272-3200
Any Other Inquiries. 1-800-423-2866
8200 Remmet Ave., Canoga Park, CA 91304

Now you can listen to music that's coursing through the AC wiring system of your home. It's exciting. It's soothing. It's vibrant. And, it's all around you.

By Drew Kaplan

No, I don't want you to listen to the 60 cycle hum of your AC power. No, I don't want you to listen to a 120 volt blast.

But, if you're like me you're going to find that this 'Weird Music' is really going to end musical frustration. And frankly, I've been frustrated.

As you might expect from reading my catalogs, I have 4 complete music systems in my home, and a very large collection of records, cassettes, open reel tapes and CDs.

One reason I'm frustrated is because I can't listen to my open reel tapes unless I'm at one of my two main systems.

And, if I'm on the patio, in the kitchen, or in the garage, I'm relegated to AM, FM or cassettes on a pocket stereo or portable.

And frankly, I've never taken the time to transfer all my albums, open reel tapes and CDs to cassettes. So, I haven't been able to listen to what I want where I want.

WELL, NO MORE

It may seem weird to plug a speaker into an AC outlet, but a new technological breakthrough has allowed me to listen to any music I choose from my best stereo, anywhere in my home.

The music (or speaking) is transmitted through the AC wiring in my home.

So, instead of running speaker wires all over my house, I just plug in a speaker wherever I want rich, room filling sound.

I really like it. I had always wanted to have wireless speakers in my living room because my wife hates having me run wires everywhere.

In the dining room, we can have uninterrupted music from one of my autoreverse cassette decks 'piped in' while we entertain quests.

In the bedroom, now I can listen to my old open reel tapes. And in the garage, I can use the continuous programmable playback from my CDs. Of course, my system can transmit AM or FM too.

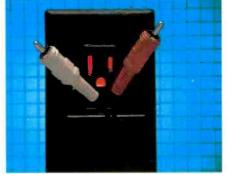
NOT STEREO AND PROBLEMS

It's not a perfect system. But, you'll be shocked by the magnificent rich sound.

And, installation consists of simply plugging its cable into the left and right tape jacks of your receiver and plugging in the AC power transmitter.

It will have no effect whatsoever on your stereo system.

NOTE: Don't worry about your tape jacks. Extra jacks are provided so you won't lose the use of your tape jacks.



But, it's not stereo. It combines the signals from the left and right channels



and transmits a combined signal throughout your home's electrical system. So, you'll enjoy full rich music anywhere.

You can plug in as many 2-way speaker systems as you wish. And, you can plug them in anywhere in your home, or office, that you'd like vibrant, room filling music.

It's been 20 years since I did custom home stereo installations. But, even that long ago, everyone wanted to be able to listen to their favorite music without being restricted to a single room.

You'll really enjoy the sound quality. These speaker systems are not just for background music. With their powerful woofers and tweeters the depth of the sound is really amazing.

So, don't be restricted to one room. Enjoy your music wherever you are. In your kitchen, in your bedroom, den or on the patio, you'll have your favorite music anytime, totally hassle free.

The 91/2" X 43/4" X 6" speakers will knock your socks off with their rich full sound. A 41/2" woofer combined with an acoustically designed cabinet really belts out the bass, while a 21/2" tweeter easily matches the high frequency response of most traditional speaker systems.

A word about noise. You can virtually forget it. This system is virtually noiseless. It operates on VLF (Very Low Frequency) FM that is virtually unaffected by noisy motors and fluorescent lights.

It will, however, react to wireless intercoms and the BSR's X10 remote control system that we sell. But, the reaction is momentary and not too bothersome.

So, in short, although it's not stereo (you can put two speakers in a room), it's a fabulous sounding way to listen to your favorite music wherever you are.

IT'S PORTABLE

Installation of the speakers consists of simply plugging them in. Then you can adjust their On/Off volume controls.

Each even has a handle on the back so you can take them out to the garage, the patio or even to unattached barns.

As long as you're on the same side of the AC transformer (most houses are), virtually any plug in your home should be a source of your favorite vibrant music.

It's made by Universal Security and backed by their limited warranty.

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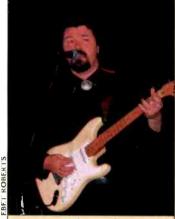
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by Christie Barter & Steve Simels

7 IME was when the phrase "the New Dylan" had wide currency in the music business. According to con-



Omar: Creedence of the month

servative estimates, the tag has been attached to upwards of seventy singer/songwriters over the years. These days, however, you're likely to hear a certain kind of roots-conscious band tagged "the New Creedence," especially since that band's erstwhile leader. John Fogerty, seems to have run out of gas.

This month's batch of New Creedences includes the Brandos, whose first album on Relativity is pretty hot stuff, and Columbia's Omar and the Howlers (the coolest name since Sam the Sham & the Pharaohs), whom we caught at a recent show in Manhattan. Playing songs from their first album, "Hard Times in the Land of Plenty," Omar (Van Dyke) and his cronies sounded impressively Creedence-like in their potent mixture of political protest and blues-rock authority. We don't know whether they also have Creedence's Top 40 hitmaking flair, but both album and concert indicate this is a band to watch.

OUNTRY Music Foundation Records has released an album called "The Bristol Sessions," after the eastern Tennessee hill town where they took place in 1927. Said

to contain some of "the most significant recordings ever produced." including the first by the Carter Family and Jimmie Rodgers, the two-record set of thirty-six songs is available only by mail order from the foundation. Send a check or money order for \$14.98, plus \$2.25 to cover postage and handling, to Country Music Foundation Records at 4 Music Square East, Nashville, TN 37203.

NE of the hottest acts on the concert circuit these days is the Kronos Quartet. which has been called the Fab Four of classical music. By the looks of their current tour schedule, they should be playing a concert hall near you sometime between now and the end of May. The quartet's informal stage manner and post-punk dress code have charmed hundreds of fans who might otherwise stay away from chamber music altogether. The music they play -almost entirely twentiethcentury, ranging from Bartók to Terry Riley and Ornette Coleman—and the forthright



Megadeth: what's in a name?

way they play it have won them enthusiastic responses from critics as well.

The first Kronos album for Nonesuch entered Billboard's classical chart well over a year ago and at presstime was still holding on; the latest, "White Man Sleeps," is a Top 10 hit. The quartet was the subject of a CBS Sunday Morning segment and an interview on the network's Nightwatch program in September, a guest appearance on Sesame Street is coming

this month, and an hour-long television documentary is just waiting for an airdate.

OU don't expect irony from a heavy-metal band, but there is some in the strange case of popular Los Angeles headbangers Megadeth. Seems the boys were hit with a lawsuit over their name, to which another L.A. band claimed a prior right (although they spelled their name with the missing "a" in "death"). Fortunately, the suit was settled in the a-less band's favor in time for Capitol Records to release its latest assault on your eardrums next month.

But where's the irony? Simply that neither of the Megabands was aware that the name was first used, back in 1974, for the fictional heavymetal band featured in the National Lampoon's "Lemmings" stage show. Stars of that little Megadeath were Chevy Chase and John Belushi, who, in retrospect, were only slightly funnier than the current name-holders.

OME of the biggest names in classical music have donated their services to Music for Life, a concert being given at Carnegie Hall on November 8 to benefit the Gay Men's Health Crisis (GMHC), which provides support services for people with AIDS. Leonard Bernstein and James Levine are sharing the musical planning of the event, which will fea-

ture such artists as Leontyne

Price, Marilyn Horne, Yo-Yo

Kronos Quartet: chamber music for the charts



RACENOTES. A recent

J USA Today poll asking

fifty celebrities to name their

favorite Elvis Presley song

produced some interesting re-

sults. The praises of Hound

Dog were sung by Don John-

son and Paul Newman, and

Don't Be Cruel was the tune

of choice for Burt Reynolds and Dolly Parton. But by far

the most astute response

came from TV star/astron-

omer Carl Sagan, who said,

"I can't make up my mind

R E C O R D

Ma. Luciano Pavarotti, Murray Perahia, and Samuel Ramey, many of whom will be performing together for the first time.

Deutsche Grammophon is expected to record Music for Life for worldwide distribution, producing added revenues for GMHC, and radio station WNCN-FM in New York City is taping the concert for syndication through the Concert Music Broadcast Network for airplay over the Thanksgiving weekend, November 26-29.

Ramey,

Cook: a switch

larly diverse backgrounds. Contralto Maureen Forrester

and tenor David Rendall hail

from the world of concert

music and opera, and Sarah

Brightman, who is Mrs. An-

drew Lloyd Webber, has built

her career on starring in her husband's hits. The Carousel

orchestra is the Royal Philharmonic, conducted by

Broadway's Paul Gemignani.

The producer is Thomas Z.

Shepard, head of MCA Clas-

sics and an undisputed master when it comes to record-

ND they said punk

wouldn't last. Believe it or not, punk's founding fa-

thers, the Ramones (their new Sire album, "Half Way to

Sanity," is just out), have

now been together for elev-

years. And, yes, they're still

wearing those artfully ripped

blue jeans, singing about

teenage lobotomies, and gen-

erally carrying on like the

kind of adolescent reprobates

you see hanging around local

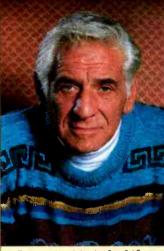
pizzerias. Nice to know

en-count

'em, eleven-

ing a Broadway musical.

ERE'S a switch-a recording of a Broadway revival that does not star opera singer Kiri Te Kanawa. Just now arriving in stores



Bernstein: Music for Life

around the country is a new recording, on MCA Classics, of Rodgers and Hammerstein's Carousel in which the leading roles of Julie and Billy are sung by Barbara Cook and Samuel Ramey.

Cook, who began her career on Broadway, has known the role of Julie since the late Fifties, when she appeared in a major revival of Carousel at the New York City Center. Ramey, of course, is an opera singer, but he's not the first celebrated operatic bass or bass-baritone to sing a romantic lead written by Rodgers and Hammerstein-Ezio Pinza starred in the original cast of South Pacific.

The other featured artists in the new Carousel have simi-

there's an element of consistency in our lives, however small.

But there's some potentially shocking news for Ramones fans: The band has a brand-new drummer, ex-Blondie legend Clem Burke. Burke is a gifted, flashy technician reminiscent of the late Keith Moon, and it's hard to imagine how his pyrotechnics can be adapted to the Ramones' more, er, minimalist style. You'll be able to check it out for yourself, as the band is hitting the road. We also wonder whether Burke will change his last name like the rest of the boys. Clem Ramone? Hmm

Chris Isaak, the neo-rockabilly rocker whose two critically acclaimed albums on the ("Chris Isaak" is the most recent) have failed to burn up the charts. The problem, we suspect, is that people don't take good-looking musicians seriously unless they're Whitney Houston, which is clearly unfair.

We caught Isaak's act recently at a New York club, and we can report that he's the genuine article: a spellbinding singer, an ace songwriter, and the leader of one of the best rock-and-roll bands in America. If he passes through your town, miss him at your peril. And petition Warner Bros. to release his moody update of the Yardbirds' Heart Full of Soul as a single.

C OMETIMES it's tough being a sex symbol. Just ask Warner Bros. label

Ramones: an element of consistency



Isaak: looking good between Little Sister and (Marie's the Name) His Latest Flame. . . I.R.S. Records is reissuing the first two dB's albums, previously available only as British imports. Now let's hope I.R.S. does the same for the band's debut American LP, 1984's "Like This," briefly available on Albert Grossman's Bearsville label before its demise. . . How about the following

graffito glimpsed near the newly renovated Carnegie Hall? "Q: How does Rocky call his mother? A: Yo-Yo Ma." . . . Most audacious cover band of the year: New underground fave York Pussy Galore, which recently remade all of the Rolling Stones' two-record masterpiece, "Exile on Main Street." This could signal a fascinating trend. Think of the possibilities-Ozzy Osborne redoing the Carpenters' greatest hits, perhaps, or Weather Report cutting the first Ramones album?

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Stereo Review's critics choose the outstanding current releases

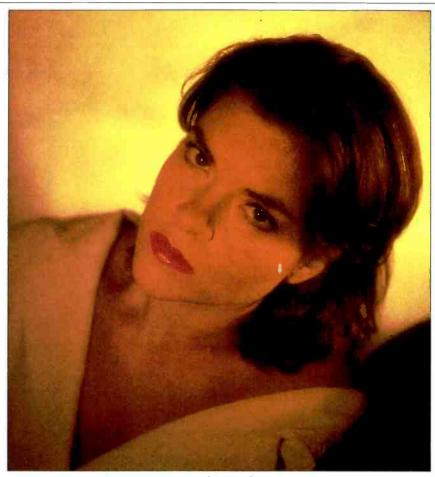
ROSANNE CASH GETS BACK TO BASICS

OR the last twenty-seven years, music lovers in Louis-Kentucky, quenched their thirst for hard-to-find and out-of-print albums at King's Record Shop, a dilapidated, enticing hole-in-the-wall nestled smack in the middle of the city's seedy blue-movie and girlyshow district. Operated by Gene King, the friendly, sideburned brother of Country Music Hall of Famer Pee Wee King, the store is a magical "Twilight Zone" of an establishment, a place where, judging from the window displays and most of the inventory, time called it quits somewhere around 1965. It is a place where country, rock, pop, and jazz coexist without even so much as a whimper.

Those styles also peacefully coexist in the work of singer Rosanne Cash. The daughter of country legend Johnny Cash, she grew up with one eye on the beehive hairdos of her hillbilly relatives and the other on the latest trends in the pop underground. With the help of her husband/producer Rodney Crowell, Cash successfully integrated those influences in her first three Columbia albums, later turning her back on country for the driving rock and pop of "Rhythm and Romance," her hit-laden LP of 1985.

For her latest, "King's Record Shop," however, Cash wanted a smaller sound—without synthesizers, less layered, recorded with a minimum of overdubs. In short, she wanted a back-to-basics production approach, or, as she says, "a real simple, guitar-framed record... to try to make the sound get close to the real person."

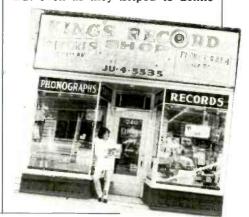
And the cover art, a shot of Cash superimposed on a hand-tinted photograph of Gene King's store-front, is about the only bit of "doc-



Rosanne Cash: a stunning mix of the traditional and the progressive

toring" to be found in the whole production. In perhaps her most straightforward and unmannered performance on record, Cash again offers a stunning mix of traditional and progressive country, ballad, and biting rock. Far more sober than her previous album, "King's Record Shop" rips into vital veins and arteries of emotion, from the visceral nakedness of The Real Me, another chapter in the saga of her "come here, go away" relationship with Crowell, to her slant-eyed, bluesy, and definitive interpretation of Crowell's side of the story, I Don't Have to Crawl. In between are the kind of left-field gems Cash somehow always manages to find: Benmont Tench's pleading Why Don't You Quit Leaving Me Alone, John Kilzer's dark and episodic Green, Yellow and Red, and Eliza Gilkyson's call-to-action against wife-battering, Rosie Strike Back.

The musicians who appeared on Cash's earlier records—notably Hank DeVito (who shot the album's cover photo), Albert Lee, Emory Gordy, Jr., Richard Bennett, Tony Brown, Larrie Londin, and Rosemary Butler—have all gone on to different things in the years since Cash started to carve out her niche. But even as they helped to define



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her style-and along with it, an important subgenre of popular music-she and Crowell have replaced them with players whose passion equals her own, particularly Steuart Smith, with his knife-wielding guitar, and Vince Santoro and Eddie Bayers, who key up the crispest drums in town. It is, after all, a New Era in Nashville, one that for Cash, at least, means wedding the tension of newness and uncertainty with the security of tradition. This is, in effect, what it means to step through the door of "King's Record Shop." As anyone who has been there can tell you, it is an unforgettable trip. Alanna Nash

ROSANNE CASH: King's Record Shop. Rosanne Cash (vocals); Patty Smyth, Steve Winwood, Rodney Crowell. Vince Gill (background vocals); Randy Scruggs (acoustic guitar); Steuart Smith (electric guitar); other musicians. Rosie Strike Back; The Way We Make a Broken Heart; If You Change Your

Mind: The Real Me: Somewhere Sometime; Runaway Train; Tennessee Flat Top Box; I Don't Have to Crawl; Green. Yellow and Red; Why Don't You Quit Leaving Me Alone. COLUMBIA FC 40777, © FCT 40777, © CK 40777 (39

GIULINI'S ELEGANT BRUCKNER

OT so many years ago, the Bruckner symphonies were regarded as the exclusive preserve of Austrian, German, and Dutch conductors, though Toscanini did perform the Fourth and Seventh with the New York Philharmonic in the Thirties. Now we find other Italian conductors turning to the work of the Austrian master, with recordings made between 1985 and 1987

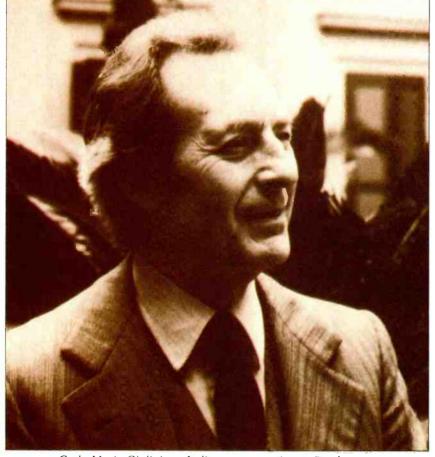
in Vienna and Berlin by Riccardo Chailly, Riccardo Muti, and Carlo Maria Giulini. In Giulini's new recording of the Bruckner Seventh, as in his earlier one of the Eighth and Muti's of the Fourth, the conductor has transmuted the towering Alpine grandeurs of late Bruckner to a more verdant Tuscan landscape-a very interesting idea, and not at all a bad one for those listeners who may find the composer's transcendental strivings rather too insistent and overextended.

Giulini and the Vienna Philharmonic approach the Seventh, over the years the most popular of Bruckner's symphonies, in a passionately lyrical vein. The element of dramatic insistence in the score is toned down, and everything seems to flow organically. The requisite tempo shifts in the first movement. with its ever-remarkable opening melody, assume a heretofore unsuspected elegance in Giulini's hands. The celebrated adagio is broadly set forth, complete with the textually debatable cymbal crash at the climax, and the Vienna Philharmonic's Wagner tubas in the valedictory for the Master of Bayreuth are especially noteworthy.

A passionately lyrical performance in which the dramatic insistence is toned down and everything seems to flow organically.

In its initial pages, the scherzo does not convey the usual rustic Austrian atmosphere but that of a pastoral dance heard at a distance, though the focus becomes more defined as the music progresses. As in the first movement. Giulini tones down the insistent elements of the finale, keeping its legato aspects in the foreground. The lovely subsidiary theme has never in my memory been treated with such subtlety of dynamics and coloration, and the sound from Vienna's Musikvereinsaal is as full-bodied as anyone could wish.

As most seasoned collectors know, there are plenty of top-class recordings of Bruckner's E Major



Carlo Maria Giulini: an Italianate perspective on Bruckner

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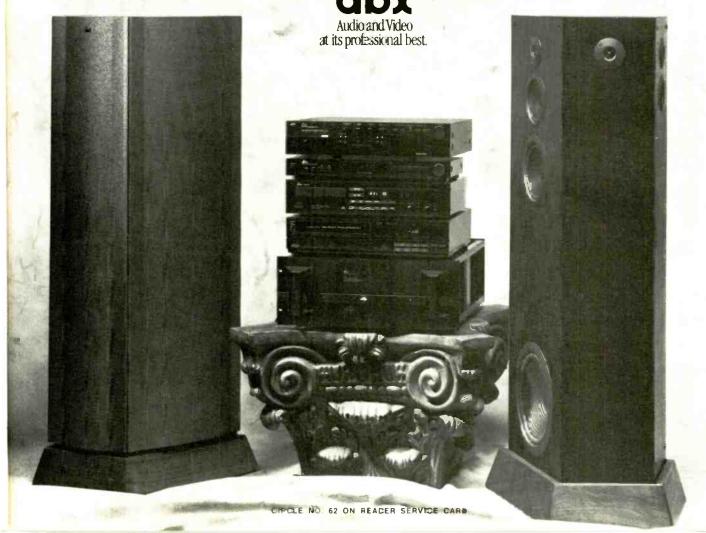
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BEST RECORDINGS OF THE MONTH



Cruzados: Marshall Rohner, Chalo Quintana, Tony Marisco, Tito Larriva

Symphony, but anyone who fancies an Italianate perspective on the Austrian composer could hardly make a better choice than this one by Giulini. David Hall

BRUCKNER: Symphony No. 7, in E Major. Vienna Philharmonic Orchestra, Carlo Maria Giulini cond. DEUT-SCHE GRAMMOPHON @ 419 627-1. © 419 627-4, @ 419 627-2 (68 min).

CRUZADOS: BELIEVABLE COUNTRY ROCK

F Tex-Mex weren't the flavor of the month, "After Dark," the new Cruzados album, probably wouldn't have been madeand rock would be the poorer for it. It's a set of dusty, twilight rhythms and scorching guitar—now a blistering noonday sun, now a low, far-off incandescence, heat lightning on a summer night. Cruzados combine the country music of parched cinderblock and sweating beer bottles with the hard rock of a fist fight waiting to happen.

Tito Larriva's songs twang, rumble, and slog, but they never jerk or jump. You wonder how a guy this young can have experienced so much truth and heartache. In Blue Sofa, he's caught between an affair with an older woman and the purer love he has for his young girl friend-a purity that doesn't prevent him from leaving her to watch TV alone on a Friday night while he indulges himself. Bed of Lies captures the shattering compromise between an unfaithful woman and her alcoholic lover in bed. Small Town Love is a poignant song about looking back on a first love: how time erases the heartache, but also the promise, and how many things supplant love as we grow older.

As a lyricist, Larriva is both poet-

ic and believable. His strong images deal in truths, not artifice. Perhaps the clearest evidence of his skill is

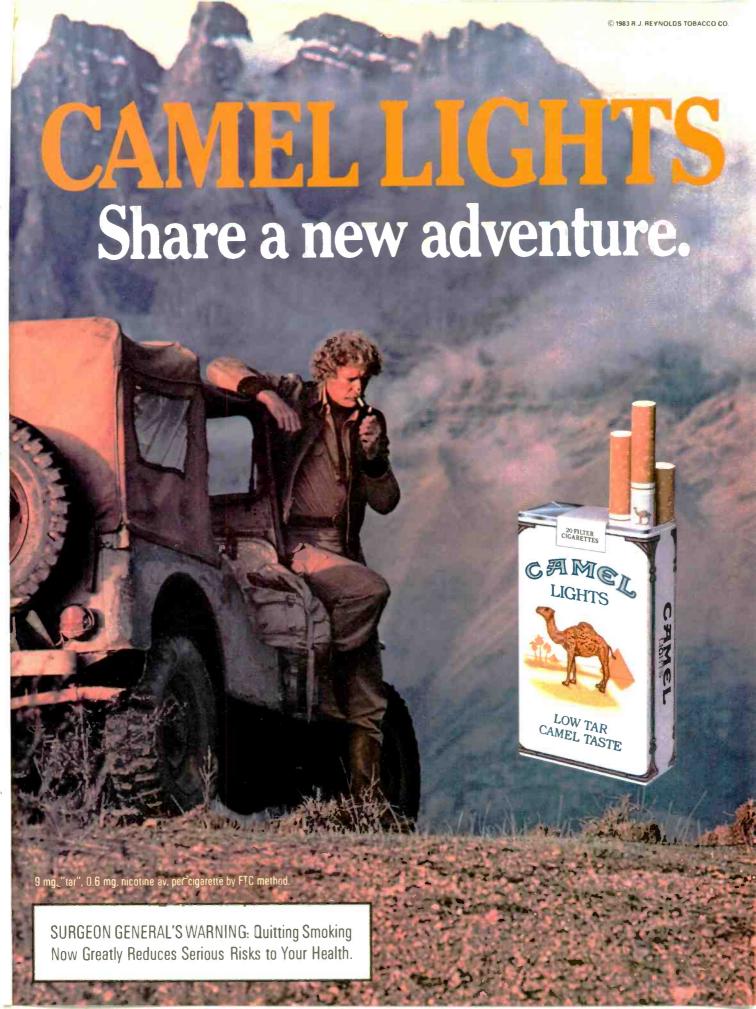
A set of dusty, twilight rhythms and scorching guitar combining the country music of parched cinderblock and sweating beer bottles with the hard rock of a fist fight waiting to happen.

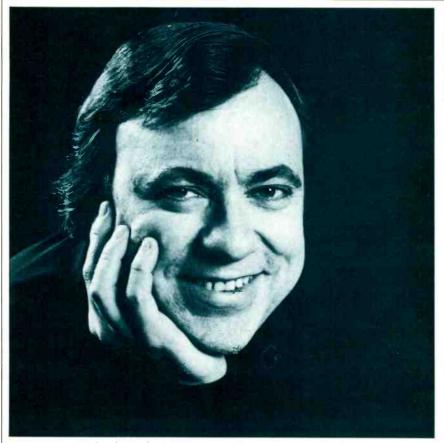
the one song in "After Dark" he didn't write—I Want Your World to Turn. This gussied-up number lacks the forthrightness and canny eye for detail that mark the rest of the album. Backed by a rhythm section in perfect sync and the boiling guitar fills of Marshall Rohner, Larriva's burning vocals and hard-edged songwriting make this one of the most powerful rock albums of the Mark Peel year.

CRUZADOS: After Dark. Tito Larriva (lead vocals, guitar); Marshall Rohner (lead guitar, vocals); Chalo Quintana (drums); Tony Marsico (bass, vocals). Small Town Love; Bed of Lies; Road of Truth; Last Ride; Time for Waiting; Young and on Fire; Summer's Come, Summer's Gone; I Want Your World to Turn; Chains of Freedom; Blue Sofa (Still a Fool). ARISTA AL 8439, © AC 8439, @ ARCD 8439 (38 min).

BRAHMS WITH WARMTH, WIT, AND FANTASY

ICHARD GOODE'S performances of Schubert and Beethoven sonatas have demonstrated that he is uncommonly secure and communicative in the sort of music that is more substance than glitter. His new Brahms collection on Nonesuch provides further assurance of the sort of response such material continues to draw from him. The program is a convenient one for collectors who like to have these pieces grouped as Brahms published them: the eight capriccios and intermezzos





Richard Goode: bringing a bracing freshness to Brahms

that constitute Op. 76, the similar assortment titled Seven Fantasies, Op. 116, and the three intermezzos and single rhapsody of Op. 119.

I can't remember any other performances of this music-either of the individual pieces or of the integral sets as presented here—that managed to suggest so strongly Brahms's love for Schubert and his admiration of Chopin while projecting so much of his own individuality. Some of these pieces are barely two minutes long, and the longest takes less than five minutes, but what a broad range of temperament and mood they encompass—and how firmly and comfortably inside them all Goode seems to be.

But the impression one carries away from this recording is of having spent an enriching hour with Brahms rather than an hour with Richard Goode. That, to my mind, is the true objective of a serious musician, but I don't mean to suggest that Goode's seriousness is self-

conscious or reverential. His range of mood and temperament includes warmth, wit, and, as Brahms himself was well aware in so titling his Op. 116 collection, a good deal of fantasy. All these elements are superbly realized, and veteran listeners as well as newcomers to the material should find a bracing-but thoroughly uneccentric—freshness throughout.

The piano is recorded in a very realistic perspective, with a fine balance between warmth and crispness reflecting a similar balance in the playing itself, and Goode's own notes on Brahms's piano worksand on each of the nineteen pieces in this collection-take us still farther inside the music with him.

Richard Freed

BRAHMS: Eight Piano Pieces, Op. 76; Seven Fantasies, Op. 116; Four Piano Pieces, Op. 119. Richard Goode (piano). NONESUCH @ 79154-1, @ 79154-4, © 79154-2 (62 min).

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- □ BOB MARLEY AND THE WAILERS: Babylon by Bus. ISLAND 90029-2 (two LP's on one CD). "Powerful" (April 1979).
- □ JONI MITCHELL: The Hissing of Summer Lawns, ASYLUM 1051-2. "Truths that are social as well as personal" (Best of Month, February 1976).
- □ NO WAY OUT (Maurice Jarre). VARESE SARABANDE VCD 47301. Original-soundtrack recording. One of this fall's big film hits.
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CLASSICAL.

- ☐ CHOPIN: Piano Concerto No. 1; Ballade No. 1; "Heroic" Polonaise; Two Nocturnes. Pollini, Kletzki. ANGEL CDM-69004. Among the label's first "Studio" mid-price releases, the concerto is "a performance for the ages" (Best of Month, June 1961).
- ☐ MENDELSSOHN: Violin Concerto in E Minor. SAINT-SAËNS: Violin Concerto No. 3. Lin, Thomas. CBS MK 39007. Performances of "prodigious skill" and "exceptional maturity" (Best of Month, September 1984).
- ☐ MOZART: The Magic Flute. Lear, Peters, Wunderlich, Fischer-Dieskau; Böhm. The Impresario. Augér, Grist, Schreier, Moll; Böhm. DG 419 566-2. "First-class" (August 1965).
- □ PUCCINI: Turandot. Callas; Serafin. ANGEL CDCB-47971. The perfect match of singer to role (from 1958).
- □ RAVEL: Daphnis et Chloé, Suite No. 2; Boléro; La Valse; Pavane. Dutoit. LONDON 414 406-2. "Classy" (January 1983).
- ☐ TIPPETT: A Child of Our Time. Norman, Baker, Cassily, Shirley-Quirk; C. Davis. PHILIPS 420 075-2. "Intensely dramatic" (April 1976).

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Natalie Cole: more than a touch of class

Nelson (background vocals); additional vocal and instrumental accompaniment. I'm a One Woman Man; The Hand That Rocks the Cradle; For Sure, For Certain, Forever, For Always; I Have You; Leavin's Not the Only Way to Go; and five others. MCA MCA-42009, © MCAC-42009, © MCAD-42009 (35 min).

Performance: Back to basics Recording: Very good

Through the ups and downs of a spectacular, yet checkered career, Glen Campbell has consistently redeemed himself on records with a remarkably elastic and expressive singing voice, a formidable command of the guitar, and an uncanny sense of song selection.

After something of a hiatus, Campbell is back with a high-profile record that proves that the old skills are still in fine working order, and that the world has finally caught up to his ideas about the natural wedding of country and pop. At the same time, however, producer Jimmy Bowen has stripped away the layers of strings that bravely bolstered many

of Campbell's biggest hits and steered him through an honest, though somewhat sophisticated country record. To be sure, Bowen wasn't taking any chances-Emmylou Harris, Steve Wariner, Willie Nelson, and Lee Greenwood drop in for duets and background warbling-but he needn't have worried. Songs such as Ted Harris's The Hand That Rocks the Cradle (which proudly suggests there ought to be a Hall of Fame for Mothers) and Jimmy Webb's two offerings, For Sure, For Certain, Forever, For Always and Still Within the Sound of My Voice, pave the way toward a varied, true-grit set. In short, this is a congenial half-hour of contemporary country music that should put Campbell back in strong.

ROSANNE CASH: King's Record Shop (see Best of the Month, page 147)

THE CHESTERFIELD KINGS: Don't Open Til Doomsday. The Chesterfield Kings (vocals and instrumentals). Selfish Little Girl; I'll Go; Everywhere; Time

Will Tell; I Can't Get Nothin'; You're Gone; Someday Girl; and seven others (eight others on cassette). MIRROR 12, © MC-12.

Performance: Stylized Recording: Good

Apart from having one of the coolest names in rock history, the Chesterfield Kings are a somewhat problematic little group. What they do, extremely well, is re-create the look and sound of every American garage band that sprang up in the wake of the British Invasion in the Sixties, from half-remembered one-hit wonders like the Shadows of Knight or the Chocolate Watch Band to certifiable obscurities that never made it past one performance at a teen club in Kenosha, Wisconsin. As you might imagine, this is an enterprise that verges perilously close to camp, but, to the Kings' credit, reproduce this stuff-every thev wheezy harmonica lick and Brian Jones haircut-with utter seriousness and a scholar's attention to detail. In "Don't Open Til Doomsday," they include, among their own authentic-sounding originals, not only an utterly obscure mid-Sixties Ray Davies song but one that T-Bone Burnett wrote about fifteen years before he got semi-famous.

Points for mimicry aside, there's something vaguely off-putting about the whole business. This is not like reviving the Delta blues or rockabilly. The groups the Kings are taking their cues from were, for the most part, inferior copies of British acts already a generation removed from their American sources. There's a reason the Shadows of Knight or the Chocolate Watch Band never became household names: They weren't all that good, which makes the Kings' apparent obsession with them that much more puzzling. I mean, an occasional cover version is one thing, but trying to base an entire career on "Nuggets"-era restorations is just plain weird. On the other hand, better this than, say, a disco revival, and if you remember the Sixties at all, you might get a kick out of the Kings' dead-on evocation of groups that probably played your local high school.

NATALIE COLE: Everlasting. Natalie Cole (vocals); vocal and instrumental accompaniment. Everlasting; Jump Start; The Urge to Merge; Split Decision; When I Fall in Love; and five others. MANHATTAN ST-53051, © 4XT-53051, © CDP-53051 (54 min).

Performance: Aglow again Recording: Excellent

There is more than a touch of class in Natalie Cole's new album. Recapturing the luster of earlier years, before her career faltered, Cole moves confidently through an assortment of songs that reflect the range of her musical personality, from the deliciously brazen bounce of Bruce Springsteen's Pink Cadillac to the enduring ballad When I



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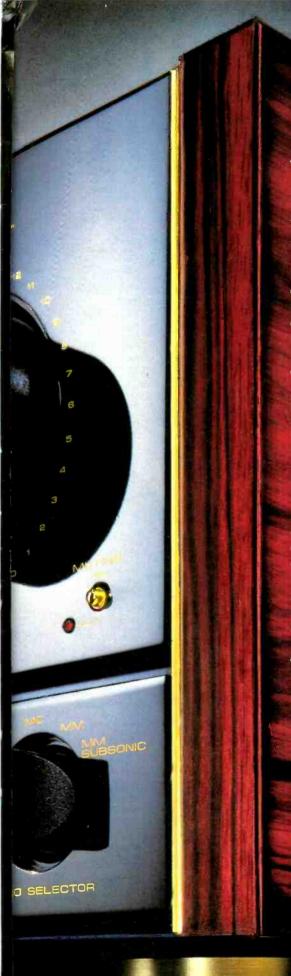






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Fall in Love, which was one of her father's biggest hits. She presents it all with grace, ease, and taste. And she's in good voice, with energy to spare.

Among the composers who have contributed well-crafted songs to this program are Burt Bacharach and Carole Bayer Sager (the pensively sweet Split Decision and In My Reality), but Cole's own gifts as a composer are apparent in the brightly buoyant More Than the Stars. Also appealing are the dance tunes, Everlasting and The Urge to Merge, and the bluesy I'm the One, but Pink Cadillac is the knockout.

CRUZADOS: After Dark (see Best of the Month, page 152)

DUANE EDDY. Duane Eddy (guitar): Paul McCartney (bass); Ry Cooder, George Harrison, James Burton, Steve Cropper, Jeff Lynne (guitar); other musicians. Kickin' Asphalt; Rockestra Theme; Theme for Something Really Important; Spies; Blue City; and five others. CAPITOL ST-12567, @ 4ST-12567, © CDP-12567 (41 min).

> Performance: Great fun Recording: Very good

Duane Eddy, as one of rock's original guitar heroes, was, let's face it, a man with a gimmick. To wit: When confronted with a melody, he'd invariably play it, single-note style, on the bass strings, then drench the whole thing in reverb and tremolo, hence his nickname, Mr. Twangy Guitar. Gimmick or not, Eddy's style has been widely imitated over the years, and now, after a surprise hit in 1986 (a resuscitation of the old Peter Gunn theme with the Art of Noise), the originator is back.

Not surprisingly, the gimmick still works, but I was unprepared for just how much fun the new album is. The most immediately grabby thing here is a Paul McCartney-produced revamp of the Rockestra Theme, which sounds as if McCartney wrote it with Eddy in mind, but there are also some nice bluesy tracks helmed by Ry Cooder, some wonderful Jeff Lynne productions that recall his work with Dave Edmunds, and a couple of Art of Noise contributions that are as effectively creepy and futuristic as ever. Nothing very profound is going on here, to be sure, and anyone who likes contemporary guitarists like Steve Vai may wonder what all the fuss is about, but this is as nuttily entertaining an album as I've heard all year. Try it.

GLORIA ESTEFAN AND MIAMI SOUND MACHINE: Let It Loose. Gloria Estefan (vocals); Emilio Estefan, Jr., Rafael Padilla (percussion); Enrique Garcia (drums); Jim Trompeter, Clay Ostwald (keyboards); Jorge Casas (bass); John De Farria (guitar); Randy Barlow, Teddy Mulet (trumpet); Ed Calle (saxophone); other musicians. Betcha Say That; Let It Loose; Can't Stay Away from You; Give It Up; Love Toy; and five others. EPIC OE 40769. © OET 40769, @ EK 40769 (49 min).

Performance: Intoxicating Recording: Very good

With imagination, solid musicianship, and a touch of daring, Gloria Estefan and Miami Sound Machine have fashioned an exciting new sound. Founded on Latin salsa and the rich musical traditions of their native Cuba, it's embellished with electronic effects and the tuneful trappings of contemporary popular music.

"Let It Loose" opens, however, with what turns out to be the most conventional selection, a pleasant but unremarkable dance tune called Betcha Sav That. The album only gradually reveals, in succeeding numbers, what Estefan and the band really have to offer. The song erupts with pulsating rhythms, peppery Latinesque vocalinstrumental exchanges, and a swaggering saxophone solo by guest Clarence Clemons. Latin meets funk a little later on in Give It Up and the uptempo Surrender.

The second side is truly dazzling. In Love Toy, basic salsa is transformed as Estefan interweaves her kittenish vocals with the group's bop-like chants against a backdrop of irresistible percussion and incisive Latin jazz-piano commentary by another guest artist, Paquito Hechevarria. This incendiary mix is followed by the lyrical beauty of I Want You So Bad, which couples synthesized instrumental effects with Estefan's throbbing vocals.

Gloria Estefan is not just another singing pretty face. She is a formidable vocalist, and she helped write half the songs here along with her co-founders of Miami Sound Machine, Emilio Este-



Duane Eddy: nuttily entertaining

fan and Enrique ("Kiki") Garcia. Their cohesive music and sound prove that there are still new horizons to be explored in popular music.

A FLOCK OF SEAGULLS: The Best of. . . . A Flock of Seagulls (vocals and instrumentals). I Ran; Space Age Love Song; Telecommunication: The More You Live, The More You Love; Nightmares; Wishing (If I Had a Photograph of You); and four others. JIVE/RCA 1034-1-J, © 1034-4-J.

Performance: Sublimely silly Recording: Terrific

You may recall these guys, who were briefly big at the beginning of the MTV era and are presumably now toiling at the Eighties equivalent of a car wash, primarily because of lead singer Mike Score, who had the silliest haircut ever to emerge from the British New Wave. The band posed as space-age visionaries who were, as Dorothy Parker put it, deeply superficial, and at the time nobody seemed to notice that they were, at heart, utterly traditional: a pop singles machine in the tradition of ELO, Abba, or Steve Miller.

This new Flock of Seagulls collection makes that stance fairly explicit. There's one hummable, danceable tune after another, each high gloss and utterly winning. Call it disposable, call it New Wave nostalgia, but there's something oddly touching about the innocence of this music, just as there's something oddly touching about the innocence of a Buddy Holly song. And if you think that's a ridiculous comparison, then listen to this album's standout track, Wishing. A gorgeous, hypnotic love song that you can drift away on for hours, it's every bit as moving as Well All Right or True Love Ways and, despite all the synthesizers and special effects, every bit as simple and direct. As bands with those peculiar gifts are increasingly rare as the Eighties wind down, I can't recommend this album too highly, haircut or no haircut. S.S.

VINCE GILL: The Way Back Home. Vince Gill (vocals, guitar, mandolin, dobro, banjo); Rosanne Cash, Rodney Crowell, Andrew Gold, Emmylou Harris. Bonnie Raitt, Sweethearts of the Rodeo (background vocals); additional vocal and instrumental accompaniment. Everybody's Sweetheart; Cinderella; Let's Do Something; Losing Your Love; Something's Missing; and four others. RCA 5923-1-R8, © 5923-4-R8, © 5923-2 (34 min).

Performance: Almost there Recording: Snappy

In his two previous albums, hotshot singer/songwriter and instrumentalist Vince Gill has sounded like a slave to his influences, notably Rodney Crowell, Rosanne Cash, and Emmylou Harris. In his third album, however, Gill crafts his songs as if he might be trying to find

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Thanks for helping us out!

Stereo Review

his own sound, with the sweet irony that the new record employs those same aforementioned progressive country soulmates, along with Bonnie Raitt, as

Gill's background singers.

Obviously, in the time between albums two and three, Gill has had other things on his mind besides imitating his idols. His wife, Janis, for example, has found big-time success as half of Sweethearts of the Rodeo, and Gill has turned the forced separation of her touring into exemplary song fodder in Everybody's Sweetheart and The Radio. If Everybody's Sweetheart shows a sense of humor Gill previously kept hidden, he puts it to even better use on Baby That's Tough (co-written with Guy Clark), where he sings, "You always take more than you give me/Is that the new math, or what?" Also, for the first time on any of his albums, Gill contributes his own banjo, mandolin, and dobro licks. He's an impressive enough player, especially on the blues turns, but the real plus is that the playing helps propel him out of the Crowell-imitator mode and into something genuinely worth pursuing. Cinderella, for example, is a sort of New Wave, hillbilly/bluegrass cut pointing in a direction that could take Gill to real stardom

As it is, "The Way Back Home" amounts to a sampler of varying styles-all winning and enormously engaging—that Gill is still trying on. One of them, one day, may also furnish a sense of identity. A.N.

GRATEFUL DEAD: In the Dark. Grateful Dead (vocals and instrumentals). Touch of Grey; Hell in a Bucket; When Push Comes to Shove; West L.A. Fadeaway; and three others. ARISTA AL-8452, © AC-8452, © ARCD-8452 (41 min).

Performance: Surprising Recording: Good

Life, my grandfather used to say, is like tuna fish: You either like it or you don't. Undoubtedly the old coot would have said the same thing about the Grateful Dead if he had been a rock fan. because this is the ultimate cult band: You either connect with them or you don't.

That is why, as a non-Deadhead of long standing. I'm so astonished by "In the Dark." Although it sounds no different from the way the Dead have always sounded-like a bunch of stoned-out ex-hippies pretending to rock-it's as attractive and even moving as any album in memory. Perhaps the Dead is a band that actually needed to get old. Certainly their we've-seen-it-all stance is more convincing now that they're all middle-aged, especially since there's a gently rueful sense of loss reflected in the music now rather than their old "That's Karma!" equivocations.

Whatever accounts for the change, the album unequivocably works. There are some splendid songs, such as the



The Grateful Dead: a gently rueful sense of loss

wistful but funny Touch of Grey and the Band-like Black Muddy River, the singing is downright soulful (incredible when you consider the adenoidal horrors the Dead have previously served up), and the slightly chaotic instrumental work actually makes you glad, in this era of electronic, anal-retentive studio perfectionists, that the Dead really are stoned-out ex-hippies pretending to rock. Whatever you think of these guys, this is clearly the most surprising album of the year: the first Grateful Dead record you don't have to be a Deadhead to enjoy.

HEROES: Here We Are. Heroes (vocals and instrumentals); vocal and instrumental accompaniment. Driftaway; Here We Are; Let Me In; Riverside; Dance Your Blues Away; and five others. RCA 5908-1-R, © 5908-4-R, © 5908-2-R (41 min).

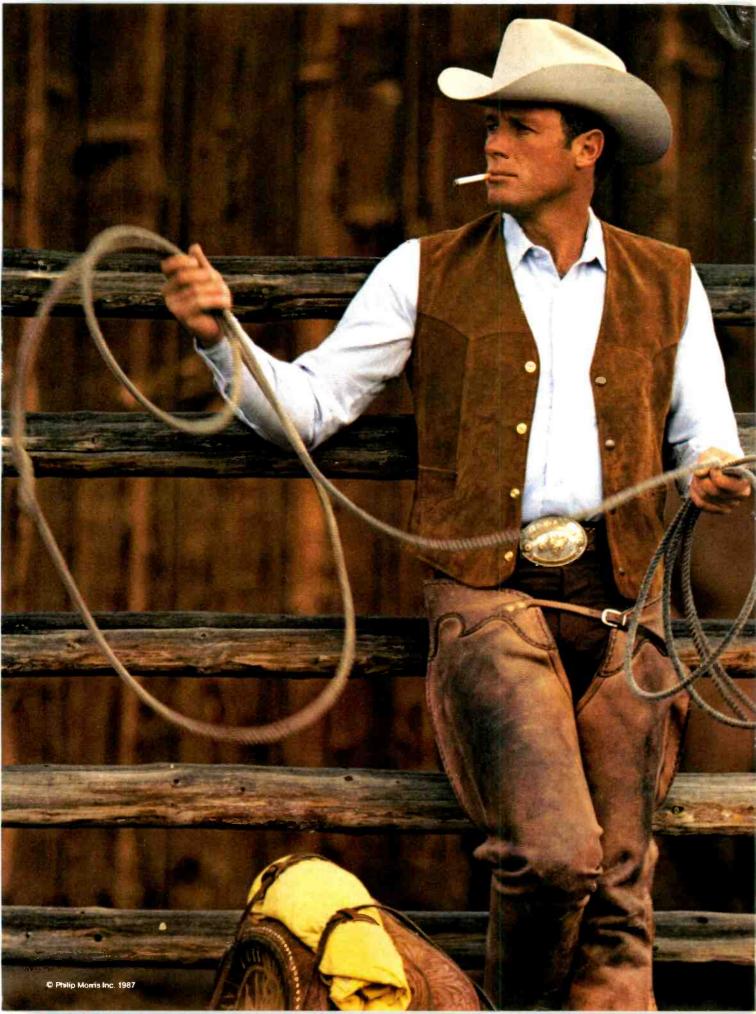
Performance: Funky Recording: Good

Heroes is led by Darren Costin, formerly the drummer for Wang Chung. Yeah, I thought Wang Chung's drummer was a machine, too. Actually Costin sings like a machine. His vocals bob up and down like a couple of pistons while the perky party music slaps away in the background. Costin's stiff delivery, coupled with a heavy timbre, suggest a graduate of the Toastmaster's Club and all but defuse the hip dance-funk arrangements in "Here We Are," a lively if formulaic dance record that will remind you of Howard Jones, Wham, Flock of Seagulls—just about every synth-pop outfit except Wang Chung. There's a nice groove to much of this record, but when a band sounds as if it's fronted by Tom Jones's dentist, it's hard to stay in the mood.

HIGHWAY 101. Highway 101 (vocals, instrumentals); vocal and instrumental accompaniment. Whiskey, If You Were a Woman; Bridge Across Forever: Somewhere Tonight; Good Goodbye; Are You Still Mine; and five others. WARNER BROS. 25608-1, © 25608-4, © 25608-2 (33 min).

Performance: Hit bound Recording: Okay

At first glance Highway 101 looks like your average Hollywood hillbilly band sent out from Central Casting. You know the type. The outfits are too perfect, especially lead singer Paulette Carlson's, the hair is too carefully coiffed (this is the guys we're talking about). and Carlson's diction is suspiciously Southern for a singer reared in Minnesota. Then you read the press kit, and your worst fears are confirmed. The male members of the band, all veterans of the Los Angeles music scene, have SAG cards and movie credits to boot.



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M. Albery: Morris Music/Musical Designs
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PR Rio Piedres: On Too Audio

RI North Providence: Eastern Discount

SC Columbia: Audio Atemative * Greenville. Stereo Video Inc. * Hilton Head Island: Video Pius Inc. * Rock Hill Tart's

SD Sloux Falls: Western Stered

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WV Charleston: Hi-Fi Clinic * Morgan The Sound Source

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Some of that prejudice fades when you put the record on. Make no mistake about it, this is commercial country music, retro honky-tonk, to be precise, with more hooks than a tackle box. The real news, however, is Paulette Carlson. Sounding at once like early Dolly Parton, earlier Brenda Lee, and occasionally like present-day Tanya Tucker with a hint of Stevie Nicks or Kim Carnes lacing the edges, Carlson throws a one-two punch as a vocalist and songwriter.

Already established as a staff writer for the Oak Ridge Boys' Silverline Music, Carlson contributes some of the most memorable songs here-Good Goodbye, Are You Still Mine, and The Bed You Made for Me-all strong women's songs with a woman's point of view. Her compatriots-Cactus Moser on drums, Curtis Stone on bass, and (ves) Jack Daniels on guitar-support her vocally and instrumentally as if they were all joined at the hip. The problem, though, is that they're supplemented by studio pickers, and it's difficult to tell who's doing what.

Finally, there's something disconcerting about this record, a slight attitudinal hovering above the material, the way Karen Black sang country music in Robert Altman's Nashville, for example, or Betty Buckley in Tender Mercies, poking fun at it while professing total immersion. In other words, it doesn't always sound real. But when it does, as in Whiskey, If You Were a Woman, a classic honky-tonker if ever there was one, it hits hard. Highway 101 bears watching.

HIROSHIMA: Go. Dan Kuromoto (keyboards, synthesizers, saxophone, flute, drums); vocal and instrumental accompaniment. Go; I've Been Here Before; 311; No. 9; and four others. EPIC FE 40679, © FET 40679, © EK 40679 (39 min).

Performance: Polished Recording: Excellent

Hiroshima strikes a middle ground between fusion and New Age, two musical schools that were somehow co-opted by the same lifestyle that gobbled up Volvos, Jacuzzis, and Polo shirts. Like most quasi-jazz, the level of musicianship is high. Glistening saxophone and guitar solos drift in and out of layers of synthesizer and percolating synthesized percussion. It's melodic, energetic, funky in some places, and altogether agreeable.

Don't be fooled by the Japanese graphics on the album jacket. The music in "Go" is thoroughly assimilated American jazz/pop. When Oriental instruments like the koto or shamisen are used, they're strictly ornamental. And, as you'd expect from New Age jazz, there are some pretty sappy moments. If you've got a programmable CD player or cassette deck, skip over the three vocal tracks-hokey stuff about romantic rendezvous and the miracle of love. "Go" isn't real jazz, and it won't take you to the inner reaches of the human soul, but it does make for a pleasant drive to the mall.

THE ISLEY BROTHERS: Smooth Sailin'. The Isley Brothers (vocals); vocal and instrumental accompaniment. Everything Is Alright; Dish It Out; It Takes a Good Woman; Send a Message: Smooth Sailin' Tonight; and three others. WARNER BROS. 25586-1, © 25586-4, © 25586-2 (43 min).

> Performance: Old smoothies Recording: Very good

Surely the Isley Brothers are among the longest-surviving funksters on the boards, with their evenly measured, moderately paced style touched by just a bit of the blues. Their formula is a relatively simple one: a few catchy licks delivered with falsetto embellishments and a certain strutting vigor, the emphasis more on sturdy rhythms and impassioned vocal delivery than on melodic or harmonic development. The formula has worked well for them and continues to hold a certain charm.

The Isleys are at their best here in It Takes a Good Woman, which stirs memories of the late Marvin Gave as the boys work up a sensually emotional frenzy with solid down-home flavoring. The sweetly lilting Smooth Sailin' Tonight is another exceptionally appealing number

Fans will find this album comfortably familiar but will note that there are now only two brothers rather than three. O'Kelly Isley died of a heart attack last year, before this album was recorded. and Ronald and Rudolph Isley have dedicated it to him. Their feeling of loss is poignantly expressed in Send a Message (To My Brother). They'll miss him, and so will we.

RICHARD LLOYD: Real Time. Richard Lloyd (vocals, guitar); other musicians. Fire Engine; Misty Eyes; Alchemy; Spider Talk; Lost Child; #9; The Only Feeling; Soldier Blue; and three others (six others on CD). CELLULOID CELL-6135, © CELC-6135, © CELCD-6135 (59 min).

> Performance: Strong Recording: Pretty good

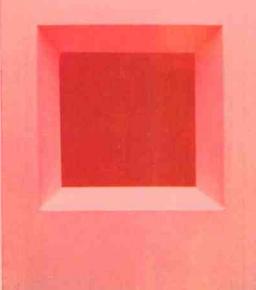
retrospect, Television, Richard Lloyd's old band with Tom Verlaine, was never as radical as people assumed at the time, and it now seems clear that was because Lloyd played Paul McCartney to Verlaine's John Lennon. Which is to say Lloyd had pop tendencies that probably checked Verlaine's more outré avant-gardisms.

On his own, Lloyd now makes music as immediately likable as Television's was initially forbidding. "Real Time," his new live set, recorded this year at C.B.G.B. (the punk shrine in Manhattan that Television helped put on the map), is state-of-the-art garage rock, a

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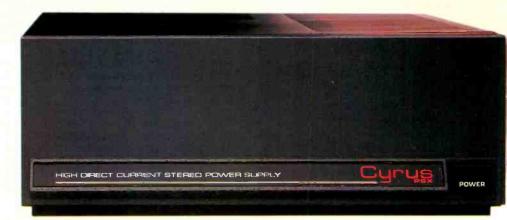


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collection of simple, accessible tunes that Lloyd sings with complete conviction and decorates with lyrical, incisive, and beautifully thought-out guitar work. Lloyd's playing may lack Verlaine's barbed-wire intensity and angular dissonace, but it is touched with something quite a bit rarer—genuine grace.

In short, "Real Time" is a very fine album, one that in a better world would be receiving a massive promotional push by a much larger record label. Pick to click: a dramatic, almost soulful reading of the usually more ethereal Misty Eves.

WILLIE NELSON: Island in the Sea. Willie Nelson (vocals, guitar); vocal and instrumental accompaniment. Island in the Sea; Little Things; Nobody There but Me; Cold November Wind; All in the Name of Love; and five others. COLUM-BIA FC 40487, @ FCT 40487, @ CK 40487 (38 min).

Performance: Masterly Recording: Very good

When Longfellow wrote that all things come to those who wait, he must have been thinking of Willie Nelson's "Island in the Sea." In his twenty-ninth Columbia album Nelson starts out with a flaccid title tune and doesn't give much hope for improvement by the second track. But on the third, Little Things, where a man telephones his exwife to fill her in on the comings and goings of their children and friends, the record starts to home in on the truth and beauty that motivate an artist like Nelson. In a low-key performance that demonstrates the power in studied simplicity, he goes on to examine the pain of love and starting over in Nobody There but Me, for which Bruce Hornsby and the Range add distinctive backing, the sensitive Women Who Love Too Much, and All in the Name of Love, a bluesy, unsettling murder tale from the pen of Booker T. Jones and Will Jennings. Despite the slow start-and a rendition of Tom Paxton's venerable Last Thing on My Mind that doesn't exactly cry to be done-it's obvious that Nelson is simply a master of song interpretation and delivery, with the best phrasing this side of Ol' Blue Eyes. And that, you'll probably agree, is worth waiting for.

THE RAMONES: Half Way to Sanity. The Ramones (vocals and instrumentals). I Want to Live; Bop Till You Drop; Garden of Serenity; Weasel Face; Go Lil Camaro Go; and seven others. SIRE 25641-1.

Performance: The usual Recording: Very good

It's hard to remember now, but way back in 1976, when the Ramones' first album came out, these guys were actually viewed as threatening. Yes, in those heady days the album's grainy blackand-white cover photo, defiantly sludgy recorded sound, and one-minute/onechord songs about beating up brats with baseball bats clearly signaled the end of Western Civilization as we knew it.

In 1987, of course, the Ramones are more like . . . well, just another rock band, though one a tad more primitive than, say, Starship.

Their latest effort, "Half Way to Sanity" (who's kidding who?), contains the usual Ramones pleasures—anarchic



Phil Saatchi: vocal angst

rants (Weasel Face, Worm Man), tips of the hat to Brian Wilson (Go Lil Camaro Go), and sophomoric humor (I Lost My Mind)—but there are a couple of new wrinkles. Most startling, Joey Ramone's voice has deepened with the years, and his endearing nasal whine has mutated into a creepy bullfrog baritone. At times he sounds like Mick Jagger doing his imitation of an eighty-year-old sharecropper. And for sheer chutzpah, it's hard to top the singer's claim in I'm Not Jesus; has anyone seriously thought otherwise?

The rest of "Half Way to Sanity," except the surprisingly psychedelic Garden of Serenity, is the usual head-banging stuff, rendered with almost classic precision by a band that appears to be hanging on to its adolescence with single-mindness enough to make the Beach Boys look mature.

PHIL SAATCHI: Wheel of Fortune. Phil Saatchi (vocals, guitar, keyboards, drum programs); vocal and instrumental accompaniment. Little in Love; King of Another Country; Build a Bridge; Love Is a Mission; Wheel of Fortune; and five others. A&M SP-5152, © CS-5152, © CD-5152 (37 min).

> Performance: Goin' for it Recording: Good

It takes a little time to figure out what Britain's Phil Saatchi is up to. As close as I can tell, he mixes the passionate vocal angst of Sixties rhythm-and-blues with a myriad of instrumental approaches, molding a flexible style that satisfies more often than not. At times he aims for the arid arrogance of, say, Big Country, but more often he comes across like Daryl Hall, especially on Love Is a Mission, or Paul Young, who springs to mind on the title cut and on Poor Man's Paradise. Producer Pete Smith, who did the honors on Sting's "The Dream of the Blue Turtles," surrounds Saatchi with a generally smooth cushion of sound, sneaking in a humble harmonica when needed. Saatchi writes his lyrics with an eye toward exploring dank, grimy corners and crafting intelligent hooks that harpoon the heart, much in the style of Simply Red. Yet in an odd way, for a man who lends himself to so many comparisons, he has a drive, an intensity, and a mark all his own. Keep your eye on this guy. A.N.

SPLIT ENZ: History Never Repeats— The Best of Split Enz. Split Enz (vocals and instrumentals). I Got You; Hard Act to Follow; Six Months in a Leaky Boat; What's the Matter with You; One Step Ahead; I See Red; Message to My Girl; History Never Repeats; and three others. A&M SP-3289, © CS-3289, © CD-3289 (39 min).

> Performance: Archival Recording: Okav

If you only know Split Enz by way of Crowded House, this compilation is worth picking up. There were two incarnations of Split Enz, actually. The first, from 1974 to 1977, was an avant-garde band that didn't realize they'd missed the psychedelic revolution by a few years. They sported wild, primary colors and recorded for Chrysalis ("Mental Notes" and "Dizrhythmia" were two excellent releases from this era). The Enz then underwent a slight attitude adjustment when founder Tim Finn's brother Neil signed on in the late 1970's. This second band was less eccentric and decidedly more commercial and pop-oriented, and this is the one represented on "History Never Repeats."

The selections display the group's facile songwriting, clever word play, and the determinedly lighthearted approach that probably doomed it. My only quarrel is that "Conflicting Emotions," Split Enz's last U.S. album, is underrepresented with just one song, Message to Girl.That's understandable, though—the U.S. public stayed away from it in droves. Neil Finn learned his lesson. He grew tougher and more confrontational with Crowded House.



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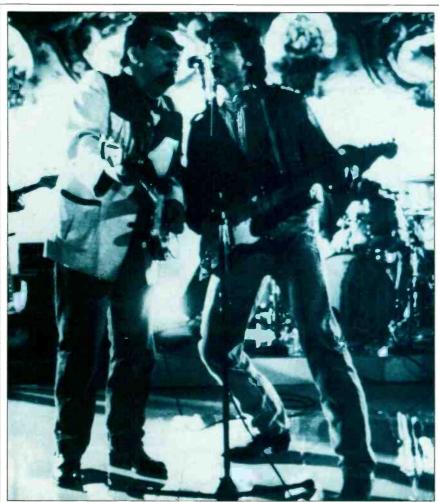
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David Hidalgo of Los Lobos and "La Bamba" star Lou Diamond Phillips

RITCHIE VALENS LIVES!

F you've seen La Bamba, you already know that it's not a conventional rock-star film bio, a variant of The Glenn Miller Story-boy searches for new sound, finds it, becomes a huge success, and then dies. Instead, it's a genuinely powerful family drama in which the music is just one element among many. But that is not to slight the music: The concluding recreation of an Alan Freed all-star rock show is one of the most riveting things of its kind ever. I just mean that the film has a lot more on its mind than you might expect.

The soundtrack album, moreover, is a triumph, the most exciting evocation of Fifties rock anybody has ever recorded. Los Lobos, who richly deserve a hit of this magnitude, were, of course, born to the job of re-creating the music of Ritchie Valens, and they attack all of it-even the obscure Ooh! My Head, a killer rockabilly number-with enormous verve and authority. Everybody else rises to the occasion too, from Brian Setzer's downright eerie impersonation of Eddie Cochran to Marshall Crenshaw's finally being Buddy Holly, from Bo Diddley's sizzling remake of Who Do You Love (how did they get that Fifties Chicago sound in an all-digital recording?) to Howard Huntsberry's showstopping version of Jackie Wilson's Lonely Teardrops, which by itself is worth the price of the album.

In short, La Bamba is an absolutely fabulous record, and as far as I'm concerned, everybody connected with it deserves serious points in heaven. History lessons have rarely sounded so sub-Steve Simels

LA BAMBA. Original-soundtrack recording. Los Lobos: La Bamba; Come On, Let's Go; Ooh! My Head; We Belong Together; Framed; Donna; Charlena; Goodnight My Love. Howard Huntsberry: Lonely Teardrops. Marshall Crenshaw: Crving, Waiting, Hoping. Brian Setzer: Summertime Blues. Bo Diddley: Who Do You Love. SLASH/WARNER BROS. 1-25605, @ 4-25605, © 2-25605 (31 min).

"History Never Repeats" returns to simpler times, Finn's bubblegum days. It's a sound worth remembering. M.P.

STARSHIP: No Protection. Grace Slick, Mickey Thomas (vocals); Donny Baldwin (drums, vocals); Craig Chaquico (guitars). Beat Patrol; Nothing's Gonna Stop Us Now; It's Not Over ('Til It's Over); Girls Like You; Wings of a Lie; and five others. RCA 6413-1-G. © 6413-4-G, @ 6413-2-G (49 min).

> Performance: Professional Recording: Very good

I wore out my original copy of "Surrealistic Pillow" fifteen years ago, so it's a little difficult to find charitable words for "No Protection." The only thing the two albums have in common is a purple-and-gray color scheme. The biggest difference, of course, is that twenty years ago music was a mission for Jefferson Airplane. Now it's a job for Starship. "No Protection" is product, pure and simple. If you think the formula is easy, listen to the hopelessly anonymous releases that roll off the vinyl assembly lines by the hundreds, releases that go nowhere. It's not easy. There are a thousand bands that would give anything to be able to write hits like Nothing's Gonna Stop Us Now. But the band that recorded "Volunteers" "Crown of Creation" wouldn't have been one of them.

BOB STEWART: In a Sentimental Mood. Bob Stewart (vocals); instrumental accompaniment. In a Sentimental Mood; Close Your Eyes; Skylark; Never Let Me Go; Speak Low; Alone Together; and four others. STASH ST-266, @STC-266, © STCD-3 (37 min).

> Performance: Warm and winning Recording: Very good

I've heard Bob Stewart's singing described as being "like a nonplastic Vic Damone." That may be a bit unfair to Damone, but the adjective is right on target in relation to at least a dozen other male vocalists I can think of who make every track they sing sound computer-generated. Stewart, a former band singer (Shep Fields, Henry Jerome, Art Mooney) and Down Beat poll placer, not only knows how to keep the beat of a song moving right along but also, and more important, how to get directly into the expressive heart of the lyricsusing his big, solid baritone to communicate just what those lyrics mean. In other words, he can sound both strongvoiced and vulnerable, even softhearted and plaintive, without ever losing genuine masculinity. That's rare these days.

Stewart's "In a Sentimental Mood" is an alternately jaunty and reflective set of twelve well-chosen evergreens by Van Heusen and Burke, Carmichael and Mercer, Schwartz and Dietz, the Gershwins, and a few others. The lilt and warmth in Stewart's voice is beautifully matched by the trio backings,

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Roy Hemming

KIRI TE KANAWA: Kiri Sings Gershwin. Kiri Te Kanawa (vocals); the New Princess Theater Orchestra, John McGlinn cond. Somebody Loves Me; Boy Wanted; Things Are Looking Up;



Tanya Tucker: back on top

Love Walked In; Love Is Here to Stay; and ten others. ANGEL O DS-47454, © 4DS-47454, @ CDC-47454 (46 min).

> Performance: 'S not so good Recording: 'S strangely mixed

As much as I have to admire Kiri Te Kanawa's efforts to stretch her repertoire to include "crossover" material, I'm afraid her style is mostly wrong as a match for John McGlinn's use of the original arrangements of fifteen Gershwin songs. Despite a beautiful Love Walked In (originally for a tenor), and a delightfully camped-up By Strauss, most of the tracks suffer from Te Kanawa's inability to scale down her operation tones without resorting to a cloyingly nasal sound or to awkwardly clipped and overemphasized pronunciations. The overly close miking also makes her continual scoops for breath all too evident and distracting. In contrast, McGlinn's orchestra and the small chorus used on a few tracks sound as if they're across the hall! Roy Hemming

TANYA TUCKER: Love Me Like You Used To. Tanya Tucker (vocals); vocal and instrumental accompaniment. If It Don't Come Easy; Love Me Like You Used To; I Won't Take Less Than Your Love; Alien; If I Didn't Love You; and five others. CAPITOL CLT-46870, © C4T-46870, © CDP-46870 (33 min).

Performance: On top of things Recording: Very good

In her comeback album last year Tanya Tucker sounded tense, constrained, and afraid to step one hemp hair off the tightrope. In short, she delivered a solid, safe, and not very inspiring collection of songs, one that still managed to score the all-important hits. On "Love Me Like You Used To," however, Tucker goes to the mat for something else—a thoroughly entertaining record. Here, for the first time in years, she sounds relaxed and in control of the project, treating the songs like comfortable old friends

Instead of the customary hit-and-filler formula, "Love Me" serves up an inordinately strong program of highintegrity tunes, from I Won't Take Less Than Your Love, which packs a sweet, unitarian surprise, to Temporarily Blue, which Tucker sings as someone who has suffered for love but won't play the fool. Things heat up with the randy I Wonder What He's Doing Tonight and Heartbreaker, but there is such presence in Tucker's performances that she can sell the less appealing stuff, too, turning I'll Tennessee You in My Dreams into an affecting nugget and rising above the hokiness of Alien. All in all, this is about as satisfying as commercial country music gets these days.

TWISTED SISTER: Love Is for Suckers. Twisted Sister (vocals and instrumentals). Wake Up (The Sleeping Giant); Hot Love; Love Is for Suckers; I'm So Hot for You; Tonight; and five others. ATLANTIC 81772-1, © 81772-4, © 81772-2 (38 min).

Performance: Metallic laugh track Recording: Good

To the uninitiated or unsympathetic, all heavy metal sounds pretty much alike. But the cognoscenti of crunch know otherwise. There are the glamrockers like Mötley Crüe, the pretty boys like Bon Jovi, and the darker, sinister forces like Megadeth and Metallica. Too ugly to vie for the glam set and too tame to scare anyone, Twisted Sister has carved out a niche as the court jesters of metal. Or perhaps the laughing stock. Vocalist Dee Snider is a parody of a caricature, a threat-to-America's-youth straight from Central Casting. His hysterical setpieces are backed by the blandly competent Eddie Ojeda and Jay Jay French, whose twin lead guitars boldly go where virtually every heavy-metal band has gone before. "Love Is for Suckers" is loud, fast, juvenile, and predictable, right down to the obligatory admonition to "Play it loud, mutha!" A better way to play it is not at all.

MARIA VIDAL. Maria Vidal (vocals); Dweezil Zappa (guitar); vocal and instrumental accompaniment. The Real Feel; Do Me Right; I Am a Girl in Spain; House of Love; Soul Love; and five others. A&M SP6-5160, © CS6-5160, © CD6-5160 (37 min).

> Performance: Slither queen Recording: Layered

Okay, I'll be up front about this. I don't dance. At least, I haven't for a few years. It's certainly been a while since I approached the kind of wild abandon

Marie Vidal gets up to daily, judging from this high-energy record. Vidal, formerly part of Desmond Child and Rouge, is a Cuban-American who says her life is fueled by "a yearning need for movement." It's safe to say her yearnings got satisfied here, in ten songs executive-produced by Jimmy Iovine, with a large assortment of producers doing the hands-on work. Vidal has also worked with Stevie Nicks (on "Rock a Little"), and she's no stranger to evocative, sensual lyrics—she co-wrote most of the songs in this album. But with a synthesizer-and-guitar base, she mainly keeps things upbeat and swaying. A couple of years ago, we would have called this disco.

JOE WALSH: Got Any Gum? Joe Walsh (guitars, vocals, keyboards); vocal and instrumental accompaniment. The Radio Song; Fun; In My Car; Malibu; Half of the Time; and five others. WARNER BROS. 25606-1, © 25606-4, © 25606-2 (41 min).

> Performance: Hack work Recording: Okay

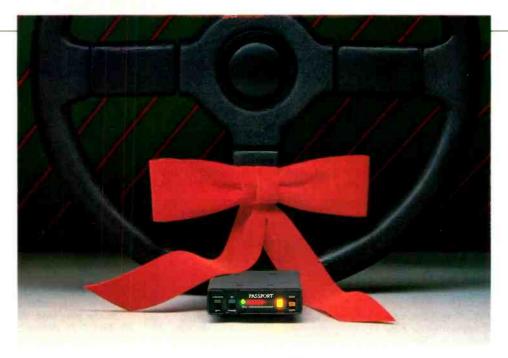
"Got Any Gum?" is an example of the worst sort of music-business self-indul-



Maria Vidal: upbeat

gence and cronyism. Joe Walsh, late of the Eagles, wants to do an album. He doesn't really have any songs, and America isn't exactly storming the gates at Warner Bros. demanding a Joe Walsh album. But what the heck, he's a brand name. There's no budget to record any new bands, but Joe Walsh can do a record if he wants to.

The title is the only imaginative thing about "Got Any Gum?"—usually these



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Cincinnati Microwave Department 384N7 One Microwave Plaza Cincinnati, Ohio 45249-9502 sessions are called something like "Got My Own Thang to Do" or "Alone at Last." Everything else is hack work. Didn't anybody suggest to Walsh that maybe we don't need another mindless paean to "your favorite station playing your favorite song"? Didn't anyone point out that, as a guitarist, Joe Walsh might want to play the instrument as if he had some ideas about it?

Most important, did anyone associated with "Got Any Gum?" really think it was a good record? My guess is that no one at Warner Bros. trusted his or her own judgment enough to point out how awful "Gum" is. Trouble is, these are the same tin-eared industry execs who turn down talented new acts every day. If this were Japan, everyone involved in this disaster would submit resignations.

WHO'S THAT GIRL. Original-soundtrack recording. Madonna: Who's That Girl; Causing a Commotion; The Look of Love; Can't Stop. Duncan Faure: 24 Hours. Club Nouveau: Step by Step. And four others. SIRE 1-25611, © 4-25611, © 2-25611 (40 min).

Performance: Hot and raw it isn't Recording: Good

If nothing else, you have to admire Madonna for the "g" factor: That's right, guts. First off, it takes guts to walk around and call yourself Madonna, even if your parents did slap that one on you. Second, it takes guts to marry a sociopath. Third, it takes guts to pose for girly magazines, and to come out on stage in your skivvies one day and a wedding dress the next. Fourth, it takes guts to sing Like a Virgin and Papa, Don't Preach, the latter being a hell of a record. And fifth, it takes guts to present yourself as a "persona" when everything else you do suggests you're really trash.

Alas, there is nothing gutsy about Madonna's performance on the soundtrack of Who's That Girl, a movie in which the singer goes to great lengths to prove she is not an actress—something gutsy in itself. Obviously, Madonna is saving her better cinematic performances-and all her dance numbers but the fully lobotomized ones that appear here—for another project. On the other hand, Duncan Faure's 24 Hours jogs along nicely, Club Nouveau's Step by Step picks up the mood, and Scritti Politti's Best Thing Ever does keep the toe tapping. A.N.

X: See How We Are. X (vocals and instrumentals). I'm Lost; You; 4th of July; In the Time It Takes; Anyone Can Fill Your Shoes; See How We Are; and five others. ELEKTRA 60492-1, © 6049214, © 60492-2 (38 min).

Performance: Urban cowboys Recording: Good

X's bare-bones, countrified rock, rustic production values, and dark, intelligent lyrics are an acquired taste. But even though "See How We Are" is a smarter album than 99 percent of what's on record racks today, I can't muster much of an appetite for it. Singer/songwriters John Doe and Exene Cervenka have created a brutal and realistic picture of a parched society, many of their images coming from the New York City neighborhoods where artists, musicians, and the poor cohabit-a landscape of dangling pay phones and dingy walk-ups,



Madonna: it takes guts

insane panhandlers, and swarms of street kids on the hustle. It's tough to argue with the dreary American dream served up in the album's title track: "There are seven kinds of Coke, five hundred kinds of cigarettes. This freedom of choice in the U.S.A. drives everybody crazy."

Even when they sing about themselves, there's a tired, depressed honesty in X's lyrics ("I drive two hundred miles or more each day/Just so you can get a look at us/And figure out if we're worth what you paid)." And there's an unfinished quality to the rough harmonies and rambling tunes, a roughness that allows X to communicate directly and forcefully in live performance but seems hollow and self-conscious on record, as if devoting too much attention to the arrangements or performance would somehow dilute the group's hillbillies-in-the-city authenticity. "See How We Are" makes better reading than listening. M.P.

COLLECTIONS THE PRINCE'S TRUST 10th ANNI-VERSARY BIRTHDAY PARTY. Dire Straits: Money for Nothing. Midge Ure: Call of the Wild. Suzanne Vega: Marlene on the Wall. Phil Collins: In the Air Tonight. Big Country: Fields of Fire. And seven others. A&M SP-3906, © CS-3906, © CD-3906 (55 min).

Performance: Variable Recording: Good

Ah yes, another month, another superstar charity record, and, like most of them, it's wildly variable in quality. The weakest effort here is probably from Suzanne Vega. I'm a fan, but I doubt that even she is particularly thrilled by her nervous, out-of-tune performance in Marlene on the Wall. Similarly underwhelming are Rod Stewart's bombastic runthrough of Sailing (a song he has now sung more times than Judy Garland did Over the Rainbow), Phil Collins's inevitable take on In the Air Tonight, and Big Country's Fields of Fire, an anemic performance even by their less-than-stellar standard.

On the plus side, there's an affecting No One Is to Blame by Howard Jones and an extremely spirited Money for Nothing by Dire Straits. The rest, including a chaotic Paul McCartney effort with the whole cast joining in, is sort of by the numbers. If you've seen the video version on HBO, you'll really miss the sight of Prince Charles and Lady Di attempting to dance in the aisles. S.S.

STAR TRACKS II. Cincinnati Pops Orchestra, Erich Kunzel cond. Music from Superman (Williams); Back to the Future (Silvestri); Star Trek I (Goldsmith); Star Trek II (Horner); Star Trek IV (Rosenman); Space Camp (Williams); Cocoon (Horner); and four others. TELARC @ CD-80146 (55 min).

> Performance: Fun Recording: Excellent

There's some surprisingly impressive music here, surprising because most of it is so proudly derivative. Unlike the Starship Enterprise, these composers boldly go where everybody has gone before. So we find lots of ersatz Richard Strauss from John Williams, ersatz Prokofiev from Jerry Goldsmith and Williams, ersatz Copland from Bill Conti, even ersatz John Williams courtesy of James Horner. Much of it is appealing, however. Particularly grabby: the stunning fanfare for the doomed planet Krypton (Williams), the genuinely exotic battle music for Star Trek's Klingon baddies (Goldsmith), and an unexpectedly stirring modernist main title for Star Trek IV (Leonard Rosenman).

The performances are uniformly convincing. Erich Kunzel and the Cincinnati Pops take this stuff every bit as seriously as standard concert fare, and Telarc has, as usual, gone the extra distance. For James Horner's attractive Epilogue from The Wrath of Khan, the label actually leased Leonard Nimoy's original voiceover from Paramount. This may not be imperishable art, but, in the immortal words of the Undertones, it's never too late to enjoy dumb entertainment.



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YESSIR, THAT'S COUNT BASIE

ESTER YOUNG once told me that he had just made some recordings in which he played the clarinet. "When will they be released?" I asked. "I don't know," Young replied, "Norman stashes them until he's ready to put them out." Not long after that, Lester Young died, and a few years passed before his last clarinet sides finally entered the catalog.

Producer Norman Granz has long had a habit of recording his artists whenever a good opportunity comes along and taking his good time releasing the records. Since a recording does not generate royalties sitting in a vault, there is some reason to frown on this practice. On the other hand, having too many new releases on the market can cut into an artist's income because he is then, in a sense, competing with himself. So arguments can be made for and against the practice of sitting on recorded material. All this comes to mind in connection with the release of three "new" Count Basie albums on the Pablo label, each one featuring Basie in a different instrumental setting and none of them, as far as I can tell, previously released.

The earliest recording, "Yessir, That's My Baby," consists of what I presume to be the remnants of the 1978 Oscar Peterson-Basie duet date that two years later yielded their "Night Rider" album. Clearly, the best material was issued first, but aside from the selections marred by use of a chimey electric piano, there is still a bit of meat left on this bone.

The second, quite different set is "Get Together," an octet date. It starts off with Ode to Pres, briskly played in the best Basie small-band tradition, then settles into a relaxed and equally characteristic groove with Basie's Bag, and ends the first side with a medium-tempo number, Swinging on the Cusp,

which features a nice stop-time chorus and brings out the best in Basie and his stellar cast. The second side is mostly laid-back Basic and even better.

Finally, there is "Fancy Pants," which includes Basie's last big-band studio recordings, made in 1983. Only one of his original sidemen, guitarist Freddie Green, remained, but the sound that sustained the band through three postwar decades was intact.

There are undoubtedly more Basie tapes lingering in Pablo's vault, and probably in other places as well. Eventually they will all be released—the great, the good, and the simply fair. These three albums cover all three Chris Albertson

COUNT BASIE AND OSCAR PE-TERSON: Yessir, That's My Baby. Count Basie, Oscar Peterson (piano); John Heard (bass); Louis Bellson (drums). Teach Me Tonight: Tea for Two; Poor Butterfly; After You've Gone; Blues for Roy: Blues for C.T.: Yessir. That's My Baby; Joe Turner, PABLO 2310-923, © 5-2310-923, © 2310-923-2

COUNT BASIE: Get Together. Count Basie (piano); Clark Terry, Harry "Sweets" Edison (trumpet); Eddie "Lockjaw" Davis, Budd Johnson (tenor saxophone); Freddie Green (guitar); John Clayton (bass); Gus Johnson (drums). Ode to Pres; My Main Men; Basie's Bag; Swinging on the Cusp; Like It Used to Be; Pretty Time (medley). PABLO 2310-924, © 5-2310-924, © 2310-924-2 (44 min).

COUNT BASIE: Fancy Pants. Count Basie and His Orchestra (instrumentals). Put It Right Here; Hi-Five; Samantha; Time Stream; By My Side; Strike Up the Band; Fancy Pants; Blue Chip. PABLO 2310-920, © 5-2310-920, © 2310-920-2 (37 min).

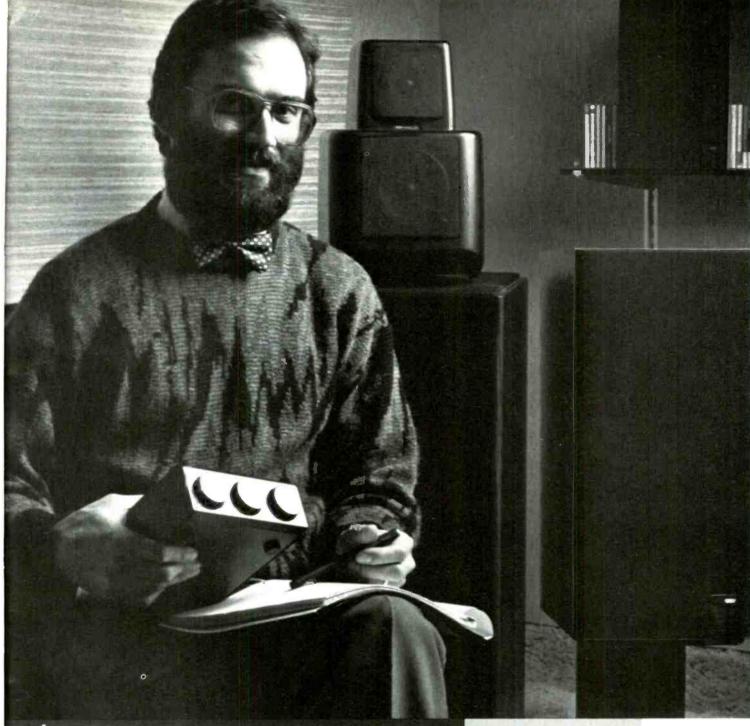
an accordion. I'm not fond of this instrument, but as played here by Francis Varis, it is at least palatable. What this import contains is essentially fusion music with a twist of Konitz, while "Dovetail," on the Sunnyside label, offers a musical and instrumental environment created by Konitz himself along with pianist Harold Danko and bassist Jay Leonhart. Playing without a drummer is somewhat unorthodox, but it works extremely well in this case. The three men started playing "instant arrangements of familiar tunes," as Konitz describes their performances, during a brief club engagement five years ago and recorded this album shortly thereafter. Though the sound is intimate, the range is wide, from the free-form title tune to the wonderfully mellow reading of Sweet Georgia Brown, which gets downright funky. No doubt about it. this is an hour of truly superb modern jazz-despite the wordless vocal that is delivered by Konitz on Penthouse Serenade.

JANIS SIEGEL: At Home. Janis Siegel (vocals); Hiram Bullock, Cornell Dupree (guitar); David Sanborn (alto sax); Branford Marsalis (tenor, soprano sax); Lew Soloff (trumpet); Richard Tee (piano, organ); Mitchell Forman (synthesizer); Buddy Williams (drums); other musicians. Trouble Man; Small Dav Tomorrow; Night Trane; Bob White; From Vienna with Love; Black Coffee, and three others. ATLANTIC 81748-1, © 81748-4, @ 81748-2 (44 min).

Performance: Sizzling Recording: Loaded

As a longtime member of Manhattan Transfer, Janis Siegel knows how to serve up schmaltz and still hold on to her dignity. That's a somewhat schizophrenic trick, keeping your distance while giving your all. Occasionally, however, Siegel gets off the Transfer line and records an album on her ownthis is her second, after "Experiment in White"-and the results are worth writing home about.

At times, Siegel is reminiscent of Annie Ross, of Lambert, Hendricks, and Ross, the Sixties jazz trio and no doubt one of Transfer's main inspirations. But much of the material here gets closer to the bone than what Siegel sings with her usual partners. Ranging from Johnny Mercer to Marvin Gaye, her program is a grab bag of delights, including the two songs she had a hand in writing, Night Trane and The Cruel Master of My Dreams (Malibu), the moody Small Day Tomorrow, and Bob White, Mercer's swing novelty that puts the songbird-and Siegel-to the test. But Siegel, as supple a singer as you'll find anywhere, tosses this off as if she'd been singing it all her life. That kind of deft charm, and the entrancing backing by such folks as Branford Marsalis and David Sanborn, makes for a special album indeed A.N.



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

BEETHOVEN: Symphony No. 3, in Eflat Major, Op. 55 ("Eroica"); Coriolan Overture, Op. 62. Vienna Philharmonic Orchestra. Claudio Abbado cond. DEUTSCHE GRAMMOPHON @ 419 597-1. © 419 597-4, @ 419 597-2 (60 min).

Performance: Very good Recording: Very good

Claudio Abbado takes a lyrical-dramatic view of the much-recorded Eroica, with emphasis on the lyrical. Except for an unexpected tempo pull-up in the massed-string passage following the famous dissonant chordal climax, there is little in the first movement to raise eyebrows. The Marcia funebre is distinguished by exceptionally fine string tone from the Vienna Philharmonic musicians, and the scherzo goes at a more than usually moderate pace. Abbado saves the real fireworks for the variations-finale, which comes off with great brilliance.

The real high point of the disc, however, is a stunningly powerful reading of the great Coriolan Overture, as stirring a reading as I have heard since the legendary Mengelberg of the early 1930's. The sound, from a June 1985 concert recording, is spacious, rich, and finely detailed in texture. Were it not for a mention in the accompanying notes, you'd never know that an audience was present.

BRAHMS: Eight Piano Pieces, Op. 76; Seven Fantasies, Op. 116; Four Piano Pieces, Op. 119 (see Best of the Month, page 152)

BRUCKNER: Symphony No. 7, in E Major (see Best of the Month, page

DVOŘÁK: Piano Trio No. 4, in E Minor, Op. 90 ("Dumky"). MEN-DELSSOHN: Piano Trio No. 1, in D Minor, Op. 49. Beaux Arts Trio. PHIL-IPS • 416 297-1, © 416 297-4, © 416 297-2 (61 min).

Performance: Polished Recording: Crystalline

The Dvořák E Minor Trio, with its unorthodox format of six varied folkflavored movements, has long been a

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Cellist Angelica May

DVOŘÁK'S CELLO CONCERTO

IRTUALLY every eminent cellist has recorded the Dvořák concerto, but in many respects the standard remains the legendary 1937 reading by Pablo Casals with the Czech Philharmonic under George Szell. Now Supraphon has released on CD a recording by a littleknown Casals student from West Germany, Angelica May, that has something of the old master's touch in terms of expansive-intensive phrasing and sheer musicality. She may not have the largeness of tone associated with Casals or, say, Rostropovich, but as far as I am concerned, she has everything else.

May's collaborator is Václav Neumann, leading the Czech Philharmonic, and after the solo work the most impressive aspect of the recording is the absolute rightness of the balance between soloist and orchestra. The cello is integrated with the orchestral fabric in a Brahmsian fashion, as it should be in a work of this scale, and Neumann's contribution is entirely worthy of comparison with Szell's partnering of Casals. You hear dozens of lovely woodwind details that tend to get lost in recordings where the soloist is placed front and center. Neumann also, of course, shows an unerring command of Dvořák's

grand line, and the touching final pages grip the heart without giving way to sentimentality.

May's previous recordings have mostly been of Baroque music, many in collaboration with Gustav Leonhardt, but shortly before this Dvořák recording she undertook with Neumann a complete recording for Supraphon of the works for cello and orchestra by Bohuslav Martinů. From that set the Sonata da camera, the last work the composer wrote in Europe before fleeing to America in 1941, was chosen as the CD coupler for the Dvořák. If it lacks the intensity of such works as the Double Concerto for Two String Orchestras, Piano, and Timpani, it is effective virtuoso fare with a somewhat Neo-Classical Stravinskian opening, an expressive aria-style slow movement, and a brilliant motoric finale. The performance by all concerned is superb, and the recorded sound is again ideal. Highly recommended!

DVOŘÁK: Cello Concerto in B Minor, Op. 104. MARTINU: Sonata da camera for Cello and Orchestra. Angelica May (cello); Czech Philharmonic Orchestra, Václav Neumann cond. SUPRA-PHON/DENON @ 33CO-1152 (66 min).

favorite of mine, and I am delighted with the impassioned treatment it gets here. Even the dreamy episodes smolder, and the fast ones offer all the requisite fire. I respond less readily to the Mendelssohn work, chiefly because of the rather Schumannesque heaviness of the opening movement, but the ardent slow movement, the fascinatingly nervous scherzo, and the brilliant finale put me back in a more Mendelssohnian world. The recorded sound in both cases is bright yet intimate, bringing out the harmonic and linear detail.

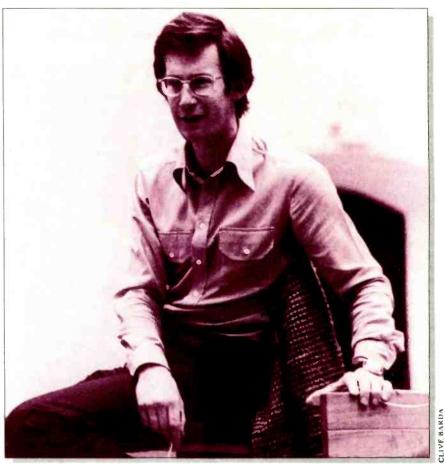
FAURÉ: Requiem, Op. 48. BERN-STEIN: Chichester Psalms. Aled Jones (treble); Stephen Roberts (baritone, in Fauré); London Symphony Chorus; Royal Philharmonic Orchestra, Richard Hickox cond. RPO/MCA @ MCA-6199, © MCAC-6199, ® MCAD-6199 (53 min).

Performance: Excellent Recording: First-rate

Of the several recordings of the Fauré Requiem that have come my way in the last few months, this is quite the most attractive; it is, in fact, one of the most appealing in many years. Richard Hickox, the young director of the London Symphony Chorus and associate conductor of the London Symphony Orchestra, does not make the mistake of enshrouding this radiant work in darkness or piling on weight in the name of sobriety. His reading is more moving than the self-consciously mystical ones of Sir Colin Davis and Carlo Maria Giulini because he allows the music to move on.

Hickox's overall timing is about thirty-five minutes, against Giulini's fortytwo, and that difference is felt in terms of momentum in every one of the work's seven sections. There is never a feeling of undue haste, and there is no lack of weight when called for (as in the big moments of the Sanctus and Agnus Dei), but the natural momentum and clarity Hickox achieves are very much in keeping with the unique character of the work. The clarity especially illumines both the choral and the orchestral coloring, and the soloists, too, fit in much more convincingly than the "star personalities" who so often get these assignments. Stephen Roberts's light baritone is just what is needed, and Aled Jones sounds a little riper than some other trebles who have recorded the "Pie Jesu," but he is a very reliable and tasteful singer.

These same virtues apply to Jones's performance in the middle movement of Bernstein's Chichester Psalms. The work is an imaginative and generous companion piece for the Requiem, effectively balancing Fauré's deep-felt gentleness with Bernstein's deep-felt exuberance, and Hickox's reading is one of the very few I've heard of any of Bernstein's works that can be called as persuasive as the composer's own. The



John Eliot Gardiner: a spacious account of Handel's "Pastoral Ode"

sound on the LP (I have vet to hear the CD) is first-rate in every respect.

Two small flaws in this otherwise splendid production are the mislabeling of the Fauré as "Op. 84" (Leonard Burkat has it right in his notes, of course) and MCA's failure to provide the Hebrew texts for the Bernstein.

HANDEL: L'Allegro, il Penseroso, ed il Moderato ("Pastoral Ode"). Michael Ginn, Patrizia Kwella, Jennifer Smith, Marie McLaughlin (soprano); Maldwin Davies, Martyn Hill (tenor); Stephen Varcoe (bass); Monteverdi Choir; English Baroque Soloists, John Eliot Gardiner cond. ERATO @ ECD 880752 two CD's (114 min).

Performance: Splendid Recording: Fine

Set to Milton's two well-known companion poems, L'Allegro and Il Penseroso, and a third poem, Il Moderato by Charles Jennens, Handel's "Pastoral Ode" is one of his most inventive works, and one of the few pieces of music in which he turned to descriptive writing. Although it is dramatically static, the music is full of poetic and musical riches.

Handel himself omitted the third part, and it is frequently left out in modern performances, but John Eliot Gardiner has quite rightly included it in this recording. (This is not, however, as the notes claim, the first complete recording. That honor goes to the Banchetto Musicale under the direction of Martin Pearlman on Arabesque.)

As we have come to expect from performances of Handel by the Monteverdi Choir and English Baroque Soloists conducted by John Eliot Gardiner, the pacing is spacious, and the soloists, chorus, and orchestra are first-rate. The only drawback here is the diction. Milton's verses are jawbreakers with their constant use of consonant clusters, and singers are apt to be-and, in fact, must be-quite deliberate in order to get everything in. The danger is in treating each syllable with such care that the flow of the verse bogs down and the line is lost, which often happens here, especially in the recitatives. Nonetheless, this Erato recording is a splendid addition to the Handel catalog. S.L.

KORNGOLD: Sonata for Piano No. 1. in D Minor; Sonata for Piano No. 2, in E Major; Sonata for Piano No. 3, in C Major. Matthijs Verschoor (piano). ET-CETERA ● ETC 1042, © XTC 1042, ◎ KTC 1042 (70 min).

Performance: Diligent Recording: Very good

Erich Wolfgang Korngold's First Piano Sonata was written in 1908, when the

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composer was all of eight years old, and the Second came along only two years later. By the time No. 3 appeared, he was a ripe old thirty-four years of age.

Korngold was a prodigy at the level of Mozart and Mendelssohn, and his music was greeted not only with astonishment but with genuine affection. The vogue for his work passed in his own lifetime, however, and he ended up writing for Hollywood. In recent years, there have been several attempts—largely unsuccessful, I believe—to revive his music.

At a time when modernism was taking over the creative mainstream of Central European music, Korngold was a Romantic leftover in the Strauss/Mahler line. This made him popular with the public but hard for serious critics to take seriously. There may be a small thrill in hearing overripe and even decadent post-*Tristan* Romanticism from a subteen, but as the child grows up the curiosity effect wears off.

Nevertheless, it is the Romantic qualities of Korngold's work that have kept it alive. The music almost always sounds as though you must have heard it before: endless musical déjà vu. This is a perfect formula for film music, a genre at which Korngold was eminently successful. More recently, in the wake of the revival of turn-of-the-century late Romanticism—Mahler, Nielsen, Franz Schmidt, early Schoenberg, even Zemlinsky, Korngold's teacher—and the recent neo-Romantic movements in new music, there is again interest in Korngold's work.

The one mature work on this new recording, the Piano Sonata No. 3, is a conscious, low-key attempt to restate the enduring values of melody, tonality, and traditionalism. It includes a minuet, a rondo, and a gorgeous Andante religioso (the best single movement on the album by far). It is tighter and less rhetorical than the kiddie stuff, but it still does not succeed in turning me into a Korngold fan. I hesitate to say it, but the simple truth is that this music has more corn than gold. Matthijs Verschoor, a good pianist from Holland, gives it the old Dutch try, but it isn't Eric Salzman quite enough.

A. LLOYD WEBBER (orch. David Cullen): Variations. W. LLOYD WEBBER: Aurora. Julian Lloyd Webber (cello, in Variations); London Philharmonic Orchestra, Lorin Maazel cond. PHILIPS © 420 342-1, © 420 342-4, © 420 342-2 (46 min).

Performance: Persuasive Recording: Very good

The new Philips album containing Variations by Andrew Lloyd Webber, the composer of Cats, Evita, and Jesus Christ Superstar, involves virtually the entire Lloyd Webber dynasty. It not only features the composer's brother, cellist Julian Lloyd Webber, for whom the work was created, but also includes

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

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a brief tone poem by their father, William Southcombe Lloyd Webber (1914-1982), who is remembered as director of the London College of Music but has not, until now, had any of his own music on records.

Andrew Lloyd Webber composed his Variations (on the last of Paganini's twenty-four caprices for violin solo) in 1977 in payment of a bet he had made with his brother, who wanted something for himself and a "rock band." A short time later he expanded the origi-

nal quintet instrumentation to an octet. and in that form the piece served as the Dance segment of his staged musical Song and Dance. Finally, at Andrew's invitation, David Cullen orchestrated the work, eliminating the electronic instruments of the "rock band" in favor of full symphonic forces while preserving much of the original character of the niece.

As recorded here, Variations is inventive, imaginative, and in large measure engagingly playful, though many listen-

ers may feel there is just too much of it. You can't help noticing that it takes about the same time to perform as the Strauss masterwork for cello and orchestra in variation form, Don Quixote, which sounds a good deal less dated after nearly a full century than this new piece is likely to sound a decade from now. If you liked Andrew Lloyd Webber's Requiem, though, you will like his Variations. Lorin Maazel makes as strong a case for the work, and for Aurora, as he did for Requiem, and Julian Lloyd Webber plays the solo part with the expected proprietary zeal.

LUTOSLAWSKI: Cello Concerto: Dance Preludes; Concerto for Oboe, Harp, and Chamber Orchestra. Heinrich Schiff (cello); Eduard Brunner (clarinet); Heinz Holliger (oboe); Ursula Holliger (harp); Bavarian Radio Symphony Orchestra, Witold Lutoslawski cond. PHILIPS @ 416 817-1, @ 416 817-4, © 416 817-2 (52 min).

Performance: Authoritative Recording: Very good

Witold Lutoslawski is a strong conductor of his own music and has had opportunities to record and rerecord many of his works. This second installment in his new series for Philips brings us his third recording of the remarkable Cello Concerto he wrote for Mstislav Rostropovich in 1970. The other two are not available here, so the new version with Heinrich Schiff, recorded live in January 1986, is especially welcome, and it is a first-rate presentation of a most intriguing work-the most intriguing, I think, in this particular collection. It is surely a far more substantial piece than the double concerto written for Heinz and Ursula Holliger ten years later, a piece that seems too long for what's in it. The Holligers' earlier recording of it, with Michael Gielen and the Cincinnati Symphony, is still circulating. The new one with the composer conducting gains a little in terms of sonic allure, perhaps, but the two performances are very much alike and equally effective.

Between these two major Lutoslawski concertos of recent years, Philips has placed the less ambitious but decidedly ingratiating Dance Preludes, a ten-minute sequence of folk-flavored material composed in 1955 for solo clarinet with harp, piano, percussion, and string orchestra; it makes a charming interlude. All three works, however you may respond to them personally, are given performances of unique authority and vitality.

MAHLER: Symphony No. 7, in E Minor. Frankfurt Radio Symphony Orchestra, Eliahu Inbal cond. DENON ® 60CO-1553/54 two CD's (79 min).

Performance: Wholly committed Recording: Very good

With the "difficult" Seventh Symphony, Eliahu Inbal and the Frankfurt Ra-



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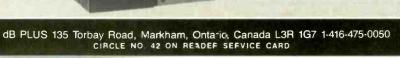
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A JOHN ADAMS SAMPLER

composer-in-residence with the San Francisco Symphony for several years, John Adams had several of his works introduced by that orchestra under Edo de Waart, and some were recorded. De Waart is now music director of the Minnesota Orchestra, but he returned to San Francisco last November to record more of Adams's music for Nonesuch. The product of those sessions is an intriguing collection we might call "A John Adams Sampler," though Nonesuch heads it with the title of the first of the five pieces it includes, The Chairman Dances.

That first piece is a wild but sweetly humorous little fantasy, related to but, I gather, not actually an excerpt from Adams's opera Nixon in China, which had its staged première in Houston in October. The fantastic scene it depicts is described by the composer in his preface to the score: "Madame Mao, alias Jiang Ching, has gatecrashed the presidential banquet. She is seen standing first where she is most in the way of the waiters. After a few minutes she brings out a box of paper lanterns and hangs them around the hall, then strips down to a cheongsam, skin-tight from neck to ankle and slit up to the hip. She signals the orchestra to play and begins to dance by herself. Mao is becoming excited. He steps down from his portrait on the wall and they begin to foxtrot together. They are back in Yenan, the night is warm, they are dancing to the gramophone. ... " Michael Steinberg, in his excellent album notes, observes that as the chairman and the former actress turned culture commissar travel back in time they turn into Fred and Ginger, and "you might imagine the piano part at the end being played by Richard Nixon."

Following The Chairman Dances is Christian Zeal and Activity, a gentle, hymnlike piece with a surprise in the form of taped portions of electronic evangelists' sermons. The nature of each of the next two pieces, contrasting (and quite substantial) fanfares called Tromba lontana and Short Ride in a Fast Machine, is aptly indicated by their respective titles. Finally, there is the expansive Common Tones in Simple Time, a representative and quite fascinating example of characteristic minimalist procedure-or, in any event, characteristic Adams-minimalist technique. In the superb rendering preserved here, the effect is hypnotic.

Everything about this release comes about as close to perfection as one might imagine: the marvelously persuasive performances, the unobtrusively vivid recording, and, by no means least, Steinberg's invaluable explications.

Richard Freed

JOHN ADAMS: The Chairman Dances; Christian Zeal and Activity; Tromba Iontana; Short Ride in a Fast Machine; Common Tones in Simple Time. San Francisco Symphony Orchestra, Edo de Waart cond. NONESUCH @ 79144-1, @ 79144-4, © 79144-2 (51 min).

dio orchestra maintain the high standard set by the previous releases in their distinguished Mahler symphony cycle for Denon. The series needs only the gigantic Eighth and the profoundly elegiac Ninth to reach completion. (We have heard nothing of any plans for Inbal to record a completed Tenth, either in the Deryck Cooke version or an alternative, but presumably we shall get its adagio, which Mahler finished.)

Inbal takes an essentially lyrical, flowing approach to the Seventh, something like Claudio Abbado's 1984 reading with the Chicago Symphony for Deutsche Grammophon. Listening to Inbal's performance, one is always aware that this music is truly a "Song of the Night," as the work has often been called.

The opening baritone-horn solo, intoning the so-called "rowing" motive, is especially notable, and the momentum Inbal gives the entire first movement is far more effective than the funeralmarch tempo some conductors opt for. Inbal takes the second movement—the first in the central Nachtmusik triptych-at a faster pace than Abbado, who is slow for my taste, or James Levine, on RCA, who has it just right. But Inbal handles the ghostly scherzo, the middle movement, with wonderful attention to instrumental coloration, particularly in the reprise, and the serenade movement that rounds out the Nachtmusik is perfection in both mood and detail, such as the mandolin episode toward the close. The echo effects scattered throughout the symphony come off superbly within the acoustic surround of Frankfurt's Alte Oper audi-

Like Levine and Abbado, Inbal gives a remarkable clarity and coherence to the rondo finale, but I still find the music short on substance for its length and complexity. The very end, though, with its tintinnabulating din, has never sounded quite as overwhelming as it does here. Indeed, all of the plectral and bell sounds in the work, such as the distant cowbells in the second movement, linger in the memory from Inbal's recording. Only one thing is lacking in this realization of Mahler's Seventh, and that is the ultimate measure of orchestral virtuosity the Chicago Symphony displays under both Levine and Abbado. But for spirit and conviction, Inbal need bow to no one.

MENDELSSOHN: A Midsummer Night's Dream (Complete). Eva Lind (soprano); Christine Cairns (mezzosoprano); Vienna Youth Chorus; Vienna Philharmonic Orchestra, André Previn cond. PHILIPS 3 420 161-1, © 420 161-4, © 420 161-2 (47 min).

Performance: Affectionate Recording: Rich

MENDELSSOHN: A Midsummer Night's Dream (Excerpts). Overtures: The Hebrides; The Fair Melusine; Ruy Blas. Montreal Symphony Orchestra. Charles Dutoit cond. LONDON @ 417 541-1, © 417 541-4, © 417 541-2 (61 min).

Performance: Overtures best Recording: Outstandingly vivid

André Previn's ten-year-old Midsummer Night's Dream recording with the London Symphony remains highly competitive in Angel's fine CD transfer. His Viennese remake for Philips offers a little less of the score but still a little more than many recordings reasonably regarded as "complete." It is, in any event, quite successful on its own terms. which is to say that the great orchestra plays it all very beautifully and Previn's great affection for the wonderful material is never in question. Eva Lind (who, at twenty-two, appears to be Philips's newest "hot property") and Christine Cairns blend adorably in "You spotted snakes," which, like the rest of the vocal material, is sung in the German text that Mendelssohn actually set. The sound itself is rich and full, with a lovely bloom on it.

The sound London has provided for Charles Dutoit's recording has more than a bloom on it. It is outstandingly vivid, and the stunning brass in the opening of Ruy Blas will surely make this a prime demonstration disc. There is room for the three unrelated overtures in his package because Dutoit does not perform anything like a complete Midsummer Night's Dream, only the overture and the four best-known pieces from the incidental music (the scherzo, intermezzo, nocturne, and Wedding March). His Montreal orchestra is every bit as brilliant as Vienna'sperhaps even more so. He propels the scherzo at a heady pace, in sharp contrast to Previn's more expansive approach, but without any suggestion of breathlessness. There is such a suggestion in the nocturne and intermezzonever in the phrasing itself, but between phrases-and the Wedding March is rather bland. Overall, this presentation is a little short on charm and conspicuously short in terms of omissions, for no one, surely, would want to be without the Fairies' Song and the exquisite vocal finale. The overtures, though, are carried off with so much eloquence and charm that I wish Dutoit had simply given us all of Mendelssohn's works in this genre on one CD.

MENDELSSOHN: Piano Trio No. 1, in D Minor, Op. 49 (see DVOŘÁK)

MOZART: Die Entführung aus dem Serail. Edita Gruberova (soprano), Konstanze; Kathleen Battle (soprano), Blonde; Gösta Winbergh (tenor), Belmonte; Heinz Zednik (tenor), Pedrillo; Martti Talvela (bass), Osmin; Will Quadflieg, Pasha Selim (spoken role). Vienna State Opera Chorus; Vienna Philharmonic Orchestra, Georg Solti cond. LONDON @ 417 402-1 two LP's, @



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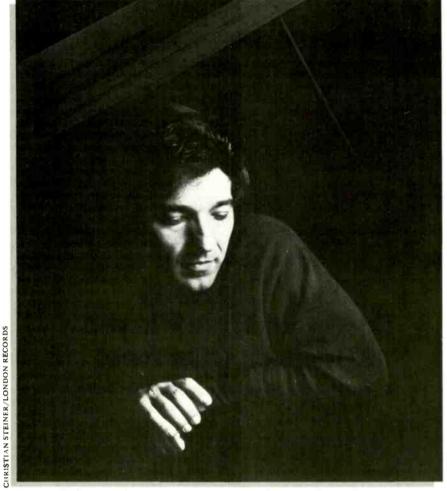
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Vladimir Ashkenazy: a convincing, durable approach to Schubert

417 402-4 two cassettes, © 417 402-2 two CD's (124 min).

> Performance: Stylish Recording: Excellent

I confess that I often find this opera to be the least rewarding of Mozart's major ones. The plot situation is stilted, and the characters are simply paper cutouts. But then I hear a performance like this one conducted by Georg Solti, and my reservations are easily put aside as I succumb to the enchantment of the score. Mozart many times equaled the melodic and instrumental invention of Die Entführung aus dem Serail (The Abduction from the Seraglio), but he rarely surpassed it.

The genesis of this skillfully engineered recording, according to a note by Solti in the accompanying libretto booklet, was a moving performance of the "Traurigkeit" aria by Edita Gruberova in a memorial concert for the conductor Karl Böhm. By the time the recording sessions began, the soprano had decided not to sing Konstanze on stage any more. What we have here, then, is her legendary interpretation of the role recorded when she was still at her vocal height. She sings beautifullyone is tempted to say dazzlingly!

Happily, the same may be said of Kathleen Battle, whose singing is similarly radiant and who plays Blonde for all her saucy pertness. Gösta Winbergh brings dramatic ardor to Belmonte, a role that, like Don Ottavio, can easily be no more arresting than a stick of wood. Heinz Zednik brings warmth and bounce to the role of Pedrillo, and Martti Talvela sings with rich-voiced enthusiasm as Osmin, making a curiously thankless part far more palatable than usual. As the Pasha Selim, the distinguished Will Quadflieg sounds a bit mature, but how fortunate we are to have a recorded performance by this beloved and celebrated actor.

The chorus and orchestra sing and play with verve, polish, and delicacy under Solti, who seems at a new apex of his interpretive powers. As in his other fine recent recordings, he unifies the soloists, chorus, and orchestra to produce a truly integral performance. His Entführung is an exquisite and elegant achievement.

RACHMANINOFF: Prelude in Csharp Minor, Op. 3, No. 2; Preludes, Op. 23, Nos. 1-10, and Op. 32, Nos. 1-13. Ronald Brautigam (piano). ETCET-ERA © ETC 2013 two LP's, © XTC 2013 two cassettes, @ KTC 2013 one CD (74 min. 32 sec).

> Performance: Good Recording: All right

Ronald Brautigam, a Dutch pianist in his early thirties, first came to notice here a few years ago with an attractive recording of works by Beethoven. His playing of Rachmaninoff's twenty-four preludes demonstrates sound musicianship rather than flash, and he responds sympathetically to the character of each of the respective pieces. Brautigam is clearly not bound by any traditions, nor does he pursue eccentricity for the sake of individuality. His is a somewhat lighter approach than one might expect in this music-as if to suggest that Rachmaninoff's profound Russianness will come through without any boosts from the pianist. It's the sort of playing-particularly in such pieces as the G Major and G-flat Major Preludesthat one might expect in, say, the Fauré nocturnes; in any event, it suggested to me that he might be right at home in that sort of material.

Brautigam is actually pretty much at home in the Rachmaninoff, and the freshness of the well-worn G Minor Prelude is bracing. Vladimir Ashkenazy, of course, can give him (and most other pianists) points throughout the sequence, and London's two-CD set in which Ashkenazy plays these twentyfour preludes and the Second Sonata is a little firmer of focus even though those recordings were made earlier than Brautigam's, but it is certainly a convenience to have all the preludes on a single well-filled CD.

SCHUBERT: Piano Sonata in B-flat Major (D. 960); Fantasy in C Major, Op. 15 (D. 760, "Wanderer"). Vladimir Ashkenazy (piano). LONDON @ 417 327-1, © 417 327-4, © 417 327-2 (63

Performance: Expansive sonata Recording: Mostly superb

Schubert's final sonata is one of those big masterworks that lends itself to a variety of approaches and perhaps reveals all of its secrets to no single interpreter. Vladimir Ashkenazy, reliable and stimulating as always, is vastly satisfying-if not quite the last word. For direct comparison, there is Alfred Brendel in the same coupling on one of Philips's recent Silver Line CD's. Brendel is more overtly dramatic, but Ashkenazy scores points-for me, anyway-by taking the first-movement repeat, which not only gives a better sense of dimension to the piece but also enables us to hear the passage Schubert wrote to lead back to the beginning.

Ashkenazy's way with the music might be said to be somewhat less personal than Brendel's, as if he were determined at all costs that Schubert be allowed to speak for himself, with no (Continued on page 200)

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The Audiohouse Electronic Connection	Vero Beach W. Palm Beach	FL
Stereo Designs, Inc.	Atlanta	GA
Macy's	Atlanta	GA GA
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Chroma Electronics Comfort ACR Inc.	Honolulu Honolulu	HI
Electronic Station	Honolulu	HI
Honolulu Audio Video	Honolulu	н
Co., Inc. Sound Specialties of Kona	Kailua-Kona	HI
Spencer Sound Systems	Coralville	IA
Golden Ears Audio Video Electronics Cave	Fairfield Iowa City	IA
Jamison's Music West	Nampa	ID
Team Electronics Columbia Audio/Video	Algonquin All Stores	IL IL
Good Vibes Sound	Champaign	IL
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JR Lloyd Audio Consultants, Inc.	Decatur All Stores	IL IL
The King's Stereo	Springfield	IL
Alan Audio, Inc. Sound p ro	Bloomington Carmel	IN
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The Sound Shop	Manhattan	K:
SOHO Electric Co.	Overland Park	K!
The Stereo Shoppe	Lexington	K
Art Colley's Audio Specialties	Baton Rouge	L
Wilson Audio	New Orleans	L
Trolley Stereo Tweeter Etc.	Belmont All Stores	M
Sound Trak Audio	Brockton	M
Natural Sound, Inc.	Framingham	M
The Music Store, Inc.	Greenfield	M
Tripod Audio Inc.	Northampton	M
New England Car & Home		16.5
Stereo	Springfield	M
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Audio Associates	All Stores	M
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Audio Associates	Rockville	M
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Sound Co.	S. Portland	M
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Audio King	All Stores	M
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Best Sound Company	St. Louis	M
Sound Advice	Gulfport	M
Ideal Acoustics	Starkville	M
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Soundhaus	All Stores	N
Dacia Audio/Video	Hickory	N
Electronics Marketing, Inc.	Grand Forks	N
Tweeter Etc.	All Stores	N
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Sound Incorporated	Northfield	N.
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Video International, Inc.	Brooklyn	N.
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interpretive overlay on the part of the performer. I find it a convincing and durable approach—except perhaps in the final movement, which tends to sound just a little bland compared with some more highly inflected performances but which in its own right is extremely musical.

In the Wandererfantasie Ashkenazy does seem to set out to be more dramatic, regarding it perhaps as more of a conventional virtuoso piece. His progress through this work is as brisk and driving as it is relaxed and expansive in the sonata, and the greater excitement this generates seems to me to render the performance that much less durable than that of the sonata, which promises, and delivers, an altogether deeper level of pleasure.

While Brendel's coupling is at least fifteen years old and stands up well (and costs less), Ashkenazy's 1985 recordings sound superb except for a bit of woolishness in the first movement of the sonata.

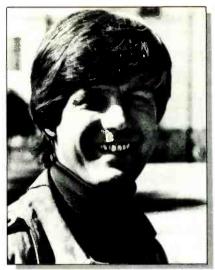
SCHUBERT: Symphony No. 9, in C Major (D. 944, "The Great"). Berlin Philharmonic Orchestra, Daniel Barenboim cond. CBS 1 M 42316, © MT 42316, @ MK 42316 (62 min).

Performance: Has its moments Recording: Good

There's a decidedly greater sense of commitment on the part of Daniel Barenboim and the Berlin Philharmonic in this recording of Schubert's Ninth than there was in their versions of the composer's Third and Fifth Symphonies released by CBS a few months back. Refinement is the hallmark of Barenboim's reading of the first two movements here, but he gives us a freewheeling treatment of the first-movement coda. I miss any sense of lacerating intensity at the climax of the slow movement, but in terms of lyric feeling, things go beautifully indeed. In the scherzo, as elsewhere, we get the full complement of repeats, and there is some lovely woodwind work. Only in the finale do things really begin to fly in terms of musical dynamism: the playing is brilliant all the way. The sound is good throughout, with a welcome but not excessive focus on the woodwind choirs.

When it comes right down to picking a recorded version of the Great C Major with all repeats, I would still go for Neville Marriner's on Philips, especially when it becomes available separately from his current boxed set of the complete Schubert symphonies and orchestral fragments.

SCHUMANN: Liederkreis, Op. 39; Five Lieder, Op. 40, Nos. 1-4; Stille Tränen, Op. 35, No. 10; Der Schatzgräber, Op. 45, No. 1; Mit Myrten und Rosen, Op. 24, No. 9; Der Kontrabandiste, Op. 74, No. 10. Håkan Hagegård (baritone); Thomas Schuback (piano).



Håkan Hagegård: intimate Schumann

RCA **1** 5664-1, **2** 5664-4, **3** 5664-2 (49 min).

> Performance: Communicative Recording: Excellent

This is perhaps the most attractive song recording Håkan Hagegård has made so far, and it is a lovely collection. One might wonder why he limited his coverage of the Op. 40 group to the four songs with Andersen texts and did not include the final Verratene Liebe, but since these four are so infrequently heard (only one seems to be otherwise available on records now), they are especially welcome.

Hagegard's response to the texts as well as the music makes every one of the twenty songs recorded here a complete and deeply satisfying experience. His singing is in general less overtly dramatic than Dietrich Fischer-Dieskau's or Hermann Prey's, and it is lighter in vocal texture as well, achieving an unlabored intimacy in which each song is fully characterized on its own terms. This is the sort of communicativeness that makes such recitals a joy. The voice is in fine shape, Thomas Schuback is the most sympathetic of keyboard partners, the sound is beautifully focused, and the booklet includes an insightful note by George Jellinek as well as full texts and good translations.

VAUGHAN WILLIAMS: Mass in G Minor; Valiant for Truth; The Blessed Son of God; No Sad Thoughts His Soul Affright; Lord, Thou Has Been Our Refuge; O Taste and See; Three Shakespeare Songs. Christ Church Cathedral Choir (Oxford), Stephen Darlington cond. NIMBUS @ NI 5083 (53 min).

Performance: Very good Recording: Very good

This very welcome program of contrasting works by Ralph Vaughan Williams inaugurates a series for Nimbus that presumably will include a good deal of French as well as English material. Both are fields of special emphasis for Stephen Darlington, who two years ago became the latest in the long line of Christ Church Cathedral's choir directors, a line that began with John Taverner in 1526. Vaughan Williams's Mass in G Minor can trace its roots, in a sense, back to the same period, for it is one of the prime results of the composer's productive interest in the music of Thomas Tallis, one of whose actual themes, of course, provided him with the basis of his beloved fantasia for string orchestra.

The luminous quality of the Mass is here beautifully conveyed in the wonderful clarity of both the performance and the recording, which manages to make the most of the cathedral sound without becoming engulfed in it. With the always-welcome Three Shakespeare Songs, it provides a solid frame for the mixed bag of five lesser-known sacred and secular pieces. Valiant for Truth is a 1940 setting of an episode of resolute leavetaking told by John Bunyan in The Pilgrim's Progress. The two pieces that follow it are from the Christmas cantata Hodie, completed in 1954; the second verse of No Sad Thoughts was written by Ursula Vaughan Williams. The two Psalm settings are the only accompanied pieces on the disc, both with organist Iain Simcock. There is a trumpet part as well, played by Jonathan Freeman-Attwood, in the very substantial setting of the Ninetieth Psalm, and an affecting solo for treble (Timothy Mirfin) in the very brief setting of lines from the Thirty-fourth Psalm, composed for the Queen's Communion in the coronation ceremony of 1953. A fine program, handsomely accomplished.

VERDI: Macbeth. Leo Nucci (baritone), Macbeth; Shirley Verrett (soprano), Lady Macbeth; Samuel Ramey (bass), Banquo: Veriano Luchetti (tenor), Macduff; Antonio Barasorda (tenor), Malcolm; others. Chorus and Orchestra of Teatro Communale di Bologna, Riccardo Chailly cond. LONDON O 417 525-1 two LP's, @ 417 525-4 two cassettes, @ 417 525-2 two CD's (137

Performance: Spirited Recording: Very true

Not many seasons ago, Macbeth was a novelty on the operatic stage; now it ranks among Verdi's most popular works—frequently performed, often recorded, and considered appropriate fare by prestigious music festivals. It is an uneven score, marked by "highs" of startling musical invention and almost hair-raising dramatic intensity and by "lows" of rather plodding music and near-bathetic action. But the glories of Macbeth, which marks the beginning of Verdi's middle period and the first manifestation of his life-long admiration for Shakespeare, are of a nobler conception and are more gripping than

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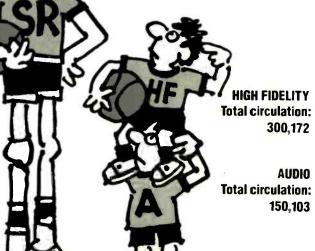
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in any of his previous operas, foreshadowing the dramatic force and sense of characterization in his ensuing output. It is a compelling and fascinating opera.

The new London recording is particularly satisfying, not only for its high sonic quality but also for the artistic contributions of all concerned. Riccardo Chailly's conducting is taut and marked by strong dynamic contrast and rhythmic impulse. Under his leadership, the Bolognese chorus and orchestra perform with accuracy and gusto, heightening the effect of the horrors at hand. The chorus of Witches, for example, singing crisply and making the most of Verdi's staccato scoring, is downright

Leo Nucci, singing the title role, is shown to particularly good advantage. If his voice is less velvety than Sherrill Milnes's was when he recorded the opera in 1976, Nucci is more convincing in evoking the protagonist's terror and guilt. By the same token, Shirley

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Verrett occasionally reaches for the higher notes, and not every one is beautiful, but she knows the role of Lady Macbeth very well indeed and projects the text more powerfully than any other soprano I have heard, with the possible exceptions of Maria Callas and Leonie Rysanek.

Samuel Ramey's voice is ideally suited to Banquo's sonorous utterances, and he delivers his short but moving aria in Act II, Scene 2, with telling effect. Veriano Luchetti and Antonio Barasorda make Macduff and Malcolm effective presences both dramatically and musically, and the remaining members of the cast are just fine.

The recording is ostensibly the soundtrack for a film version of the opera, which may well account for the omission of the ballet music in Act III. Nucci. Verrett, and Barasorda appear in the film as well, while in the other roles actors replace the singers we hear in the recording. Even without the visuals, though, this is a performance with a real sense of immediacy and rare dramatic impact. Recommended. R.A.

VIVALDI: The Four Seasons. Jaime Laredo (violin); Scottish Chamber Orchestra, Jaime Laredo cond. MCA CLASSICS O MCA-5843, © MCAC-5843, © MCAD-5843 (38 min).

Performance: Solid Recording: Very good

It seems de rigueur for every violinist to record The Four Seasons at least once and for every record company to have at least one version in its catalog. So here is Jaime Laredo's reading for MCA Classics. Featuring Laredo as both soloist and conductor, the performance is technically solid and brilliant. Laredo plays the concertos as written, without the embellishments Vivaldi himself would have expected. He neither adds nor detracts much of anything from these over-recorded though still delightful works.

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Discs and tapes reviewed by Robert Ackart, Chris Albertson, Louis Meredith. Alanna Nash

ALABAMA: Greatest Video Hits. Alabama (vocals and instrumentals). I'm Not That Way Anymore; Forty Hour Week (For a Livin'); The Closer You Get: Dixieland Delight; Feel So Right; and four others. PIONEER PA-87-185 LaserDisc (37 min).

Performance: Excellent Recording: Excellent

One major rock publication has called Alabama's output "music for the modern dentist." If that was intended as a slap, Alabama's four members needn't worry. They are a big hit with the public, and their music is quite capable of delighting people and critics—like me—whose interest generally falls somewhere outside of country music. Alabama's broad appeal is not hard to understand after you've seen this Laser-Disc collection of nine of the group's videos, including some of their hits from 1983 to 1986.

In mood and texture, the songs range from toe-tapping treks between Mobile and Motown to syrupy fare that might have come right off Lionel Richie's shelf. Visually, the tracks appear to reflect a variety of film budgets, from low-end-but-well-captured concert footage to complex production numbers like Forty Hour Week. It all adds up to nearly forty minutes of music that's bound to delight current Alabama fans and win over some new ones. LaserDisc technology adds superb picture clarity and stunning digital sound.

ALL THAT BACH—A CELEBRA-TION. Maureen Forrester, Rosemarie Landry, Keith Jarrett, Christopher Hogwood and the Academy of Ancient Music, the Canadian Brass, the Moe Koffman Quintet, other musicians. VAI 69037 VHS Hi-Fi, 29037 Beta Hi-Fi (50 min).

Performance: Splendid variety Recording: Good

There is hardly a musical idiom that hasn't been tested on the music of Johann Sebastian Bach, so it is not surprising to find that someone took the Bach Tercentenary in 1985 as a cue to assemble an unusual variety show called "All That Bach." I recommend this Canadian-made release to anyone who appreciates music with a touch of humor, which is not to say that the video, subtitled "A Celebration," does not have its serious moments. It does, but a casual air prevails from the very beginning, when contralto Maureen Forrester and soprano Rosemarie Landry have



HELP!

HE Beatles' second feature film, Help!, has not worn as well as the brash and innovative A Hard Day's Night. Some of the gags are forced, the satirical digs are no longer timely, and at times the comic goings-on are so over-the-top that the boys seem, as John Lennon observed years later, like extras in their own movie. That allowed, however, it still has a lot to recommend it-a number of genuinely funny sequences (Ringo and the tiger make me giggle even now), a great Swinging London ambience, and, of course, one of the all-time knockouts of a score.

Help! also has the inspired direction of Richard Lester. Watch his You're Gonna Lose That Girl sequence, which to this day is still the most beautifully shot and edited look at a band in a recording studio, and you'll realize that if anybody deserves the credit for inventing rock video, Lester does.

For the new Criterion home videodisc of Help!, a little something extra has been added: a reworked soundtrack. The film has been shown in mono for

many years, but Bruce Botnick, the legendary engineer who did all the Doors albums, has digitally transferred the songs (apparently from the same masters used for the new compact disc) so that for the first time ever the music does full stereo justice to what the Beatles recorded. The impact is just about overwhelming, as if a veil had been lifted from the film. Suddenly you're right there with the band. Add in Criterion's superb picture quality (the color is simply gorgeous, far better than MPI's competing tape versions) and critic Bruce Eder's intelligent liner notes, and what you get is, unquestionably, the definitive Beatles video artifact. Essential viewing—and listening.

Louis Meredith

THE BEATLES: Help! With the Beatles, Victor Spinetti, Eleanor Bron, Roy Kinnear, Leo McKern. Help!; You're Gonna Lose That Girl; You've Got to Hide Your Love Away; Ticket to Ride; I Need You; The Night Before; Another Girl; Help! (Reprise). CRITERION 2004L videodisc \$39.95.



UB40: to Russia with reggae, authentic or not

Rhythm; and fourteen others. PIONEER PA-87-181 LaserDisc (90 min).

Performance: Jolly good show Recording: Very good

This jingle composer from Brooklyn has come a long way, and you have to believe Barry Manilow when he tells his audience of forty thousand British youths that the Blenheim Palace concert is the high point of his career. Blenheim Palace, Winston Churchill's ancestral home, is currently occupied by the Duke and Duchess of Marlborough, who attended this 1984 concert.

Manilow doesn't have a great voice, but he writes the kind of songs people like, and he is an excellent showman. The videodisc contains an hour and a half of his performance, backed by a large orchestra (with strings) and a sizable choir. The choir is spontaneously augmented by the huge audience when, heading for an emotional finale, Manilow intones Vera Lynn's wartime tearjerker We'll Meet Again. With thousands of lit candles dotting the vast concert area and the audience held firmly in hand, Manilow seems reluctant to let go. Somehow we understand. This was a tremendously successful show, the kind of event only a few entertainers can hope to experience. Fortunately for Manilow fans, it is well preserved here, with digital sound.

THE PRINCE'S TRUST ALL-STAR ROCK CONCERT. Elton John, Paul McCartney, Eric Clapton, Mark Knopfler, Howard Jones, Phil Collins, others (vocals and instrumentals). Better Be Good to Me; Tearing Us Apart; Your Song; In the Air Tonight; Money for Nothing; Every Time You Go Away; Sailing: and four others. MGM/UA ML101089 VHS Hi-Fi, Beta Hi-Fi, and videodisc (59 min).

Performance: Busman's holiday Recording: Excellent

This home video is admittedly short on surprises—Tina Turner is sexy, Phil

Collins is goofy, Mark Knopfler is balding, so what else is new?—but as superstar indulgences go, it's also pretty entertaining. What's most impressive about it is the core band. Despite the presence of celebrities like Eric Clapton and Howard Jones, the concert actually coheres into something approaching a groove most of the time.

The individual star turns, of course, are wildly variable. Rod Stewart, for example, is smarmy even by his own overweening standard, but Paul Young, generally considered to be a tad inauthentic as white-boy soul singers go, comes off here as almost the real thing, especially in his duet with George Michael. To see Young and Michael together, in fact, is immediately to comprehend the difference between feeling and fashion. The rest of the show, especially Paul McCartney's runthrough of old Beatles songs, is essentially highpriced garage rock, charming for its lack of pretension against the odds, but there are a couple of moments-Prince Charles and Princess Di trying to rock out in their seats, the look of amazed delight on Bryan Adams's face when he actually gets to sing harmony with McCartney-that you'll probably remember for more than fifteen minutes. In short, a diverting time waster, impeccably recorded.

SID & NANCY. With Gary Oldman and Chloe Webb; Joe Strummer, the Pogues, Pray for Rain, other musicians (vocals and instrumentals). EMBASSY 1309 VHS Hi-Fi and Beta Hi-Fi, 13096 videodisc (111 min).

Performance: Harrowing Recording: Excellent

Well, Romeo and Juliet it isn't (or even John and Yoko), but director Alex Cox's Sid & Nancy, the more-or-less true story of the doomed romance between punk rocker Sid Vicious and socialite/groupie Nancy Spungeon, is one of the most riveting and original film biographies in recent years.

The Sid and Nancy story was, of course, in many ways a menage à trois, the third party being a mutual heroin addiction. As a result, the last half of the film, as the couple descends into a strung-out rock-and-roll version of The Lower Depths, may be a little too harrowing for some folks. Others, myself included, might complain that we get little sense of the historical and cultural milieu in which it all takes place, or that the punk supporting characters are about as unbelievable as the hippies in old American International exploitation films.

These are niggling criticisms, however, in the face of the film's wicked sense of humor, surprising moments of almost lyrical tenderness, and, especially, the astonishing performances by Gary Oldman and Chloe Webb as the principals. Oldman and Webb are not only totally believable, but they actually make you care for people who, as the film makes quite clear, were tragically self-destructive at best and creepy, narcissistic nonentities at worst.

Embassy's picture and sound quality are first-rate, and the re-created Sex Pistols songs on the soundtrack, apparently featuring guitar work by ex-Pistol Steve Jones, are as close to the genuine item as needed. All in all, this is a genuine home-video event, though not one for the squeamish.

L.M.

UB40: CCCP—The Video Mix. UB40 (vocals and instrumentals). Orchestral Dub; All I Want to Do; Keep On Moving; Watchdogs; Tell It Like It Is; Please Don't Make Me Cry; Johnny Too Bad; Don't Blame Me; and five others. A&M VC 61715 VHS Hi-Fi, BC 21715 Beta Hi-Fi (60 min).

Performance: Great music Recording: Excellent

From all accounts, UB40's recent Russian tour was a fairly stormy affair, with this left-leaning reggae band coming up against the harsh Orwellian realities of pre-Glasnost Soviet life, but very little of that is reflected in this video documentary. Mostly we see the usual backstage horsing around, shopping sprees (there's a nice pseudo-Avedon montage of band members trying on fur hats), and interviews with fans, just as in about a zillion other tour documentaries. Fortunately, the main focus is on the music, a generous sampling of the band's best material, and while director Brian Travers's camera work is routine, the band's performances are uniformly splendid.

These guys may not be the most authentic reggae act in the world, but they make awfully seductive noises, and the hi-fi sound is similarly excellent. Strictly on economic grounds, though, you're probably better off with the audio-only equivalent, "CCCP Live," also on A&M, in all three formats. Some music is better heard than seen, even with pretty pictures of Lenin's Tomb. L.M.

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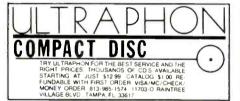
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by Ralph Hodges



The Mighty Klipschorn

T was born in 1940, three years before I was, and eighteen years later, when I first encountered it, it outsized me considerably—and it still does. The very sight of it alarmed ordinary people, who couldn't comprehend how or why a mere loudspeaker might be so bulky, imposing, and large. The sound of it alarmed them more. I think it's accurate to say that, back in the Fifties, nothing else could play as loud, over as wide a bandwidth, as the Klipschorn. Paul Klipsch informs me that today's Klipschorn can reproduce the peak levels of the Arkansas Symphony Orchestra (about 105 dB, from a recording perspective) with three-tenths of a watt maximum input.

Should we care about remarkable efficiency now that kilowatts of power are on tap if we want to pay for them? Klipsch says yes. "Loudspeaker efficiency is commensurate with loudspeaker quality. Quality is the inverse of distortion. If you double the efficiency, you halve the distortion. It's as simple as that."

What sort of distortion? "Reviewers test for harmonic distortion, but so what?" asks Klipsch. "Harmonics are natural formations of music and speech, and relatively harmless

unless present in obnoxious quantities. But when you mix two tones and come up with several additional tones never present in the input, and not harmonically related to the input, that's trouble. I call it modulation distortion."

Modulation distortion, if I understand Klipsch's description, received much attention a few years ago in its most basic form: Doppler distortion. The idea was that when a speaker cone is driven back and forth over long excursions by a vigorous low frequency, it will warble a higher frequency that it is simultaneously trying to reproduce. Instruments-and perhaps even the earwill analyze the warble effect as spurious sideband frequencies. The existence of this type of distortion is unquestioned, but its audibility and objectionableness have been debated long and hard.

Horn loading a driver can achieve astounding sonic outputs with a bare minimum of excursion, and hence a minimum of Doppler distortion. As the name suggests, Klipschorns are horn-loaded speakers. Paul Klipsch tells the story of an enthusiast who constructed the intricate folded bass horn of the Klipschorn in Plexiglas to show its operation. The transparent design was not commercially feasible, requiring over a thousand man-hours and high material costs, but it enabled observers to see the Klipsch woofer moving perhaps a millimeter, peak to peak, as it reproduced a signal of about 50 Hz at a level that had a normal cone woofer chugging away with 34-inch throws.

To get a horn to function with uniform response over a useful "high-fidelity" frequency range, without internal losses, distortions, and audible structural vibration, is a trick few speaker manufacturers attempt except, occasionally, in the middle and high frequencies. A principal problem is that when a horn is driven outside its proper bandwidth, all loading benefits utterly disappear, and the response drops more abruptly than it would with any other type of enclosure design.

A bass horn, which is what most of the Klipschorn is—its midrange and tweeter horns occupy a small volume at the top of the enclosure-requires considerable length, a carefully calculated flare rate, and a large mouth area to approach the deep lows with its superior efficiency. Some audiophiles have converted their basements and garages into bass horns, with stentorian results. By these standards, the Klipschorn is trivially small, but learned estimates say that it handles itself competently down toward 40 Hz. Furthermore, excursion is tightly limited by a back-loading interior woofer chamber, insuring that response disappears at lower frequencies instead of becoming freighted with modulation distortion.

The necessary horn length and flare rate are achieved by folding the horn back upon itself until it blossoms out to the sides of an irregular pentagonal enclosure with a 90-degree back meant to be placed in a room corner. Audiophiles often suspect that the room corner is meant to serve as the final flare of the horn, but Paul Klipsch makes no such claim. He merely utilizes the corner to augment efficiency.

Not many people know what sort of drivers are employed in the Klipschorn. The tweeter and midrange are deep behind the grille cloth, and the woofer is entirely buried within its horn labyrinth. As it happens, within the past two years Klipsch has acquired some of its major outside suppliers and brought them inboard. Drivers are not what Klipsch is all about, however. As the man says, "One of our dealers compares drivers to the strings on a violin. He couldn't care less about the cat from which the gut was extracted. This is an exaggeration, but still, in my mind, the box remains more important than the driver."

Klipsch makes what amounts to a full line of home loudspeakers at present, but the mammoth Klipschorn, sold in quantities of about one thousand a year, is a rare find in any dealer's salon. By all means listen to it if you can locate one. Not everybody likes the way it sounds, especially those who can't make room for it. But it is a design that has persisted, essentially unchanged, since before many of us were born—the only such speaker design, I might add.





Manager 10

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