

**BUYING
A RECEIVER**

NOVEMBER-DECEMBER 1979 \$1.35

hi-fi stereo

BUYERS' GUIDE

RECEIVER FEATURES

LIGHTS, KNOBS, SWITCHES, BUTTONS: WHAT TO BUY AND WHY

**SPEAKER
DESIGN
CONCEPTS**
A SAMPLING OF
SUCCESSFUL
INNOVATIONS

**SUPER
DISCS FOR
PHILES**
ENDING
AND
TO-DISC
DINGS

TAPE
DES IT
RE UP?

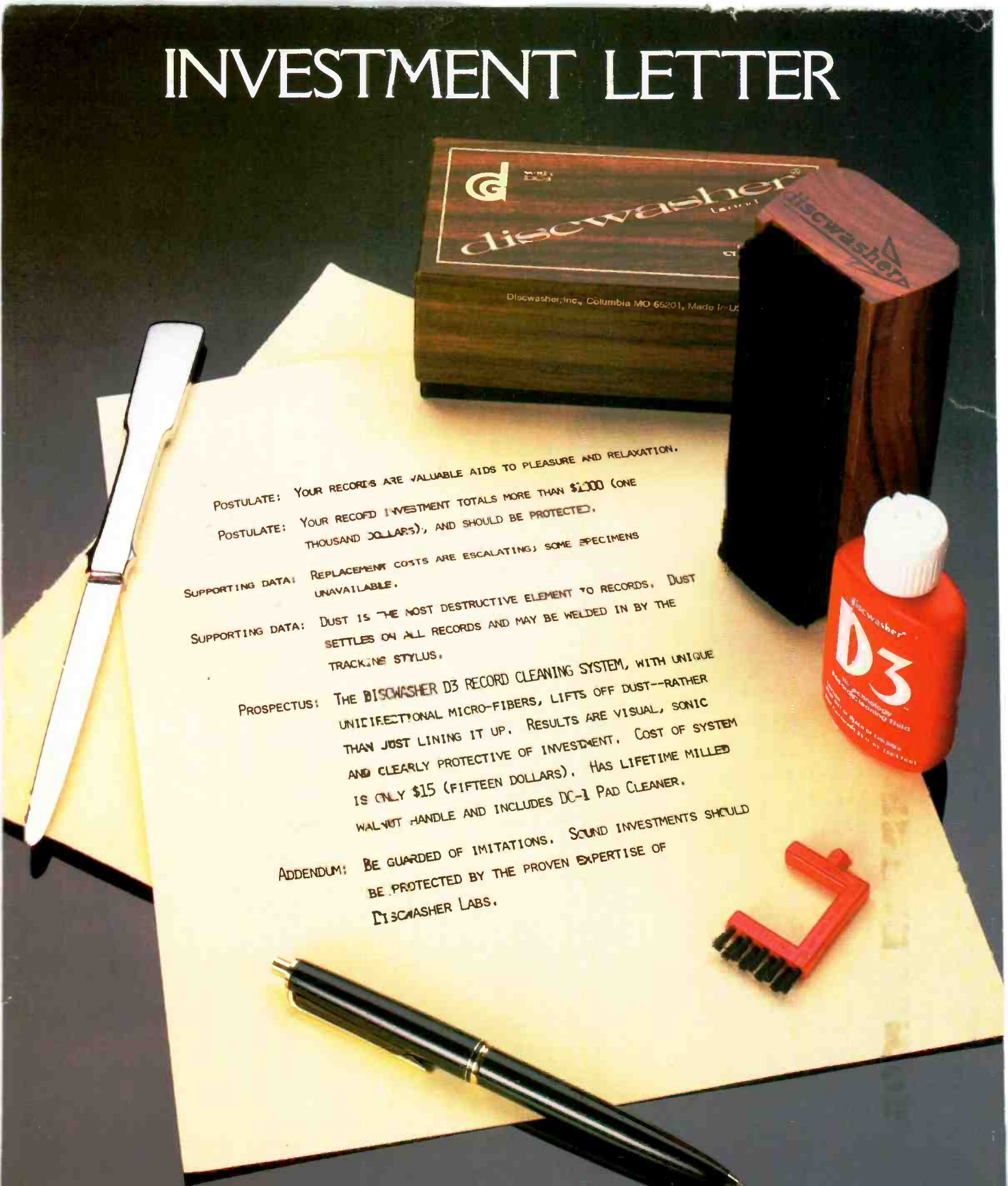


**EXTENSIVE
TEST REPORTS**

FEDERAL
FREEDOM
1380
AUBURN
MA 04210
-F-0 01 160NOV79



INVESTMENT LETTER



POSTULATE: YOUR RECORDS ARE VALUABLE AIDS TO PLEASURE AND RELAXATION.

POSTULATE: YOUR RECORD INVESTMENT TOTALS MORE THAN \$1000 (ONE THOUSAND DOLLARS), AND SHOULD BE PROTECTED.

SUPPORTING DATA: REPLACEMENT COSTS ARE ESCALATING; SOME SPECIMENS UNAVAILABLE.

SUPPORTING DATA: DUST IS THE MOST DESTRUCTIVE ELEMENT TO RECORDS. DUST SETTLES ON ALL RECORDS AND MAY BE WELDED IN BY THE TRACKING STYLUS.

PROSPECTUS: THE DISCWASHER D3 RECORD CLEANING SYSTEM, WITH UNIQUE UNIDIRECTIONAL MICRO-FIBERS, LIFTS OFF DUST--RATHER THAN JUST LINING IT UP. RESULTS ARE VISUAL, SONIC AND CLEARLY PROTECTIVE OF INVESTMENT. COST OF SYSTEM IS ONLY \$15 (FIFTEEN DOLLARS). HAS LIFETIME MILLED WALNUT HANDLE AND INCLUDES DC-1 PAD CLEANER.

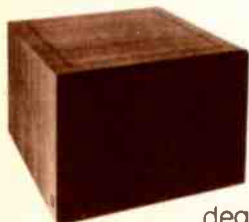
ADDENDUM: BE GUARDED OF IMITATIONS. SOUND INVESTMENTS SHOULD BE PROTECTED BY THE PROVEN EXPERTISE OF DISCWASHER LABS.

Seek out Discwasher® products at dealers worldwide who are interested in preserving your musical portfolio.

 discwasher, inc.
1407 N. Providence Rd
Columbia, Missouri 65201



New shapes of sound from RTR THE RHOMBUS SUBWOOFER...THE PYRAMIDAL SATELLITE



Now your speaker system can reproduce true bass. With the new RTR DAC/1 Rhombus Subwoofer, low frequency instruments and deep tones emerge with a degree of undistorted realism never

before heard in a home system.

In Rhombus, RTR engineers have created the *only* enclosure which combines advantages of both vented and acoustic suspension systems — without their shortcomings. This is the Differential Area Coupler* system, the first all-new enclosure design in a quarter century.

Rhombus delivers flat frequency response from 16 Hz to 150 Hz. Below 16 Hz, the system cuts off rapidly to eliminate modulation distortion. Bass peaks and resonances are wiped out by impedance leveling circuits and the DAC* format.



Pyramidal design yields an advanced small speaker. The RTR PS/1 pyramidal satellite loudspeaker solves most problems inherent in small speakers.

Geometrically, pyramid form follows function better than rectangular enclosures. Space for a major woofer in a minimal package facilitates lower frequency response and higher, undistorted

output levels. Non-parallel sides smooth bass reproduction and curtail internal resonance.

Capitalizing on this format, the RTR PS/1 Satellite incorporates an array of RTR components in a dynamic 3-way speaker system. A new total-immersion-damped woofer cone reduces sonic coloration and eliminates breakup. Carbon fiber impregnated soft dome midrange and soft dome tweeter offer superlative response with wide dispersion. All told, these are live performance audiophile speakers in a package destined to become classic.

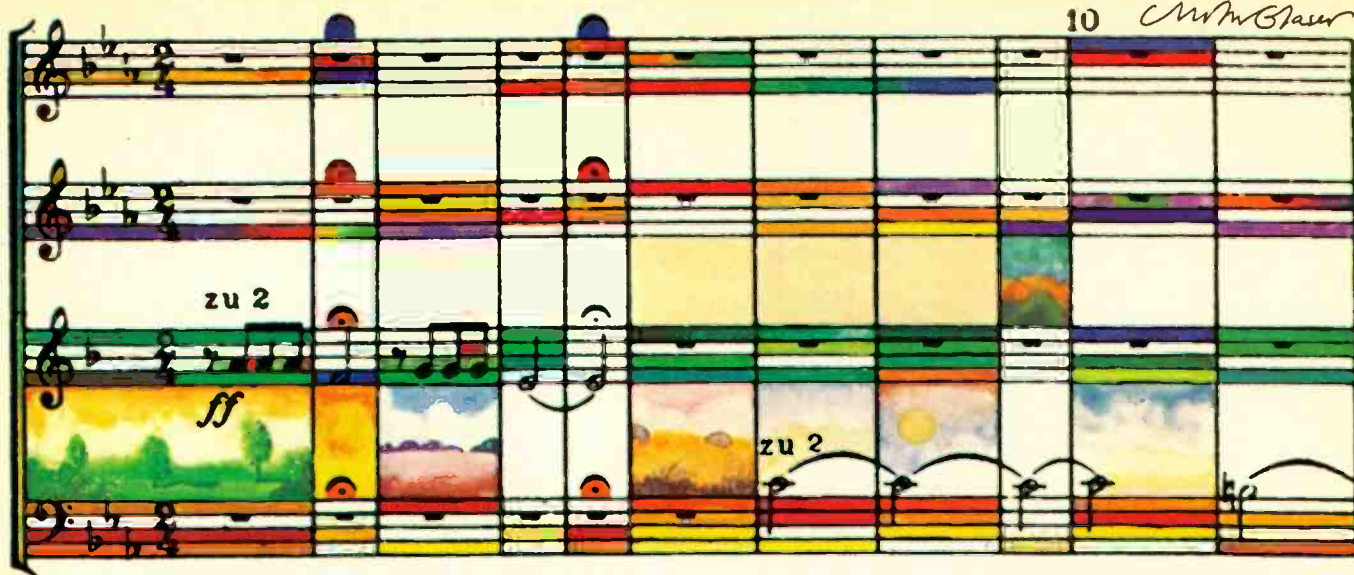
New shapes combine into a formidable system. Match Rhombus Subwoofers and PS/1 Satellites. Be rewarded with hauntingly realistic sound reproduction. Attack and dynamics of actual performance reproduce with smoothness, accuracy and superb detail. This system defines new standards of performance for *all* sonic parameters. Equally startling, the price is well below other state-of-the-art contenders. Audition it soon at your RTR dealer...and believe your ears.

RTR Industries, 8116 Deering Avenue
Canoga Park, CA 91304

*Pat. applied for.



**Listen...
you'll be hearing
more from RTR.**



Sony Tape. Full Color Sound.

Music is full of color. Incredibly beautiful color. Color that you can hear... and (if you close your eyes) color you can almost see. From the soft pastel tones of a Mozart to the blinding brilliant flashes of hard rock to the passionately vibrant blues of the Blues.

In fact, one of the most famous tenors in the world described a passage as "brown... by brown I mean dark... rich and full."

Music does have color. Yet when most people listen to music they don't hear the full rich range of color the instruments are playing. They either hear music in black-and-white, or in a few washed-out colors.

That's a shame. Because they're missing the delicate shading, the elusive tints and tones, the infinite hues and variations of color that make music one of the most expressive, emotional and moving arts of all.

Music has color. All kinds of color. And that is why Sony is introducing audio tape with Full Color Sound.

Sony tape with Full Color Sound can actually record more sound than you can hear.

So that every tint and tone and shade and hue of color that's in the original music will

be on the Sony tape. Every single nuance of color, not just the broad strokes.

Sony tape with Full Color Sound is truly different. Full Color Sound means that Sony tape has a greatly expanded dynamic range — probably more expanded than the tape you're using. This gives an extremely high output over the entire frequency range, plus a very high recording sensitivity.

There's even more to Sony tape with Full Color Sound, however. Sony has invented a new, exclusive SP mechanism for smoother running tape, plus a specially developed tape surface treatment that gives a mirror-smooth surface to greatly reduce distortion, hiss and other noise. Each type of tape also has its own exclusive binder formulation, that gives it extra durability.

Any way you look at it—or rather, listen to it, you'll find that Sony tape with Full Color Sound is nothing short of superb.

If you're not hearing the whole rainbow on your audio tape, try recording on Sony tape with Full Color Sound. Then you'll be hearing all the glorious full color that makes every kind of music, music.



hi-fi/stereo

BUYERS' GUIDE®

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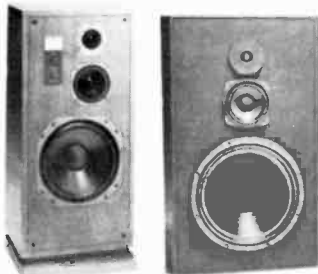
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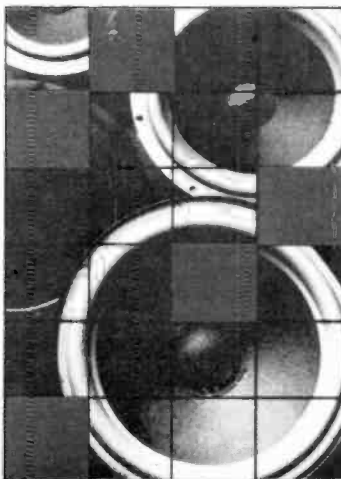
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CASSETTE DECKS
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Cover photo by Leonard Studios.

For details on the cover, see page 73.



Remove both static and dust in one easy stroke!

Audiotex Laboratories introduces the RC-2000

HOW IT WORKS: The RC-2000 utilizes a piezo-electric element which you activate by simply pushing a trigger bar. Immediately a stream of ionized air bombards the record, neutralizing its static charge and freeing dust particles. These particles are then swept away by the RC-2000's nylon brush and caught by a soft velvet surface. As easy as that, you've got a clean record. No more liquid residues; no more removing static a second time after you clean. No batteries to replace either! Try it, then throw away your cloths, liquids and brushes.

ACCLAIMED EVERYWHERE! Lightweight, durable, the RC-2000 is designed for years of repeated use. Stereo owners throughout Europe have used it and loved it; now it's available to U.S. audio connoisseurs, too, through leading stereo high fidelity stores. RC-2000 (Cat. No. 30-8585)

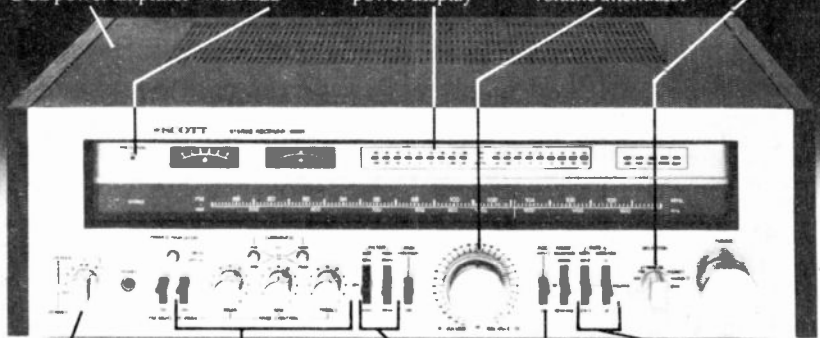
A MASTER STROKE IN RECORD CARE!

Audiotex Laboratories
Products of GC Electronics
Rockford, Illinois 61101

Circle No. 16 On Reader Service Card

If you can find a receiver that does more.

EC configuration CCL power amplifier Relay protection with LED 18 LED logarithmic power display Logarithmic volume attenuator 2 phono inputs



Connections for 3 pair of speakers Bass/midrange/treble tone controls with variable turnover frequencies and by-pass Twin position active subsonic and high filters Front panel accessory switch 2 tape monitors with full tape copy capability

Scott's new 390R is perhaps the most complete receiver ever made.

A professional control center for your entire sound system, the 390R delivers a full 120 watts per channel min. RMS, at 8 ohms from 20-20,000 Hz with no more than 0.03% THD. And it offers more options, features and flexibility than you'll find on most separates.

Compare the Scott 390R with any other receiver on the market today. If you can find one that does more... buy it.

Buy it. For specifications on our complete line of audio components,

contact your nearest Scott dealer, or write H.H. Scott, Inc., 20 Commerce Way, Dept. HR, Woburn, MA 01801.



SCOTT

The Name to listen to:
Makers of high quality high fidelity equipment since 1947.

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hi-fi/stereo BUYERS' GUIDE

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HI-FI/STEREO BUYERS' GUIDE

The tonearm that isn't.



The traditional tone arm has been replaced. By Linatrack. A revolutionary tracking system developed by Revox.

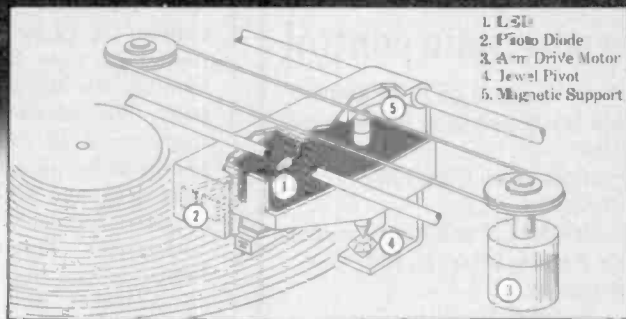
This sophisticated and highly refined electronic servo-system ensures that your records are played just the way they were cut, with perfect tangential tracking.

We've eliminated the causes of distortion inherent in conventional tone arm design. There's no need for an anti-skating device because there is no skating force. Our unique LED/photo diode array monitors the stylus angle and makes instant corrections to keep the tip absolutely perpendicular.

Pivot friction has also been dramatically reduced by our unique single-point jewelled pivot/magnetic support and suspension system.

With Linatrack, tracking error is reduced to a phenomenal 0.5° or less, virtually eliminating distortion and protecting your records from excessive wear.

The high torque direct drive motor of the Revox B790 uses Hall-Effect magnetic sensors tied to a quartz crys-



tal to constantly read and instantly correct rotational speed. This eliminates the moment-to-moment deviations found on even the most expensive conventional direct drive motors. You can verify speed accuracy with the fast responding LED digital readouts. The readouts also provide an accurate log of manual speed adjustments.

Even with its advanced features, the Revox B790 is a pleasure to operate with safe and convenient automation. It works with virtually every cartridge and is ruggedly built to stand up to years of daily operation.

For more good reasons to play your records without a tone arm, experience the B790 at your Revox dealer today.

REVOX

STUDER REVOX America, Inc., 1819 Broadway, Nashville, TN 37203 615 329-9576/In Canada: Studer Revox Canada, Ltd.

Circle No. 13 On Reader Service Card

Extend your listening distance with a *new* **FINCO...** auto FM amplifier



stereo II

FINCO's self contained top of the line Auto FM Amplifier with variable gain control

- Increases Signal up to 16 Times
- Will Not Overload in Strong Signal Areas
- Provides Crisp, Clear FM Reception
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- SOLID State - Dual MOSFET Circuitry

Highest gain FM auto amplifier available... write for catalog

No. 20-852, Dept. BG4-79

THE FINNEY COMPANY

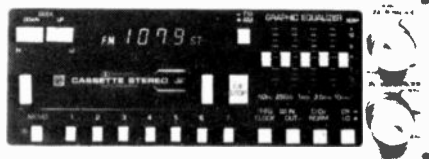
34 West Interstate Street, Bedford, Ohio 44146
(216) 232-6161

6 Circle No. 15 On Reader Service Card

THE LATEST HI-FI COMPONENTS IN OUR... AUDIO SHOWCASE

Car Stereo That Remembers

Compo III by Fujitsu Ten is a micro-processor-based AM/FM/MPX radio-plus-tape combination with digital readout. The pre-amp all-in-one unit contains an auto reverse cassette unit with Dolby, quartz clock, and five-band graphic equalizer. Also featured is a pre-set channel selector that memorizes fourteen channels (7 on the AM band, 7 more on the FM band) for instant recall. There are also search up, search down, and scan functions. Electronic tuning provides constant digital frequency readout, and a pushbutton is included for digital time display

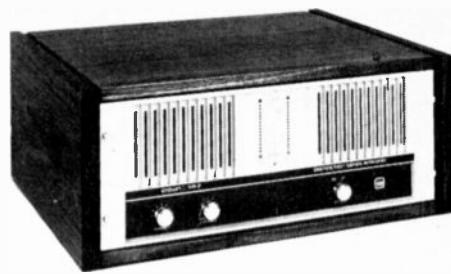


Circle No. 102 On Reader Service Card

when the radio or tape deck is in operation. A "Life Time Metal" high-frequency tape head is designed for long service life, according to the company. The system delivers a frequency response of 40 to 14,000 Hz, and the five-band graphic equalizer allows both tape deck and FM radio sound to be adjusted for car acoustics and listener preferences. There's also a four-way fader control, built-in FM muting and an equalizer switch to accommodate chrome and metal tape. Other features include: FM noise blanker to block pulse noises during FM broadcasts; lockable fast forward and rewind slide controls. The retail price is \$569.95.

Distinction Series Power Amplifier

Crown International's SA2 "Distinction Series" stereo power amplifier is rated at 220 watts per channel minimum RMS into an 8-ohm load, both channels operating, 20 Hz to 20,000 Hz, with total harmonic distortion less than 0.05%. For a 4-ohm load, the output is 350 watts per channel. Crown says the SA2 incorporates new circuit technology to avoid arbitrary output limits

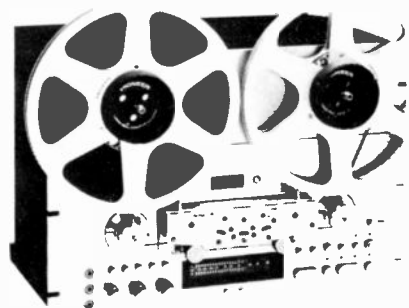


Circle No. 115 On Reader Service Card

used in voltage or current limiting amps designed for worst-case possibilities. The SA2 self-analyzing circuit allows output devices to function at optimum levels under any conditions, according to Crown. The SA2 limits output only when a built-in computer reports that the power transistors are approaching their safe operating limits for the conditions under which it is operating. The two channels are electrically separate, each with its own power supply and circuitry; in essence, they are two separate amplifiers. There's also a unique cooling system consisting of a two-speed fan built into the rear of the unit. The front panel includes two LED output level indicators. Since the range available on these indicators is 42 dB (compared to only 13 dB with a VU-type meter) no range-switches are needed to obtain full-range monitoring. Green LEDs indicate actual signal levels through simultaneous display of peak-hold and instantaneous peak functions. Price: \$1595.

Four-Head Reel-to-Reel Tape Deck

Pioneer's Model RT-909 reel-to-reel tape deck accepts 10-inch as well as 7-inch reels. The unit features a sophisticated closed-loop dual capstan transport that provides complete control over the tape segment under the head assembly, according to Pioneer. The dual capstans and two oil-damped tension arms eliminate any interference



Circle No. 85 On Reader Service Card

that might be created by take-up or supply reels. The result is smooth, consistent tape velocity and regulated tension between capstans. DC-controlled motors are used. Operation of the RT-909 is easy, because of feather-touch

(Continued on page 11)

HI-FI/STEREO BUYERS' GUIDE

Unboxed Sound. Reduced.



Introducing the Avid Model 110 Minimum Diffraction Loudspeaker.

The New Reference Standard Under \$150.

Utilizing the innovative design techniques which have made our revolutionary line of loudspeakers so popular, Avid introduces a compact Minimum Diffraction Loudspeaker™ for less than \$150.

Its performance characteristics are so superior for the price, that the Model 110 establishes a reference standard that challenges comparison.

Overall system response (48 Hz to 20 kHz ± 3 dB) is truly exceptional for a speaker in this price range, and few loudspeakers in its class offer 88 dB efficiency along with 100-watt power handling capability.

Avid builds its own drivers to meet the specific design objectives of each system, and the Model 110 is no exception.

Power handling of the 1-inch soft dome tweeter is achieved with a design incorporating magnetic fluids and a high-temperature voice coil. Avid's proprietary cone treatment techniques enable the 8-inch woofer to roll off mechanically, eliminating the need for an electronic crossover.

The Model 110 is a totally integrated design yielding a level of performance usually found only in the most expensive loudspeaker systems.

Audition the Model 110 and other Avid Minimum Diffraction Loudspeakers™ at your Avid dealer.



AVID

The careful integration of special engineered Optimum Dispersion Couplers™ and solid front grill panels with rolled edge design significantly reduces unwanted cabinet diffraction effects.

**Unboxed
Sound**

Avid Corporation
Department 110, 10 Tripps Lane
East Providence, R.I. 02914

HFBG-11

Please send me complete technical information on the new Model 110 Minimum Diffraction Loudspeaker™.

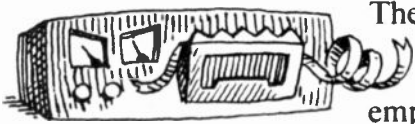
Name

Street

City

State Zip

Even the most enlightened consumer can get eaten alive in the hi-fi jungle.



There are probably few places where the phrase "caveat emptor"—let the buyer beware—is more applicable than in high fidelity.

The average consumer walks into a hi-fi store only to be confronted by a morass of receivers, turntables and tape decks, running the gamut from the unaffordable to the unpronounceable. And to make matters worse, the salesman seems to speak some bizarre dialect about megahertz and transient response.

At Sony, we sympathize with the plight of the music lover caught in this rather distressing situation. And to this end we offer some reassurance:

Since 1949, Sony has been at the very forefront of high fidelity. (In fact, our name is derived from the Latin word "sonus" for sound.)

And while the technology has changed, one thing hasn't: Since the beginning we've never put our name on anything that wasn't the best.

The V4 receiver: You don't need an engineering degree to understand what makes it superior.

Put as clearly as possible, the V4 was designed for people who are as interested in getting good value as they are good sound.

In terms of power, for example, the V4 offers ample wattage to fill almost any size living room with clean, clear sound. (55 watts per channel at 8 ohms from 20 to 20,000 hertz, with less than 0.1% total harmonic distortion.)

It has absolutely no audible distortion.

It features the same kind of "direct coupled" circuitry used in the most expensive professional broadcast amplifiers to ensure rich bass.

It's completely encased in metal to reduce interference.

It's capable of running two sets of speakers without straining, and has something

called a "phase-locked-loop IC stereo multiplex stage"

that guarantees extraordinary FM reception.

All of which explains why if you pay a few dollars less for one of

our competitor's receivers it's probably

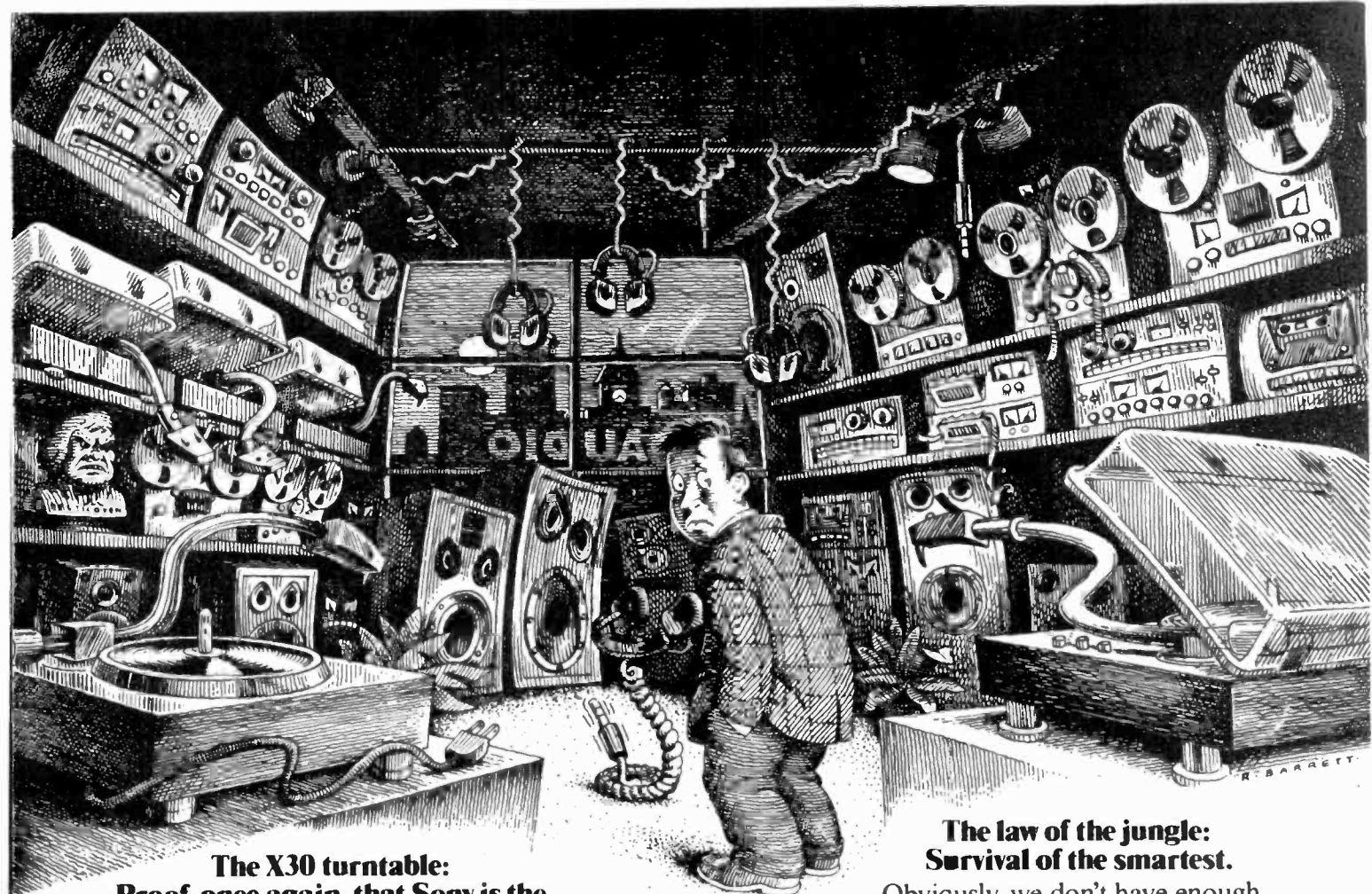
because you're getting less receiver.



The new Sony micro components: small in everything but performance.



The V4 Receiver: the latest from the company that founded the era of transistorized high fidelity.



**The X30 turntable:
Proof, once again, that Sony is the
real pioneer in high fidelity.**

Today, virtually all of the world's most expensive turntables feature "quartz lock." An electronic circuit that works like a quartz watch to ensure perfect turntable speed.

Now Sony has improved on this incredibly accurate system in the only way possible: by making it less expensive. But to buy the X30 on it's price alone would be selling it short.

Like today's most expensive turntables, the X30 features a direct-drive motor that eliminates pulleys and unreliable belts. But unlike models built by Pioneer and Technics, our direct-drive motor is both brushless *and* slotless—which means it's more accurate.

Instead of using an inexpensive particle-board base like many of our competitors, the X30's base is made of a Sony patented "bulk molding compound" that reduces acoustic feedback.

And we've even made the X30's platter mat slightly concave—so if your records are a bit warped, they won't sound that way.

SSU-2070 speakers: Sony remains one of the only hi-fi companies to produce our own speaker cones, crossover units, and even the cabinets themselves.



The X30 direct-drive turntable: it even compensates for warped records.

**The law of the jungle:
Survival of the smartest.**

Obviously, we don't have enough space here to tell you the whole Sony hi-fi story.

Like the way our new micro components use Sony developed "pulse power supplies" that reduce distortion almost to the point of being unmeasurable.

Or the way our new SSU-2070 speaker system guarantees you'll hear every part of the music with distortion reducing carbon fiber speaker cones. And a computer-designed speaker arrangement that makes sure you hear the music exactly as it was recorded.

The point of all this, however, is that for over three decades Sony has built superior audio equipment. Extraordinary products whose reputation for quality, value and reliability is unsurpassed.

So even if you don't know watts from ohms, at least you'll be able to survive in the hi-fi jungle by knowing Sony.

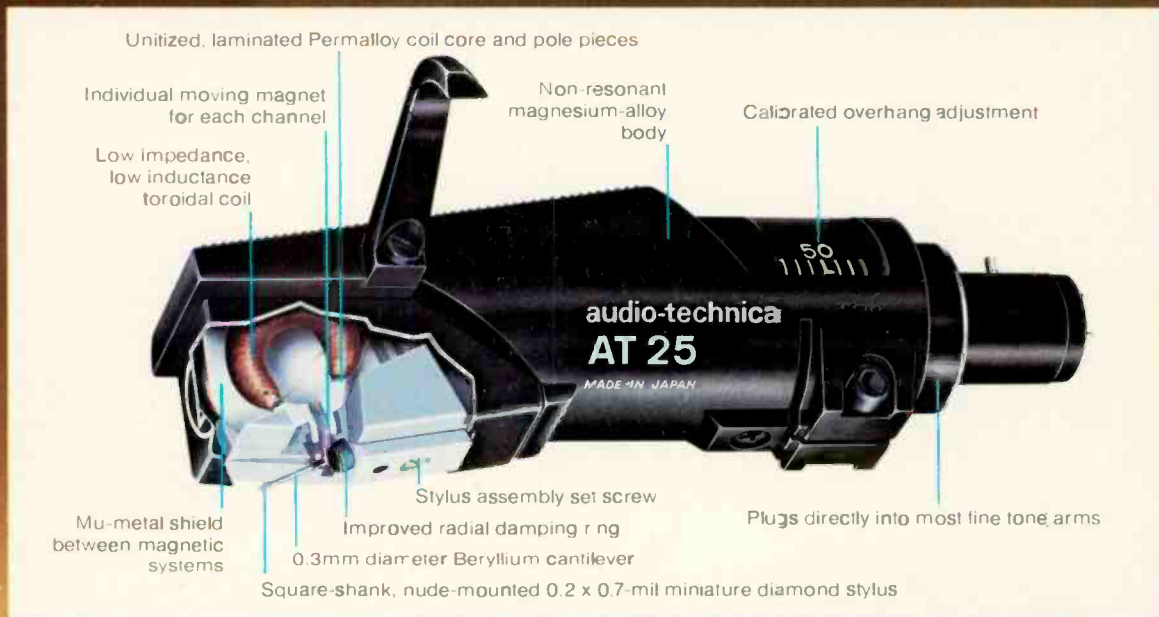
For more information, or the name of your nearest Sony dealer, write us at Sony, P.O. Box CN-04050, Trenton, N.J. 08650.

SONY AUDIO

We've never put our name on anything that wasn't the best.

New York, N.Y. 10019. Sony is a registered trademark of the Sony Corporation.

We've just improved every record you own.



Bold, creative new technology sets new standards for clarity, dynamic range, and stereo separation.

Of course the new AT25 doesn't look like other stereo phono cartridges. It's entirely different. And not just on the outside. We've rethought every detail of design and construction. All in the interest of the smoothest, cleanest sound you've ever heard. The AT25 frequency response is utterly uniform. Definition and stereo separation are remarkable. Dynamic range is awesome. Even the most demanding digital and direct-to-disc records are more spectacular, more musically revealing.

But set our claims aside and listen. The AT25 is unexcelled for transparency and clean, effortless transient response. Individual instruments are heard crisply, without stridency even at extremely high levels. Even surface noise is less apparent.

The cutaway view shows you how we do it. Start with the coils. Just two, hand-wound in a toroidal (doughnut) shape. A unique shape which cuts losses, reduces inductance, and lowers impedance. The coils are wound on laminated one-piece cores which also serve as pole pieces. Again, losses are lower. Eddy current effect is also reduced. Which all adds up to superior transient response. It's like having the electrical performance of the finest moving coil designs, but with the high output of a moving

magnet. The best of both worlds!

Each magnetic system is completely independent. No common circuits. We even add a mu-metal shield between the coils to insure no leakage between channels. Which results in stereo separation which must be heard to be believed.

But there's more. An entirely new stylus assembly with one of the smallest whole diamond styli in series production. Only 0.09mm in cross section and almost invisible. It's nude-mounted and square-shank to insure exact alignment with the groove. And it's set in a Beryllium cantilever that eliminates flexing.

Instead of snapping into place, this stylus assembly is held rigidly to a precisely machined surface with a small set screw. A small detail which insures perfect alignment, no spurious resonances, and simple stylus replacement.

We treat cartridge shell resonances too, with special damping material applied to the top of the unique plug-in shell. The magnesium shell even has a calibrated adjustment for stylus overhang to insure perfect installation.

The many technical differences between the new AT25 and every other stereo cartridge are fascinating... and significant. But the real difference is in the resulting sound. It's almost as if you had plugged your stereo system directly

into the studio console. Every subtlety of artistic expression is intact, no matter how complex—or simple—the music, no matter how loud—or soft—the performance. It's as though a subtle barrier had been removed adding clarity and presence to every record you own.

A cartridge of this sophistication and high quality cannot be produced quickly. Initially the AT25 may be in short supply. But your patience will be rewarded with performance which will send you back through your record library to discover nuances you never suspected to hear. And you'll eagerly await the sonic splendors of tomorrow's digital recording techniques.

This outstanding performance is now available two ways: the direct plug-in AT25 and the standard-mount AT24. Either one will make every other component you own sound better, including your records!



Model AT25 Unitized Headshell/Dual Magnet™ Stereo Phono Cartridge \$275

Model AT24 Dual Magnet™ Stereo Phono Cartridge \$250



audio-technica
INNOVATION □ PRECISION □ INTEGRITY

AUDIO-TECHNICA U.S., INC., Dept. 119BG, 33 Shiawassee Avenue, Fairlawn, Ohio 44313

AUDIO SHOWCASE

(Continued from page 6)

logic controls. Tape direction is immediately changed without first stopping the machine. The logic circuitry also protects against more than one control button being pushed at a time. When in the forward mode, sensing foil drives the mechanism into reverse play at end of tape, thus doubling play time for longer uninterrupted music. By depressing the "auto repeat" switch, the unit is returned to the forward play mode when the four-digit electronic counter indicates "9999," thus allowing an indefinite period of operation. A "timer start" switch is also provided. By depressing the "record mode" buttons, the timer activates the unit for recording late night FM broadcasts and the like. When the "timer start" feature is used alone, the unit automatically begins to play rather than record. Frequency response at 7½ ips is 20 to 28,000 Hz and wow and flutter is 0.04%. Price: \$795.

Two-Speed Auto Cassette Player

B.I.C. introduces the C-1, claimed to be "the world's first two-speed metal-equipped car stereo cassette deck." Light-emitting diodes show selected speed, Dolby noise reduction, EQ selector (70/120), and loudness selector. A quick-disconnect under-dash mount-



Circle No. 65 On Reader Service Card

ing to discourage rip-off temptation is standard, as is single-connection wiring harness. The peak level output meter is illuminated. This B.I.C. unit offers the car audiophile high performance at 3½ ips tape speed, in addition to the customary 1½ ips speed. The deck is compatible with any type of tape, including new metal particle tape. Notable features: 12 watts RMS per channel; fast forward and rewind controls; individual level controls for volume, bass, treble, and balance; preamp output jacks. List price: \$229.95.

Under \$100 Turntable

Akai's Model AP-B10C complete turn-



Circle No. 62 On Reader Service Card

table system, including dust cover and magnetic cartridge, will retail for under \$100. The unit has a gun-metal gray base and a hinged, removable smoked dust cover. The AP-B10C features oil-damped cueing control, vibration-absorbing insulated legs, a low mass, low resonance straight tonearm, a stylus overhang adjustment, and anti-skating control. The belt-driven, manual turntable is powered by a 4-pole synchronous motor that provides a choice of 33 and 45 rpm speeds. Measurements: 5¼ inches high by 13¼ inches deep by 17¼ inches wide. Weight: 11 pounds.

Three-Way Speaker System

This ADS three-way speaker system, model L630, features a very high quality dome midrange that provides unusual clarity and openness in the human voice, according to the company. An acoustic suspension soft-dome 1-inch tweeter with a single-layer, high-temperature metal voice coil, has a magnetic flux density of 1.65 Teslas (16,500 gauss), a magnetic flux of one million nW, and an operating frequency range from 4,000 to 25,000 Hz. The acoustic suspension soft-dome midrange 1½-inch driver with high temperature metal voice coil has a magnetic flux density of 1.5 Teslas (15,000 gauss), the same magnetic flux as the tweeter, and an operating frequency range from 650 to 4,000 Hz. The long-excursion woofer is 10 inches in diameter, with a 1½-inch high-temperature



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AUDIO SHOWCASE

voice coil and shallow Stifflite™ cone. The magnetic flux density is 0.90 Teslas (9,000 gauss), the magnetic flux is 850,000 nW, the free air resonant frequency is 20 Hz, and the operating frequency range is 20 to 650 Hz. The overall speaker system has a frequency response of 33 to 20,000 Hz (± 3 dB) or 22 to 22,000 Hz (± 5 dB). Other specs: musical peak power rating, 200 W; recommended amplifier power, 20 W minimum, 200 W maximum; crossover frequencies, 650 and 4,000 Hz; slope, 12 dB/octave; efficiency, 91 dB SPL at 1 watt RMS input at 1 meter. Price: under \$300 each.

Metal Cassette Tape

TDK Electronics' newly-developed metal particle tape, designated MA-R, is loaded into a "Reference Standard" cassette mechanism made of die-cast metal. The metal tape utilizes particles having much greater magnetic energy than do conventional oxide particles. The company claims to have "balanced" these magnetic properties with other factors to produce a stable, reliable tape. Coercivity of the new tape is 1050 oersteds, while remanence is



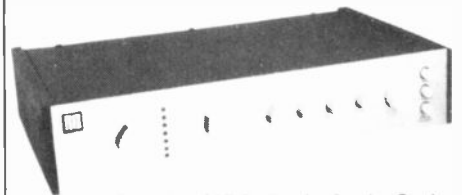
Circle No. 119 On Reader Service Card

fixed at 3000 gauss. In a suitably biased cassette deck, a "phenomenal" increase of high-frequency maximum output level (MOL) of as much as 7 dB can be expected. Higher MOL at mid-frequencies is also obtained. The revolutionary new shell that houses the tape is designed to be less sensitive to warp than conventional plastic molded shells, and is not subject at all to deformation caused by changes in ambient temperature or humidity. Performance uniformity between A and B sides of the cassette shell is assured. Other features of the new shell include: removable, replaceable erase sensor lugs; new dual-spring pressure pad assembly; transparent slip sheet. The die-cast transport mechanism and tape pack are mounted between two transparent sheets of plastic material.

TDK's 60-minute MA-R cassette has a suggested retail price of \$12.99.

Extended Dynamic Range Preamp

To preserve the dynamic range and musical detail of your records, RG Dynamics offers this new RG Dimension 3 Stereo Control Preamplifier for \$595. The unit's primary advance is claimed to be a new circuit architecture that is free of the transient overload distortion that plagues the phono sections of other preamps. If a record sounds flat and lacking in detail, says RG, the problem might be in your present preamp rather than in your records. Operating features include: a 32-step volume control; tone controls with true center "flat" positions and a complete bypass; six inputs, including

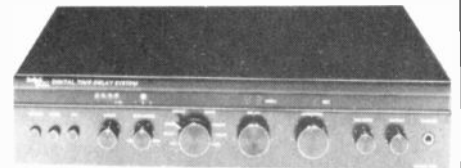


Circle No. 117 On Reader Service Card

two phono inputs; gold-plated phono jacks. The phono section offers a dynamic overload capability in excess of 20 dB over conventional units, according to the company. Also featured are: two tape inputs; two auxiliary inputs for tuners or other sources; a connection for an outboard dynamic processor, equalizer or other add-on.

Time Delay System

Audio Pulse's Model 1000 time-delay system is a third-generation unit featuring refined functions and aesthetics. New to the unit is an exclusive dynamic range expander circuitry with LED gain display. Delay time in microseconds, and ambience in seconds, are



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digitally displayed on the front panel. Input level is displayed by means of an LED array. A unique mono voice-detection system defeats the ambience system for between-song dialogue on radio broadcasts. Ambience circuitry can also be over-ridden by a remote defeat switch. There's an output with ambience mix control for headphones. Additional features include: tape monitoring facilities; external long/short additional outputs for six or eight channel operation; separate rear-channel balance control; individual input/out-

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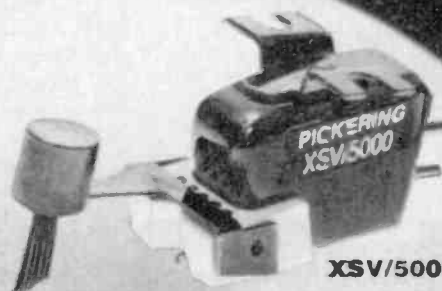
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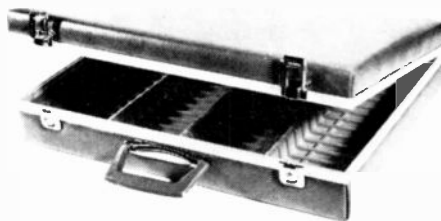
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AUDIO SHOWCASE

put controls; front/rear function switch for mode selection; six initial delays; capability to mix ambience in front channels to obtain stage depth. Model 1000 is designed for use with external amplification and secondary speakers. Specifications: frequency response, 20 to 20,000 Hz for direct (front) mode, headphone amplifier and dynamic range expander; frequency response for delayed (rear) mode, 20 to 10,000 Hz; input sensitivity, 50 mV to 60V variable; input impedance, greater than 100K ohms; initial delay, 7, 12, 18, 32, 41 and 53 mSec minimum; (continuously variable to 12, 21, 33, 58, 74 and 05 mSec maximum). Price: \$950.00.

Carryin' Case for Cassette Tapes On the Go

Savoy Leather Co. offers a full line of 8-track and cassette tape carrying and storage units. This one is the AC-60 (Style 2160), which is a padded attaché-style carrying case that holds 60 cassettes at a time. Designed to be rigged, the AC-60 includes three piano-type hinges which assure hassle-free opening and closing of the case and prevent the case from warping.



Circle No. 118 On Reader Service Card

Exterior is made of virgin vinyl, and flocked rayon is used for the interior. Price is \$25.95 each, with a one-year materials and workmanship warranty.

Three-head Cassette Deck

United Audio Products' Dual 830 front-loading stereo cassette deck offers three heads for true tape monitoring during recording, full record/playback metal capability, and electronic fade/edit fo rediting during playback. A phase-locked loop DC servo motor with integral frequency generator provides highly accurate and stable tape drive, according to the manufacturer. Logic-controlled tape-transport functions and an electronic tape-motion sensor prevent jams and tape spills. A unique Dual Direct Load and Lock



System (DLS) eliminates hinged cassette door and provides automatic head protection during insertion and removal of a cassette. A six-way bias/equalization switch includes a setting for new metal tapes. Equalized LEDs provide peak-level indications. Other features: twin-belt drive system; two-way line/MIC mixing; switchable limiter circuit; headphone level controls; MPX filter switch; Dolby noise reduction; left/right microphone inputs; Sendust record and playback heads. Price: \$499.95.

10-Band Equalizer

A new 10-band equalizer from US JVC Corp. can "tune your room" for audio reproduction of the highest quality. The equalizer utilizes a pink noise generator that simulates the response of the human ear; energy distribution is constant as the signal doubles between 100 Hz and 200 Hz; for example. The SEA-80 is claimed to actually analyze a room's acoustics so that you can make exact compensations on each of the ten channels. A Fluorescent Spectrum Analyzer Display divides input into ten bands (corresponding to the center frequencies of the equalization controls) and displays the dB level of each on ten, bright fluorescent bars. An eleventh bar charts over-all volume. This visual graph of a room's acoustics ensures real equalization, says JVC. Each display bar is designed to rise rapidly and fall slowly to enhance the visual representation of what your



Circle No. 74 On Reader Service Card

ears actually hear. The display covers the frequency range from 32 Hz to 16,000 Hz over the range from 0 to 26 dB. The SEA-80's mode switch allows a graphic reading of either the left- or right-channel signals alone, as well as both together. A memory feature allows holding an input indication for closer inspection. The unit is said to aid in control of high frequency signals when recording on cassette tapes. Suggested retail price: \$599.95.

(Continued on page 19)

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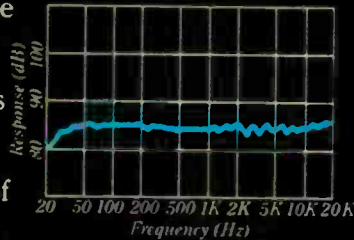
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We could go into more technical detail

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*Billboard Disco Survey, 1978.
**Recording Institute of America Survey.

If you read the specs, you won't believe the prices:

*MS-10 Loudspeakers:
\$330.00* a pair*

*DA-C7 Tuner-
Preamplifier:
\$360.00**



*DP-EC7 Turntable: \$300.00**

*DT-10
Cassette Tape Deck:
\$370.00**

*DA-A7DC
Power Amplifier:
\$330.00**

**Manufacturer's suggested retail price.*

If you read the prices, you won't believe the specs:

DP-EC7 Turntable:

Drive	20-pole direct-drive DC Servomotor
Speeds	33 $\frac{1}{3}$ and 45rpm
Speed selection	Automatic/manual
Wow and flutter	Less than 0.03% (WRMS)
Speed adjustment	$\pm 3.0\%$
Signal-to-noise ratio	Better than 73dB (DIN 45-539-B)
Tone arm, S-type	universal, static balance
Effective length	227mm (9")
Overhang	14mm (9/16")
Tracking error	+2.9° - 1.5°
Offset angle	22°
Headshell	fiber reinforced plastic (FRP)
Anti-skating mechanism	Dial setting
Possible cartridge wt.	5.0-10.5 gr.
Tracking force adjustment	0-3.0 gr. (0.1 gr. step)

Special functions: Auto lead-in, Auto return from lead-in, Auto lead-out, Free lift/cue, Free L-R traverse, Cue prevention in absence of record, Auto speed change.

MS-10 Loudspeakers:

System/cabinet finish	2-way/walnut
Impedance	6 Ω (min. 5 Ω at 2kHz)
Power handling capacity	100W (IEC rated power)
Frequency response	35-20,000Hz ± 4 dB
Speakers	
Woofer	25cm (10") cone, GFRP honeycomb
Tweeter	5cm (2") cone
Output acoustic (pressure level)	87dB/W @ 1 meter

DA-A7DC Power Amplifier:

Note: All measurements are for 8 ohms output unless otherwise stated.
 Minimum continuous output power 75W per channel, both channels driven, from 15Hz - 20kHz, with no more than 0.01% total harmonic distortion.
 Total harmonic distortion 20Hz - 20kHz At 40W per channel 0.004%
 Intermodulation distortion (70Hz: 7kHz, 4:1)

DA-A7DC Power Amplifier: (cont.)

At rated power	0.008%
At 1W per channel	0.01%
Power bandwidth (IHF) (10Hz - 60kHz)	(0.05% THD)
Frequency response	
At rated power	+0, -0.1dB
	20Hz - 20kHz
At 0.5W per channel	+0, -1dB DC - 150kHz
Input sensitivity	1V
Damping factor	100, 20Hz - 20kHz
Channel separation	
At 1kHz	80dB
At 20kHz	60dB
Signal-to-noise ratio at rated power	
IHF-A closed circuit	122dB

DA-C7 Tuner-Preamplifier:

FM Tuner Section	
Usable sensitivity	
Mono	11.2 dBf (2.0 μ V)
Stereo	23.1 dBf (7.8 μ V)
50 dB quieting sensitivity	
Mono	20dBf (5.5 μ V)
Stereo	40dBf (55 μ V)
Signal-to-noise ratio	
Mono: 76dB	Stereo: 73dB
Frequency response	+0.5, -1dB
	30Hz - 16kHz
Total harmonic distortion at 1kHz, 65dBf (figures in brackets for 'narrow' setting)	
Mono	0.08% (0.25%)
Stereo	0.1% (0.5%)
Capture ratio	1dB (2dB)
Alt. chan. selectivity	50dB (75dB)
Stereo separation (1kHz)	45dB (35dB)

AM Tuner Section

Usable sensitivity	200 μ V/m (bar ant.)
Selectivity	25dB
Total harmonic distortion	1%
IF response ratio	40dB

Preamplifier Section

Input sensitivity/impedance	
Phono 1/2	2.5mV/50k Ω
Aux. Play 1/2	150mV/50k Ω
Output level/impedance	
Rated	1V/600 Ω

Preamplifier Section (cont.)

Maximum	10V
Rec 1/2	150mV/600 Ω
Signal-to-noise ratio, IHF-A network	
Phono 1/2	87dB (10mV)
Aux. Play 1/2	99dB (closed circuit)
Total harmonic distortion at rated output, attenuator at -20dB, 1kHz	
All inputs	0.003%
RIAA deviation ± 0.2 dB, 20Hz - 20kHz	
Tone controls boost/cut	
Bass	± 10 dB at 100 Hz
Treble	± 10 dB at 10kHz
Subsonic filter	18Hz (-6dB/oct)
Power consumption	25W

DT-10 Cassette Tape Deck:

Tape speed	4.75cm/sec (1 $\frac{7}{8}$ ips) $\pm 1\%$
Wow and flutter (playback)	0.06% wrms
Fast forward/rewind	80sec (C-60 tape)
S/N ratio +3VU, weighted, 400Hz (200pwb/mm)	
Dolby out: 56dB	Dolby in: 64dB*
Erasur ratio (1kHz)	70dB
Crosstalk	
Between channels (500 - 6,300Hz)	35dB
Between tracks (1kHz)	65dB
Harmonic distortion, 400 Hz (160pwb/mm)	1%
Frequency response	
Normal tape	40 - 12,000Hz ± 3 dB
Special tape	40 - 15,000Hz ± 3 dB

*Dolby is a registered trademark of Dolby Laboratories, Inc.

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concert hall levels in your home effortlessly, with *no* sacrifice in bandwidth, linearity, or imaging abilities. While the Ohm I gets amazingly loud with as little as 10 watts input, it can handle 1000 watts comfortably.

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Inside the Ohm I, you'll find everything we've learned about multi-driver dynamic loudspeaker design. It uses a total of five drivers, including a 12-inch, optimally-vented subwoofer with an incredible 72 ounce



magnet. Voice coils are cooled by magnetic fluid to increase power handling. The Ohm I's beautifully-finished, floor-standing enclosure is compact enough to fit gracefully into any home.

The new Ohm I's are already earning rave reviews from stereo critics. After listening to them, The



Complete Buyer's Guide to Stereo/Hifi Equipment says, "The volume level was approaching the threshold of pain, but the speakers were showing no sign of strain. The response, regardless of level, was smooth and free from annoying colorations...Too often a loud loudspeaker is deficient in many other areas. Fortunately, this is not the case with the Ohm I...."

According to **Hifi Stereo Buyer's Guide** (8/79), the new Ohm I has "...a combination of efficiency and power handling that, as far as we know, is unmatched." They continue: "(The Ohm I) is one of the finest speakers we've ever heard. There is nothing it couldn't do and do it superbly...it thundered out the lowest pipe-organ pedal notes in a way that made us feel we were in a great cathedral...When appropriate, the bass was

discreet. It was all there, without saying 'Here I am'.... The treble filled the room with a spacious sweetness that seemed...downright seductive...(The Ohm I) will bring out the best from any program material and will also do justice to the coming glories of digital recording... this is a speaker with a future - for the future."

For a listening experience you've never enjoyed before except at a live performance, visit your local Ohm dealer. Ask to hear the world's first good and loud loudspeaker: the new Ohm I.



For 16 complete reviews, and full specifications, please write us at: Ohm Acoustics Corp., 241 Taaffe Place, Brooklyn, N.Y. 11205.

We make loudspeakers correctly.

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AUDIO SHOWCASE

(Continued from page 14)

Floor-Standing Loudspeaker System

Mitsubishi Audio's MS-40 floor-standing loudspeaker system is a new top-of-the-line model that utilizes light and extremely rigid aluminum honeycomb in the woofer; the honeycomb is sandwiched between layers of glass fiber-reinforced plastic to produce powerful bass response with excellent definition and clarity, according to the company. Ferro-nickel rings in the woofer and midrange reduce distortion to a tenth of that in conventional designs, it's claimed, and a gain of 20 dB can be observed. The dome tweeter is nested in a cone-like recess to give a crisp, clear edge to transients and unusual



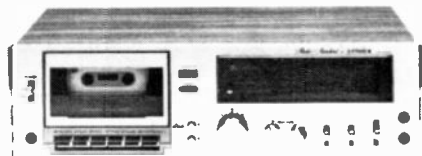
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smoothness to the highest frequencies. The tweeter's edge material is of butyl rubber, which also permeates the foamed polystyrene that fills the cavity behind the hybrid dome tweeter. The tweeter also incorporates a drive magnet with very high flux density. A very sharp slope of 18 dB per octave for the high-pass filter between midrange and tweeter was selected as optimum. Inductors are dipped in special varnish to modify impedance characteristics of the crossover elements, capacitors with very low loss factors are used, and resistors are of special silicon-dipped material. Retail price: \$550.

Two Speed Cassette Deck

Fisher's CR4028 "Studio Standard" two-speed cassette tape deck records at both 1½ and 3¾ inches per second. This "major headliner" model, one of five added to the Fisher line, features VHT/Sendust heads to enable use of metal tapes. At high speed, with either metal or other high-performance tape, performance is claimed to be outstand-

ing, with frequency ranges extending from 30 Hz to the 20,000 to 23,000 Hz range, ± 3 dB. At the slower tape speed, the frequency range is from 30 Hz to 14,000 Hz with normal tape,



Circle No. 69 On Reader Service Card

15,000 Hz with chrome or FeCr tape, and 16,000 Hz with metal tape. Signal to noise ratio (CCIR weighted) is said to be 52 dB with Dolby off, 62 dB with Dolby on. The CR4028 has Fisher's auto search function (ASF) for automatically locating and playing selections on tape. The deck also includes a cue button to create a silent space between music selections which are sensed by the automatic search, function logic circuitry for automatic selection. Suggested retail prices of the new decks range from \$250 to \$500, with the CR4028 pegged at an intermediate \$350.

Automobile Loudspeakers

James B. Lansing Sound now offers two new automobile loudspeakers, designated as models A30 and A15. The economy model, A15, is rated at 30 watts and sells for \$179.95 a pair. Model A30, priced at \$219.95 a pair, handles 40 watts, with a frequency response of 30 to 15,000 Hz, and a sensi-



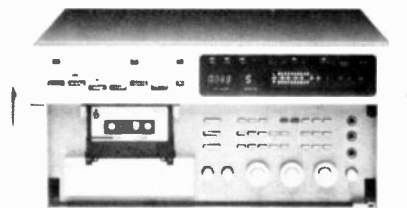
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tivity of 93 dB/1 watt/1 meter. The speaker magnet weighs 20 ounces. The coaxial-design speakers feature heavy, cast aluminum frames for durability and steel mesh grilles for cone protection. The A30 is a 6 by 9 inch oval, and incorporates a piezoelectric tweeter and long-throw voice coil for wide frequency response and great volume and power handling capability, according to JBL. Both models are designed for standard and custom installations.

MicroScan Cassette Deck

Phase Linear's Model 7000 Series Two MicroScan cassette deck, claimed to be

the most sophisticated cassette deck on the market, features automatic setting of bias, level and equalization by means of a MicroScan microprocessor. There are nine memories for nine different types of tapes. The deck has three heads, including a uni-crystal Ferrite record/playback combination (plus separate eraser head). A quartz, PLL direct-drive motor drives the capstan, while a special coreless DC motor drives the reel. Wow and flutter is put at less than 0.03% WRMS. Other specifications: signal-to-noise ratio, greater than 70 dB with Dolby on, and greater than 60 dB with Dolby off; frequency response with standard tape, 20 to 19,000



Circle No. 116 On Reader Service Card

Hz, or 25 to 16,000 Hz ± 3 dB; total harmonic distortion, less than 1% (0 dB). Other features include: record or playback timer capabilities; digital readouts for tape counter and memory locations as well as fluorescent VU display meter; memory/repeat feature. Price: \$1,350.

New AR Vertical Speaker

Teledyne Acoustic Research says this new AR92 vertical loudspeaker system is essentially the same as its cousin, the AR91 model, except for use of a 10-inch rather than 12-inch woofer, and use of a walnut-grained vinyl veneer instead of oiled walnut veneer for the cabinet. In addition to the acoustic suspension type woofer, the system utilizes a 1½-inch liquid-cooled dome midrange with semi-horn, and a ¾-inch liquid-cooled dome highrange driver. Crossover frequencies are 700 and 7500 Hz, nominal impedance is 4 ohms, and efficiency is put at 87 dB SPL at 1 meter on axis with a 1-watt input. The speaker may be used with amplifiers capable of delivering up to 200 watts



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AUDIO SHOWCASE

(Continued from page 19)

continuous power per channel, being driven into clipping no more than 10 percent of the time, using normal music or speech source material. Nominal 12 dB/octave half-section LC networks are used on all drivers. The midrange network is a modified half-section con-

taining additional components for improved impedance characteristics and optimal network-to-driver matching. The midrange and highrange outputs are controlled by switchable resistor networks. Components used include: air-core chokes wound with #17 AWG solid conductor; computer-grade bipolar electrolytic capacitors; non-inductive high power ceramic resistors. Other specs: system low-frequency response, -3 dB at 44 Hz; effective system Q, 0.7 at resonance; flux densities, woofer 8900 gauss, midrange 13,000 gauss, highrange, 14,000 gauss. Suggested retail price: \$300 per speaker.

Cassette Deck for Metallic Tape

Sony Audio's TC-K75 cassette deck provides a four-position equalization and bias switch that includes a metallic tape setting, as well as settings for normal, ferrichrome and chromium dioxide tapes. To ensure accurate sound reproduction with all types of tapes, a special dual-process three-head design is used. Two motors move the tape.



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The first, a BSL DC servo motor powers the capstan drive; the second is a servo spooling motor used to drive the reel hubs and to provide fast forward and rewind. This system helps provide wow and flutter of only 0.04% WRMS, according to the company. In addition to Dolby noise reduction, there is a 19-kHz switchable filter and variable bias adjustable settings with built-in test-tone oscillator. A sixteen-segment LED peak program meter displays peak recording levels for each channel. Functions of the TC-K75 are programmed with microprocessor solenoid-logic feather-touch controls for going from fast forward to rewind, without first going through stop. The logic circuit also permits "punch-in" recording of new materials, even during playback mode. Other features include: Auto-Space REC mute to delete unwanted program material while recording; timer activated record/play capabilities; dual concentric record level controls with line/mic input selector; headphone/line-out level control; Auto Play with memory activation; removable well cover for easy maintenance; air-damped soft eject. Frequency response is 30 to 18,000 Hz \pm 3 dB. Price: \$600.

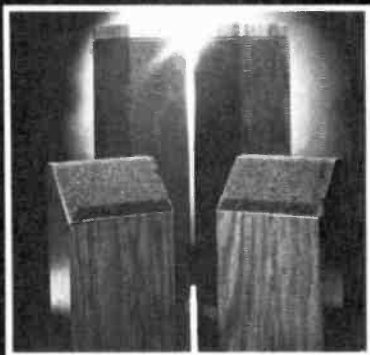
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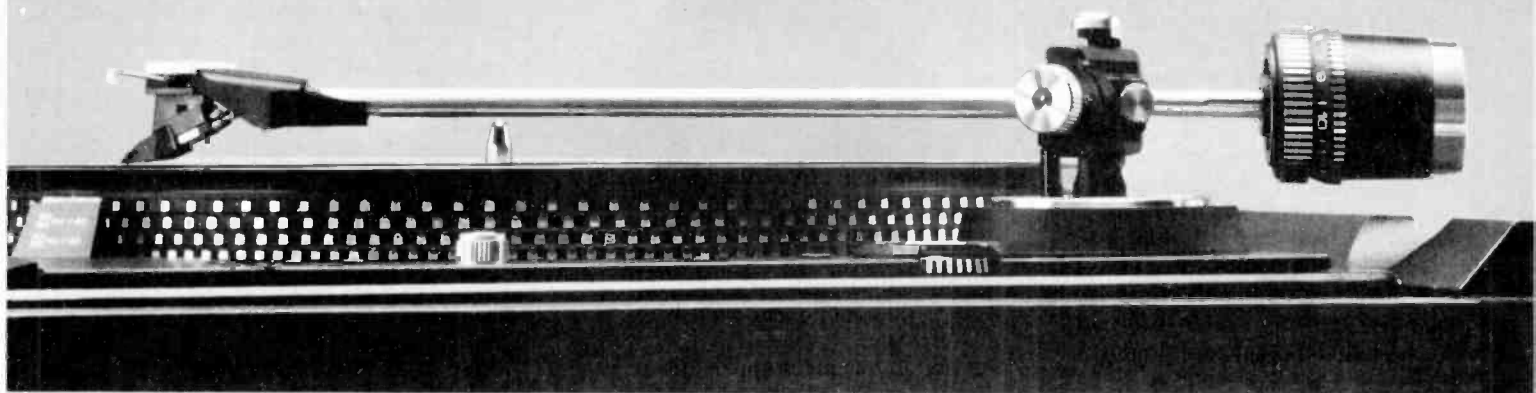
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Stereo Integrated Amplifier

Aiwa's model AA-8300U stereo integrated amplifier features power output of 45 watts per channel, at 8 ohms, with 0.1% total harmonic distortion. Many features are incorporated into the unit, and include: peak power meters; two-deck capability with A-B, B-A dubbing; muting switch (-15 dB) for temporarily lowering volume; low and high filters; and a four-way speaker system selector switch (A,B,A+B, Off). Power amplifier specifications: intermodulation distortion, no more than 0.1% (continuous rated power output); damping factor, 45, 20 to 20,000 Hz, 8 ohms; IHF power band width, 10 to 40,000 Hz. Pre-amplifier specifications:

(Continued on page 74)

If you own even one warped record
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A review of the latest popular music releases

by KEN IRSAY

James Taylor: "Flag." Columbia. \$8.98.
Carly Simon: "Spy." Elektra. \$8.98.

Dear James and Carly: I recommend your latest releases unhesitatingly to my readers. James, your album, as usual, is a quality stereo-owner's delight with its state-of-the-art production values. Your laid-back vocals combined with the Section's hot rock instrumentation are perfection indeed. And Carly . . . what can I say? Carly, Carly, Carly . . . "nobody does it better." From the rocking "Vengeance" to your Jake Brackman collaboration, "Never Been Gone," my neighborhood pizza joint should have delivery half as good as yours.



The Knack: "Get The Knack." Capitol. \$7.98.

Capitol Records definitely wants you to think of the early Beatles when you see and hear this record. The cover photo has the group posing in the familiar Beatles performing configuration, and the color spectrum perimeter record label design has been revived by the company for this release. It was used on the early Beatles albums, but long since retired. A well-crafted combination of "new wave" abandon and mainstream rock, the music brings the Liverpudlians to mind. The unit is entirely self-contained: rhythm and lead guitar, bass and drums. The producer is Mike Chapman, among whose credits are Blondie, Exile and Nick Gilder.

Peter Frampton: "Where I Should Be." A & M. \$7.98.

There's much more of his guitar playing here, and his vocals are more



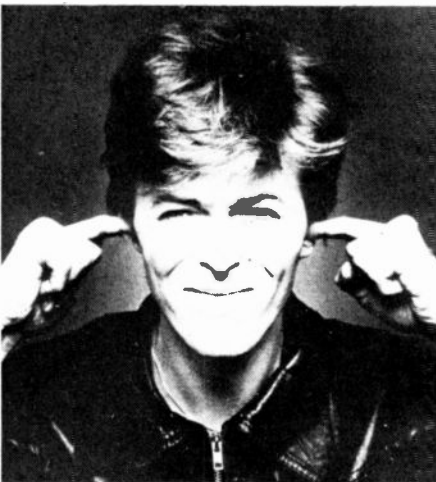
bluesy, although of a boogie rather than bereaved bent. It's his best effort since the big live album.

John Cougar: "John Cougar." Riva. \$7.98.

John Cougar is the pride of Bloomington, Indiana. His gritty vocals and unpretentious bar band backup have come to be known as the Midwest Rock sound, most typified by Bob Seger and his Silver Bullet band. "Welcome to Chinatown" is particularly similar to the Seger style, complete with female background singers a la "Night Moves." Cougar's group, The Zone, plays tough and assured.

David Bowie: "Lodger." RCA. \$8.98.

Just about every style Bowie has



ever experimented with is represented in this collection. Chanting, straight narration and progressive rock border on the weird at times but the tone is generally more "up" than some of his recent works.

The Who: "The Kids Are Alright." MCA. \$12.98.

This retrospective of The Who's career from 1966 through 1978 is comprised of some of their biggest hits taken from the soundtracks of various U.S. and overseas TV appearances and live concerts. "My Generation," from a 1967 Smothers Brothers TV show, is preceded by a howlingly funny intro of the group by Tommy Smothers. The

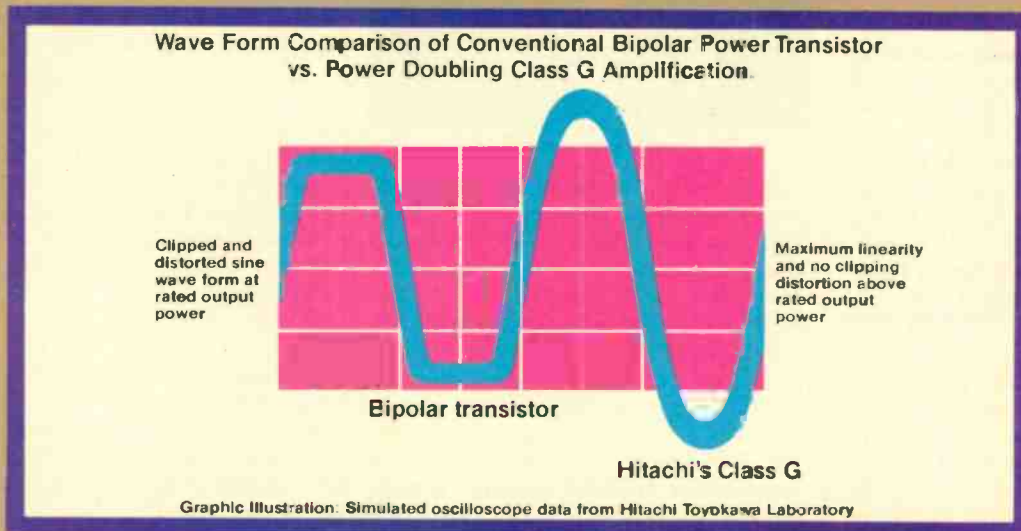


sound quality can most charitably be described as variable, but as rock history, the set is a gem.

Arlo Guthrie: "Outlasting the Blues." Warner Bros. \$7.98.

In terms of sound quality, melody, lyrics and instrumentation, this is quite simply Arlo Guthrie's best album. In a forceful opener called "Prologue," Arlo reveals his disillusionment with the "love generation" of the mid-Sixties. On "Which Side," he admits the world's troubles are many and confusing, but declares that one must take a stand on either the right side or the wrong. The instrumental backup by Arlo's long-time accompanists, Shenandoah, is first rate soft rock (Continued on page 70)

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A GUIDE TO RECENT STEREO RECORDINGS

by THOMAS D. KELLY

An avid record collector for nearly 20 years, Thomas D. Kelly has a keen ear for both live music and full-fi sound. Mr. Kelly played the records he reviews here on equipment consisting of an Empire 39 transcription system with a Shure V15 III cartridge, a C/M Labs 911 stereo amplifier, a Marantz 7T pre-amp, and two Bozak B-400 speakers.

© Mahler: *Symphony No. 4 in G Major*. Barbara Hendricks, soprano, with the Israel Philharmonic Orch., cond. Zubin Mehta, London LDR 10004 (digital recording).

It seems to me that the choice of Mahler's *Symphony No. 4* for a digital recording is somewhat strange. True, any orchestra performance should be more accurately reproduced when re-



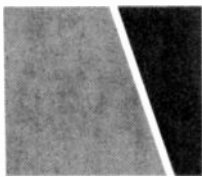
Subdued sound

corded with the digital process, but Mahler's gentle score is of such a placid nature, with a minimum of percussion, that I expected a more spectacular display piece to be selected by London, such as one of the Respighi symphonic poems, or a Stravinsky ballet. Regardless, here we have this new recording of Mahler's most popular symphony, and it is a fine, if not totally outstanding disc. Mehta's way with Mahler is paradoxical. He has recorded a magnificent *Symphony No. 2* with the Vienna Philharmonic for London, but his recordings of the *Symphony No. 1* and *Symphony No. 5*, the former with the Israel Philharmonic and the latter

with the Los Angeles Philharmonic, I find disappointing, both musically and sonically. Mehta's new version of the *Symphony No. 4* is a rather hasty affair and he does not sentimentalize, an approach very far removed from the Claudio Abbado-Vienna Philharmonic Deutsche Grammophon LP of last year. The Israel Philharmonic plays well enough, and Hendricks is appropriately angelic in the final movement. While the dynamic range of the recording is indeed quite wide, I do not hear very much warmth, and there is little concert-hall ambience. Although perhaps not recorded with the advantages of the new technological process, I still prefer hearing the superb Haitink-Concertgebouw performance on Philips, or the old but still remarkably fine sounding Solti-Concertgebouw LP on London in addition to Abbado's recording mentioned above.

© Prokofiev: *Lt. Kije Suite, Op. 60; Scythian Suite, Op. 20*. Chicago Symphony Orch., cond. Claudio Abbado, Deutsche Grammophon 2530 967.

Neither of these scores is new to the Chicago Symphony on discs, although the orchestra's early RCA recording of the *Scythian Suite* with Desire Defauw conducting has long been absent from the catalog. Defauw had a very short



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career with the Chicago Orchestra, and was followed by Rodzinski, Kubelik, Reiner, Martinon and Solti. During Reiner's regime the orchestra recorded *Lt. Kije* for RCA, a performance of considerable merit, beautifully captured by the engineers in the good old days of Orchestra Hall's finest acoustics. This disc is still in the catalog (coupled with *The Song of the Nightingale* of Stravinsky, RCA LSC 2150). Abbado's new recording of both Prokofiev scores is stunning. The DG engineers have found the perfect way to capture the rich beauty of the Chicago orchestra, and there is a rather remarkable dynamic range. *Lt. Kije* here is a quixotic affair, as Abbado misses none of the score's wit, and under his direction the masses of sound of the *Seythian Suite*, particularly the conclusion of the final movement, are much more than mere cacophonous display. If you're looking for a new recording of these brilliant Prokofiev scores, you could do no better than to get this superlative DG recording.

© Rachmaninoff: *Symphony No. 1 in D Minor, Op. 13; Symphony No. 2 in E Minor, Op. 27; Symphony No. 3 in A Minor, Op. 44.* Saint Louis Symphony Orch., cond. Leonard Slatkin, Vox Box QSVBX 5152, three records.

Rachmaninoff's *Symphony No. 1* has been reissued, along with new recordings of the other two Rachmaninoff symphonies, in this bargain-priced Vox Box with a list price of \$11.95. The same high musical qualities that distinguish the recording of the first symphony are also to be found in the other two. It is amazing how the Saint Louis Symphony Orchestra produces the sounds heard in these recordings; they surely have never impressed like this on previous disc efforts. The answer obviously is that the orchestra has grown enormously in stature, that Slatkin is a Rachmaninoff conductor of the first rank and that the engineers have worked "miracles" in capturing such incredibly rich orchestral textures. The solidity in the bass is remarkable on appropriate audio equipment, and high frequencies have that satisfying sizzle so dear to audiophiles. By all means get this album. You will not be disappointed.

© Stravinsky: *Petrushka* (complete ballet). Vienna Philharmonic Orch., cond. Christoph von Dohnanyi, London CS 7106.

Ever since the early days of LP, *Petrushka* has been a display vehicle for fine sound equipment, and perhaps some collectors remember the early

London stereo version with Ernest Ansermet and the Suisse Romande Orchestra, still available on London. Since that time there have been a number of fine recordings of this remarkable score, notably versions by Boulez and the New York Philharmonic, Davis with the Concertgebouw, Monteux with the Boston Symphony and by the composer himself with an excellent studio orchestra. London's new recording easily can stand comparison with the best of these. Dohnányi is unquestionably one of today's fine young conductors, and he already has to his credit a magnificent coupling of Mendelssohn's fifth and first symphonies, as well as the final scene from Strauss's *Salome* and a suite from Berg's opera *Lulu*, the latter disc recorded with soprano Anja Silja as the two deprived heroines. It is rather painful to listen to Silja attempting to sing these difficult roles, but the orchestral accompaniment is utterly magnificent and beautifully recorded. This new version of *Petrushka* is equally stunning sonically, with the right hall sound, plenty of warmth and depth, and a remarkable dynamic range. Interpretively, too, it offers a brilliant balletic approach, with Horst Göbel as the superlative pianist in this fascinating ballet that began life as a work for piano and orchestra and later expanded into its present form.

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STEREO RECORDINGS

© Tchaikovsky: *Suite No. 3 in C Major, Op. 55*. Los Angeles Philharmonic Orch., cond. Michael Tilson Thomas, Columbia M 35124.

Tchaikovsky's four orchestral suites are surprisingly neglected by concert audiences, as they contain some of the Russian master's most inspired writing. Each is a suite of dances, all richly orchestrated. The *Suite No. 3* is the most popular of all because of its final "Theme and Variation" section, in which a simple theme is given a dozen colorful variations culminating in an exhilarating Polacca. If you enjoy Tchaikovsky's ballet scores you'll doubtless enjoy the music in his orchestral suites, particularly the *Suite No. 3*. Michael Tilson Thomas, who already has to his credit a fine account of Tchaikovsky's *Symphony No. 1*, is equally at home in this music, and the Los Angeles Philharmonic, while not one of the most polished orchestras in the U.S., plays vigorously. Keen competition for this new recording comes from an Angel Melodiya disc with Kiril Kondrashin conducting the Moscow Philharmonic. And if you'd like to hear all four suites immaculately played and wonderfully recorded, get the Mercury three-LP album (specially priced) with the New Philharmonia Orchestra conducted by Antal Dorati, one of the true Tchaikovsky master interpreters of our time.

© Tchaikovsky: *Violin Concerto in D, Op. 35; Meditation, Op. 42 No. 1*. Isaac Stern, violinist, with the National Symphony Orchestra of Washington, cond. Mstislav Rostropovich, Columbia M 35126.

This performance of the concerto was made last season in Washington



Fine technical display

after Stern and Rostropovich had performed the work on the National Symphony's regular subscription series in the Kennedy Center. Rostropovich is a specialist in music of Tchaikovsky, likewise, Stern is an old-hand at the score, with his older recording with Ormandy and the Philadelphia Orchestra still in the catalog (coupled with the Mendelssohn *Concerto in E Minor*). As one would expect, this is an intensely emotional, dynamic account of the score, with the first movement having particular breadth and power. Stern, who lately has not always been up to par technically in his live performances, is in fine form here, and this must be counted among the finest extant recordings of the concerto. While most competing recordings have a complete concerto as a disc-mate (usually the Mendelssohn), the beautiful but modest *Meditation* is used as the filler here.

© Verdi: *Overtures to Nabucco, Aida, La Forza del Destino, Aroldo, Luisa Miller, I Vespri Siciliani*. London Symphony Orch., cond. Claudio Abbado, RCA Victor ARLI-3345.

This LP is of particular interest as it offers the first recording of the original version of the overture to Verdi's all-time favorite opera, *Aida*. Written for the premiere at La Scala, but withdrawn after orchestral rehearsals, this version remained in manuscript until 1940 when it was performed with Toscanini and the NBC Symphony. One other performance took place in Italy, but this should be new to today's au-



Aida original

diences. The overture begins the same way as the prelude we all know, but is then followed by a series of familiar themes from the rest of the opera. The remainder of the program on this Verdi LP is a welcome combination of the familiar and unfamiliar. RCA's reproduction is superlative, with the sound of the large orchestra well captured. A welcome recording that should have great attraction for collectors.

© Verdi: *Un Ballo in Maschera* (Opera in Three Acts). Jose Carreras (Riccardo); Montserrat Caballe (Amelia); Ingvar Wixell (Renato); Patricia Payne (Ulrica); Sona Ghazarian (Oscar); Robert Lloyd (Samuel); Gwynne Howell (Tom) and others, with the Orchestra and Chorus of the Royal Opera House, Covent Garden, cond. Colin Davis; Philips 6769 020 (three records).

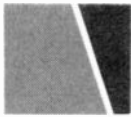
"Un Ballo" can be an exhilarating experience in the opera house, or on records, if the cast is up to the score's



Flaws and perfection

demands. This is an opera that is brimful with captivating, unending melody, a delight to the operaphile. Philips' new recording cannot be called a total success, but I would not want to be without it because of the sheer vocal beauty of the leading tenor and soprano. Carreras has a virile, youthful sound, perfect for the role of the ill-fated King. His voice is, indeed, a major plus on the worldwide opera scene. Caballé has been around for more than two decades, but on this recording she sounds as fresh as ever, and when she is good, she is really good. Never before have I heard the first act aria, "Ma dall'arido stelo divulsa," sung more exquisitely. She is utterly magnificent, and seems more dramatically involved with the role of Amelia than she has been in the past with other operatic heroines she has put to disc. Wixell is a fine Renato, with Robert Lloyd and Gwynne Howell creating a convincing pair of conspirators. But Patricia Payne possesses neither the range nor the power in her lower register for the gypsy role of Ulrica, and Sona Ghazarian's Oscar is just passable. Davis, the orchestra and chorus are as impressive here as they were in the recent Philips *Tosca*, and the engineering is excellent, of the quality one has come to expect from Philips. Some listeners may prefer the older RCA "Ballo" (with Leontyne Price and Carlo Bergonzi with Leinsdorf conducting) for its more even dis-

(Continued on page 29)



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Bud Powell/by J.R. Taylor

□ The story of Bud Powell rings with the harshness of a cliché—the young-man-with-a-horn pattern of artistic brilliance, emotional disturbance and early death—forcing itself on a hapless living human. His life followed those events which comprise the classic story of the jazz musician: a piano prodigy before the age of ten, a professional musician during his teens, a major pianist throughout his twenties, in decline at thirty, dead at forty-one.

Although he was a major influence on nearly every jazz pianist who emerged from the mid-1940's to the early 1960's, the best of Powell's music rings differently, and with greater strength. Among all the bop musicians of the 1940's Powell was closest in inventive spirit to Charlie Parker and Dizzy Gillespie. Though certainly influenced by such older figures as Art Tatum, Billy Kyle, and his idol Thelonious Monk—and possibly by his contemporary Al Haig as well as childhood friend Elmo Hope—Powell became the style-setter for his period.

He was born Earl Powell in New York City in 1924 to a pianistic family—his father's avocational interest in piano rubbed off on Powell and his younger brother Richie worked as pianist and arranger for the short-lived Clifford Brown-Max Roach band. By 1943 Bud Powell was good enough to join trumpeter Cootie Williams's

big band, and was still with Williams two years later when he took a savage beating from a policeman in Philadelphia. The beating unquestionably affected his mind, and Powell was in and out of institutions for the next decade—including the entire year of 1948. Despite his illness which steadily led to alcoholism, he did his best work in these years. The clarity of his touch; the speed of his invention; his harmonic imagination; the percussive inspiration of his accompaniments for the solos of others and for his own intricate right-hand melodies—these points drew pianists and fans to Powell at the crest of his career.

By the mid-1950s, his suffering began to tell in his work. His technique faltered, and though he employed a more restrained (and quite innovative) chordal style during these years, his efforts at recapturing his early melodic style varied in success, and rarely reached his earlier heights.

In 1959, failing physically and in little demand as a performer, Powell exiled to France. There his music and health improved, and he often worked with another ex-

(Continued on page 79)

Photo courtesy of Quintessence Jazz Series, Pickwick Records, Inc. Artwork by David M. Olmstead, Spectrum Studio.

J. R. Taylor is with the Smithsonian Institution's Jazz Program. He has written on music for the *Washington Post Book World*, the *Village Voice* and others.

STEREO RECORDINGS

(Continued from page 27)

tribution of vocal strengths, but even with its flaws, I will listen to the new Philips recording often.

Collections

© *The Artistry of Artur Rubinstein.* Artur Rubinstein, pianist, RCA Victor ARL2-2359, two records.

Now in his nineties, Artur Rubinstein no longer concertizes because of failing eyesight. But he has been indeed a legend in his own time for decades, idolized by millions throughout the world—and his name is magic. Throughout his career he has recorded for RCA, and countless discs have been issued: most of the piano music of Chopin (but why never the *Etudes?*), concertos of Beethoven, Brahms, Chopin, Grieg, Liszt, Rachmaninoff and Tchaikovsky, and many other encore-type pieces. All of the concerto recordings could hardly be considered successful, not because of the pianist himself, but because of the substandard engineering on many of them which did not do justice to the performances. Examples of this are his recent recordings of the Beethoven piano concertos with Barenboim conducting, and his concerto recordings with the Boston Symphony. This new twin-LP from RCA offers twenty-two "encore" pieces, ending with his famous performance of the "Ritual Fire Dance" from Falla's *El Amor Brujo*, a long-time favorite of both Rubinstein and his audiences. Also, one hears short works of Schubert, Chopin, Poulenc, Chabrier, Debussy, Liszt, Fauré, Schumann, Brahms, Prokofiev, Ravel and Villa-Lobos. The reproduction of the solo piano is close-up and very clear. This is a delightful collection, all taken from previous releases, and indeed does represent "The Artistry of Artur Rubinstein."

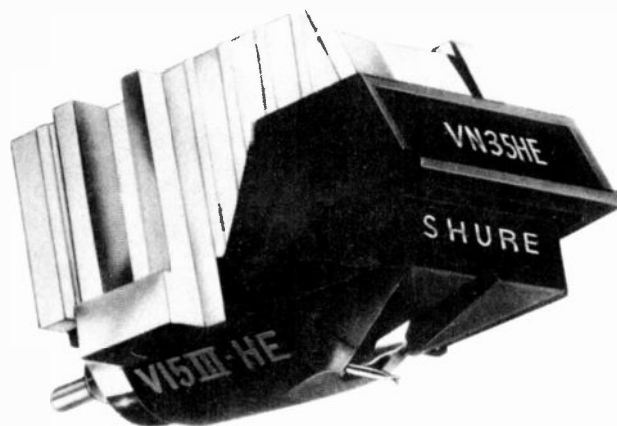
Angel 45 RPM Sonic Series

Faster recording speeds provide the capacity for greater fidelity. This is a known fact, and explains why open-reel tape recorded at 15 ips potentially is superior to tape at 7½ ips, and both are superior to 3¾. This same principle, of course, applies to discs. When Columbia released the first LP they could have made the speed 45 rpm, or any other speed they wished, as long as the equipment on which to play them would be available. A speed of 33¾ was established for various reasons, one

(Continued on page 71)

NOVEMBER/DECEMBER 1979

fact: we've put a NEW plus into the Super-Track Plus family of V15 Type III Cartridges



Freedom from distortion!

One of the critically acclaimed developments introduced in Shure's incomparable V15 Type IV phono cartridge is its revolutionary distortion-reducing Hyperelliptical nude diamond tip. It established a new standard of sound purity through a dramatic reduction of both harmonic and intermodulation distortion. Now, the Hyperelliptical tip is also available in the world-famous V15 Type III Super-Track Plus Cartridge, bringing together the sound purity and flat response of the IV at an eminently affordable price. It is truly second only to one other cartridge in the world—the V15 Type IV.

If you already own a V15 Type III you can upgrade it!

If you already own a V15 Type III, simply replace your present stylus with the new VN35HE improvement stylus. It will give your Type III cartridge the same specifications as the new V15 Type III-HE. The cost is extraordinarily low, yet the difference in sound will be immediately apparent.

V15 TYPE III-HE

Stereo Dynetic® Phono Cartridge and Improvement Stylus



Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204. In Canada, A. C. Simmonds & Sons Limited. Outside the U.S. or Canada, write to Shure Brothers Inc., Attn: Dept. J6 for information on your local Shure distributor. Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

Circle No. 47 On Reader Service Card

Opera

For Today

Regine Crespin

by Speight Jenkins

□ This column marks my thirteenth profile for this magazine of a major opera artist and the first one of a person born in France. Since France is considered one of the three major countries to have produced opera (standing well ahead in the international public's mind of Britain, the United States and Russia), such an omission would seem to be deliberate. In fact, however, France unexplainedly has produced few international singers since World War II. But Regine Crespin counts for several, and she is quintessentially French. Her Gallic qualities include charm, both sensuousness and sensuality, the capacity to be coquettish and suggestive without seeming either



The stately role of Mme. De Croissy in *Dialogues of the Carmelites* was one of Regine Crespin's signal triumphs.

a known and valued commodity internationally.

Her sound—a huge, round, warm and enveloping instrument—was probably larger than Birgit Nilsson's. Miss Nilsson, however, focused her voice precisely, and it always seemed much larger than it actually was. Miss Crespin had in addition a unique quality of sweetness to her sound; hers was the feeling of the caress of the lover, with a problem only in the control of the top register. Though her use of the soft sound was marvelous in the middle and lower voice, time and again when she went above a B flat, she was forced to sing at forte. This took away from her overall effect, be-
(Continued on page 79)



As Bizet's *Carmen*, Ms. Crespin envelops the audience with her enchanting stage presence.

silly or offensive and a grasp of how to sing the French language unsurpassed in our time. She passes from a national singer into the area of international significance in her musical grasp of German and Italian styles in music and her profound sense of language. Miss Crespin speaks English with an attractive, heavily Gallic accent; she sings English with a clarity that comes over even in as large a house as the Metropolitan Opera. And her knowledge of how to hold the eye of every member of the audience whenever she is onstage, whether singing or not, makes her truly, to use the most over-worked word in the lan-

guage, a star.

Born in Marseilles in 1927, she is contemporary with many of the great singers before the public today: Leontyne Price, Leonie Rysanek, Joan Sutherland, Christa Ludwig, Beverly Sills and many others. Her career, of course, began in France, but from the beginning the size of her voice led her into the big dramatic roles of Italian opera and into Wagner. In the first major year of singing in Paris—1951—she was hailed for *Tosca* at the Opéra Comique and for Elsa in *Lohengrin* at the Opéra. By the time such a record as "The Sound of Wagner" appeared on Angel in the early 60s, she was



Ms. Crespin has sung the role of Brunnhilde in *Die Walkure* in New York as well as abroad.

There are many reasons for owning the new Sansui SC-3300.



Metal is just one.

Metal particle tape could be the most exciting thing that's happened to tape recording in years. But to get the full benefits of metal, you need a special cassette deck — like the new Sansui metal-compatible SC-3300.

The great thing about the SC-3300, though, is that even if you're not sure about metal or are wary of the software expense, this deck still makes a great deal of sense. Here's why:

SOUND QUALITY IS

SUPERB. The SC-3300 is designed to get the most out of any tape, including the newest pure metal formulations. We're using a special alloy record/play head that's particularly immune to saturation from the high bias currents needed for metal recording; and it's much more wear-resistant than even the strongest conventional heads.

The erase head, too, is special — a double-gap ferrite design that produces a 70dB erasure factor for beautiful low-noise recordings. Our new Roller Back holdback tension mechanism further improves sound quality by suppressing frequency-modulated distortion and reducing wow and flutter to a mere 0.04%.

OPERATION IS EFFORTLESS. The feather-touch controls of the SC-3300 are monitored by an LSIC logic chip tied to high precision solenoids. So you get the freedom you need to concentrate on the music you're making or taping. It's so foolproof that no matter how fast you push the buttons, the tape will

never jam or stretch.

The unusually versatile tape selector system provides separate switches for bias and equalization, with numerical indications of the optimum levels for normal, chrome and metal tapes.

And our 16-segment/channel LED peak-level indicators make it easy to set just the right levels for maximum signal and minimum noise. They're calibrated in dB and indicate red if a signal is too strong.

ALL THE EXTRAS, TOO. For added convenience, you can connect the SC-3300 to a timer, and the logic circuits will start recording or playing any time you want. Sansui's exclusive Tape Lead-In feature automatically skips over the unusable leader and beginning portion of each tape. And of course there's Dolby™ noise reduction, memory rewind, variable output and a computer-assisted pause control.

The brushed aluminum face and simulated rosewood cabinet of the SC-3300 perfectly complement our new Double-Digital receivers. We also have a complete line of matte-black finish metal-compatible models that come equipped with rack-mounting handles.

So, whether you're a strong believer in metal or just looking for a new cassette deck, visit your authorized Sansui dealer to see the best.

Dolby™ is a registered trademark of Dolby Labs Inc.

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Sansui



SOUND PROBE

As any audio fan knows, the only way to judge a speaker is by ear. Numerical specifications give helpful indications about a speaker's capabilities, but don't really convey the "feel" and character of the sound. For this reason, we evaluate speakers simply by living with them for a while, playing many different kinds of music. We then pass on our impressions in these pages. They are necessarily subjective, but based on a standard of judgment formed over many years of listening to sound equipment as well as attending "live" concerts.

by HANŞ FANTEL and CHRISTOPHER GREENLEAF



Circle No. 78 On Reader Service Card

Mitsubishi MS-40

"You've just got to hear this speaker," our editor said to us on the phone.

Why?

"Because of the honeycomb cone."

The what?

Mitsubishi, we were told, had developed a new type of woofer construction with an aluminum honeycomb cone built on the same principle as aircraft wings and designed with the same objective: to gain maximum strength and rigidity with minimum mass. The idea is to prevent cone break-up—the buckling of the cone under heavy bass thrusts—which is the main cause of distortion in the lower range.

In theory, this made sense. But we've been around long enough to know that even sensible theories don't always pan out in practice. Still, our curiosity was aroused, and once we'd heard the MS-40's our ears were more than satisfied

It is our pleasure to report that the new honeycomb woofer pumps out just about the most hair-raisingly accurate, ultra-clean, natural, yet toe-curling bass we've ever heard. But we'll get to that later. First the vital statistics.

Description:

Outwardly, the Mitsubishi MS-40 seems like a conventional 3-way floor-standing, acoustic suspension speaker, except that the left and right speakers aren't alike. They come as an asymmetrically matched pair, with midrange units and tweeter not at the center but near the outer edge. This makes for better dispersion and, consequently, for more open sound. It also contributes to better stereo imaging.

The speaker measures 15 $\frac{3}{8}$ inches in width, 15-5/16 inches in depth, and on its permanently attached base, it stands 34 $\frac{5}{8}$ inches high. If that's too tall for you, you can take the base off
(Continued on page 34)



Circle No. 95 On Reader Service Card

Speakerlab 3

Unlike any of the speakers we have tested so far, this one is available both factory-finished and in kit form. The fully assembled speaker sells for \$175. As an alternative, you can buy the drivers and the crossover network for \$136 and build your own enclosure from plans provided by the manufacturer. An extra \$5 buys you a pre-cut front board in case you're hesitant about cutting holes. Or you can buy a complete kit with all panels pre-cut and pre-fitted for \$169, and for an extra \$30 you can get the panels with walnut veneer. These prices, by the way, give you a pretty good clue how production costs break down nowadays in speaker manufacturing.

The complete kit includes all the materials needed—the damping material for lining the inside of the enclosure, silicone rubber glue for sealing the en-

closure, grille cloth, the finishing mix for the veneer, plus detailed instructions. All you have to supply is a stapler or tacks, a caulking gun for the sealant, and a pair of willing hands. The estimated working time for completion of the kit project is about three hours, and it's the kind of job you can do right in the living room without making a mess.

Speaker kits are by far the simplest of all audio kits to build because the structures involved are less complicated than those in electronic assemblies. That's why Speakerlab is able to offer an unusual guarantee: If you can't make the kit work properly, just ship it back to the company and they'll finish the job for you. They even maintain a toll-free telephone "hot line" where you can get advice if you're stuck. But that's not likely to happen. Gordon Sell of our staff, who assembled the kit we tested, says it went together very easily

(Continued on page 34)

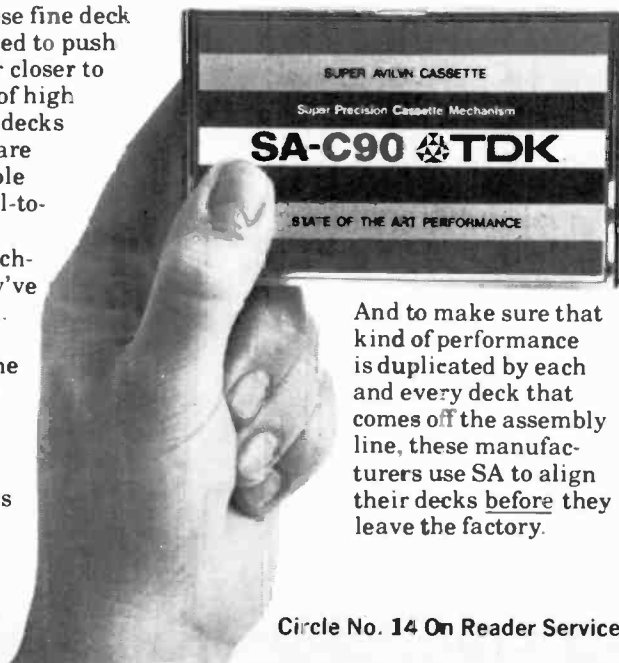
The standard bearers.



The high bias standard.

In the past few years, these fine deck manufacturers have helped to push the cassette medium ever closer to the ultimate boundaries of high fidelity. Today, their best decks can produce results that are virtually indistinguishable from those of the best reel-to-reel machines.

Through all of their technical breakthroughs, they've had one thing in common. They all use TDK SA as their reference tape for the high bias position. These manufacturers wanted a tape that could extract every last drop of performance from their decks and they chose SA.



And to make sure that kind of performance is duplicated by each and every deck that comes off the assembly line, these manufacturers use SA to align their decks before they leave the factory.

Which makes SA the logical choice for home use; the best way to be sure you get all the sound you've paid for.

But sound isn't the only reason SA is the high bias standard. Its super-precision mechanism is the most advanced and reliable TDK has ever made—and we've been backing our cassettes with a full lifetime warranty* longer than anyone else in hi-fi—more than 10 years.

So if you would like to raise your own recording standards, simply switch to the tape that's become a recording legend—TDK SA. TDK Electronics Corp., Garden City, NY 11530.

TDK
The machine for your machine.

*In the unlikely event that any TDK cassette ever fails to perform due to a defect in materials or workmanship, simply return it to your local dealer or to TDK for a free replacement.

SOUND PROBE SOUND PROBE SOUND PROBE

(Continued from page 32)



Circle No. 78 On Reader Service Card

by loosening a set of holding screws. The enclosure is finished in carefully matched walnut veneer, even on the front panel, so you can play the speaker with the grille removed to show off its impressive array of drivers. Its weight of 77 lbs. gives a clue to the solidity of the overall construction. Its price is about \$550 each.

The most distinctive feature of the MS-40 is its radically innovative woofer. From the outside, it looks like just another 12-inch cone. The inside story is something else. According to Mitsubishi, the idea for the honeycomb cone sprang from the realization that ordinary paper cones could not properly reproduce low frequencies at high power levels without buckling under the force of the heavy bass thrusts. The usual way to get around this problem is to use heavier paper for the cones, but this necessarily increases cone weight and consequently inertia. With higher inertia, transient response, crispness, and definition are compromised.

Mitsubishi tackles and surmounts this problem in a unique way: An aluminum honeycomb structure sandwiched between layers of plastic, reinforced and rigidified with fiberglass. As structural engineers have long known, the honeycomb is one of the most efficient configurations in terms of its strength-to-

mass ratio for any given material, and in this unique application to the design of loudspeaker cones the contradictory requirements of stiffness and lightness are reconciled.

In this particular case, the aluminum honeycomb is a mere 20 microns in diameter and the plastic layers forming the outer surfaces of the woofer cone are only 0.1 mm thick. The whole structure pushes the air like a piston-head, with no flexing or buckling, and no false resonances of its own. And, despite our initial doubts, you can really hear the difference.

The midrange driver is a 4-inch cone design, and the tweeter is a 1½" dome set within a flared recess that aids frequency dispersion. Overall response ranges from a floor-warping 25 Hz to 20,000 Hz, with crossover points at 600 and 5000 Hz.

The dividing network provides an unusually sharp separation between the three drivers with a steep 18 dB slopes in the crossover network. This contributes to overall clarity yet leaves no audible "holes" at any point of the tonal spectrum. Overall response seems solid and integrated with exceptional smoothness. Stepped controls on the front panel permit regulation of tweeter and midrange output in 2 dB intervals. We

(Continued on page 74)

and should present no problems to any normally handy person.

Description:

The Speakerlab 3 is a hefty acoustic suspension model, measuring 27½ inches high by 15½ inches wide by 11¾ inches deep, which makes it too big for a bookshelf and more likely to be used as a floor-standing speaker. The manufacturer recommends a minimum input of 15 to 25 watts per channel (the sensitivity rating is 91 dB at a distance of 1 meter for 1 watt input) and the unit will handle up to 200 watts RMS. Drivers include a 12-inch woofer, a 6-inch midrange cone unit, and a 1-inch dome tweeter, with crossover frequencies at 600 and 4000 Hz. The nominal impedance is 8 ohms.

The woofer cone is made of two separate layers bonded with a polymer—a type of construction that resists bending and buckling under power bass thrusts. As for the tweeter, it is of the soft-dome type, which provides smooth frequency response without harsh-sounding peaks, combined with wide-angle dispersion. Two toggle switches at the rear allow you to attenuate midrange and tweeter output in 2 dB steps to -4 dB. Overall response is substantially flat between 40 and 19,000 Hz.

Performance:

Nothing whatsoever has been compromised here for the sake of making this speaker available as a kit. It *sounds* like the first-rate design it obviously is, and at the kit price, that's a bargain. Even at the full price of factory-finished version, you get your money's worth.

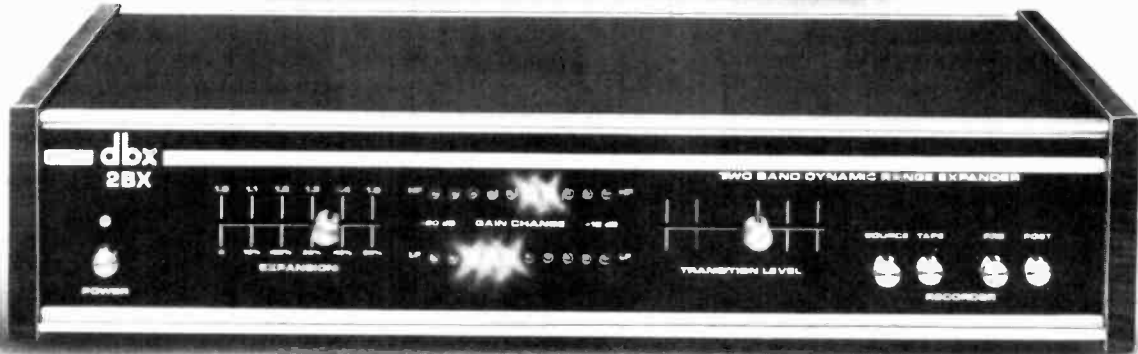
What you get is a clean, well-balanced speaker that in no way calls attention to itself and just lets you listen to the music. Like many designs capable of handling high power levels, it sounds best at fairly high volume, where its clarity and fine overall balance are most readily apparent.

The words coming to mind as one listens to the Speakerlab 3 are *unobtrusive* and *accurate*. The manufacturer claims that it sounds good on anything from Steely Dan to Rostropovitch. We took them at their word and tested the speaker with all kinds of music—rock, jazz, vocal solo, piano, classical orchestra, and organ—and the Speakerlab 3 acquitted itself very well on all of these. There is no hump in the mid-bass response, so disco-freaks might miss the booming "thump" to which they are accustomed. All other listeners are likely to be very happy with this speaker. No single attribute focused our attention—and that's high praise for any speaker.▲



Circle No. 95 On Reader Service Card

Restore the impact of "live" ...easy as 1-2-3.



No matter how accurate your stereo system is, it's only as good as the records and tapes you play on it—and they leave much to be desired. The recording process does some terrible things to live music, and one of the worst is robbing it of dynamic range, the key element which gives music its impact.

Fortunately dbx has developed a whole line of linear dynamic range expanders which can restore lost dynamic range.

1BX. The 1BX is the most sophisticated one-band expander on the market. Its RMS level detector incorporates an infrasonic filter to prevent mis-tracking caused by turntable rumble and record warp.

2BX. The 2BX divides the frequency spectrum into two bands and expands each separately. It doesn't allow the bass to influence the vocals or mid-range instruments, and in strongly percussive music, that's important.

3BX. The 3BX is the state-of-the-art, but with the introduction of the 3BX-R Remote Control option, it's more flexible and more fun than ever. The 3BX divides music into three frequency bands. Low bass will not influence the midrange. And midrange crescendi will not boost low level highs, so operation is virtually inaudible. For complex musical material, the 3BX is the best way to restore dynamic range.

All dbx expanders have design features in common. All utilize true RMS level detection. All feature a program-dependent release time, for natural, life-like sound. All are true stereo expanders that maintain rock-solid stereo imaging. And all dbx linear expanders have a pleasant benefit—up to 20 dB of noise reduction.

The 3BX is still the standard. But now there is a family of dbx expanders designed to bring any system one step closer to "live."

dbx

Making Good Sound Better

dbx, Incorporated, 71 Chapel Street, Newton, MA 02195 (617) 964-3210.

Circle No. 19 On Reader Service Card

HIGH SPEED RECEIVERS: FASTER RESPONSE MEANS MORE ACCURATE SOUND.

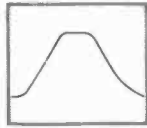
The new Kenwood receivers actually outperform all other receivers, as well as our competitors' separate amplifiers and tuners in transient response.

The reason is Kenwood's exclusive technical breakthrough: Hi-Speed. It allows our receivers to react more quickly to musical changes. So what comes out of your receiver matches precisely what went in.

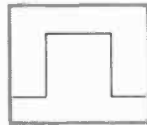
You'll hear the difference as dramatically accurate, open sound with superior imaging and detail. Like hearing an individual singer in a vocal group.

Hi-Speed is available in four models, all DC-amplified for clean bass response. Each one also has switchable wide and narrow IF bands for low-distortion FM reception, plus dual power meters.

And each Hi-Speed receiver has unique individual features that make a real difference in the tonal quality of music. Like dual power supplies that eliminate crosstalk distortion. Or a pulse count detector that digitally reduces FM distortion by half



Distorted waveform response produced by conventional receiver.



Square waveform response of Hi-Speed receiver.

while significantly reducing background noise. Or a built-in equalizer with ten turnover frequencies for full acoustic control.

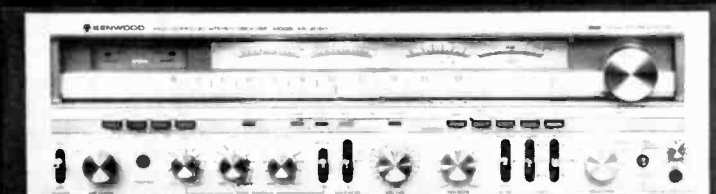
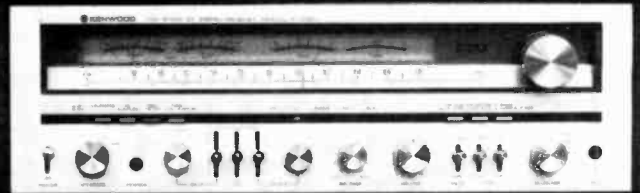
Whichever model you choose, you'll be getting the most advanced receiver technology and performance available today. Advances far beyond the competition.

Your Kenwood dealer will be happy to demonstrate Hi-Speed, now.

HI-SPEED™
Hear the future of high fidelity

KENWOOD®

For the Kenwood dealer nearest you, see your Yellow Pages, or write Kenwood, P.O. Box 6213, Carson, CA 90749
In Canada: Magnasonic Canada, Ltd.



A serious buff, checking out receivers in terms of pricing, power output, specs/performance and quality, will soon conclude that at any given dollar level you'll generally get as much power output, specs/performance and quality in any one major national-brand model as in any other. Whatever the differences, they are minimal, they are largely tradeoffs (one spec over another), and most are *inaudible*.

The areas in which you will find differences of consequence will be in operating features, control "feel," appearance and styling details.

Thus, within the framework of a specific budget, the matter of choosing a receiver boils down to settling on a model that has all the features you need and want, whose controls feel good to your touch, and one which excites or satisfies you visually.

To make your selection easier, we've checked out the receiver offerings of 28 manufacturers and placed representative models in essential categories covering four price ranges and four groupings of features. The feature groupings range from basic to "everything but the kitchen sink," the latter including many of the esoteric features found in deluxe separate-component audio systems.

We've also developed a glossary on page 82 to give you an idea of what specific features provide in the way of operating capability, flexibility, benefits, as well as overall satisfaction.

Before we get into nitty-gritties, let's take a look at what's been happening in feature trends. In general, technology once common only to high-priced audio equipment continues to filter down to broader price levels. A collateral trend is that features previously available only in separate components are now also

available in receivers.

One specific trend is the increasing use of LEDs in place of meters for more accurate readouts of power output, tuning precision, and radio station signal strength. Another is the wider use of digital displays for station fre-

metric equalization (SAE Two) are all more widely available now. A fifth trend is the wider availability of receivers offering deck-to-deck tape dubbing capability.

Once you've decided how much you'd like to spend for a receiver, study the glossary for features that you *must* have. Then check the four receiver groupings to see how well your proposed budget figure fits in with what

you need. If all the features you must have are encompassed by the price category you want, you're all set. Your buying decision will be a simple matter of determining what looks and feels good to you, and what brand you'd like.

If your budget figure looks like it won't be able to get you all the features you need, you'll have to either stretch your budget or reevaluate your needs. Some features represent genuine benefits on a broad scale, others offer benefits on a limited scale. Put a dollar value on certain features and ask if they are worth the difference. For example, is it worth a \$75 increment to have a set with automatic station scanning, as opposed to manual tuning? Try to separate your real needs from wishes.

In evaluating your needs, look into the future. For instance, you have but one tape deck now, a cassette unit, and therefore need only one tape input. But

a year from now you may also own a reel-to-reel machine. For convenient operation of both decks through the receiver, you'll need two tape connections. Or, at some point in the future you might decide to upgrade your record playing system via a moving coil cartridge. Anticipate such a possibility by buying a receiver with a moving coil cartridge input.

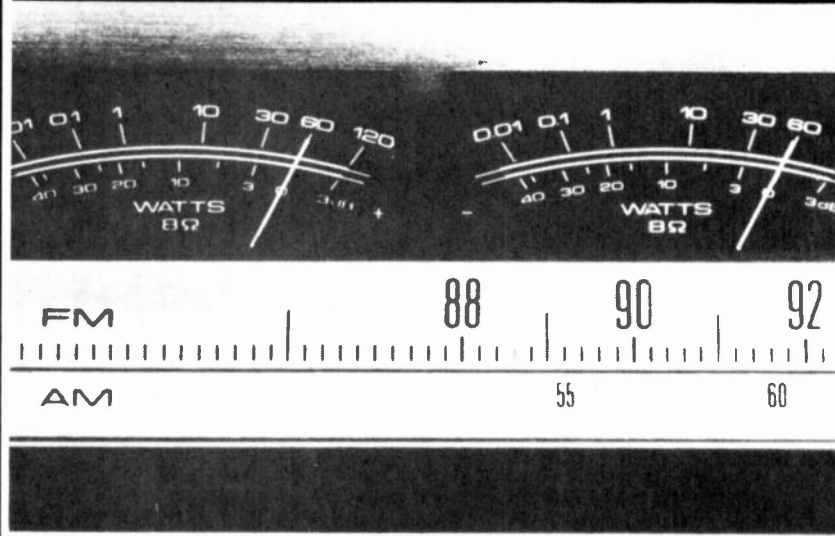
As noted, the receivers are broken

hi-fi stereo
BUYERS GUIDE
NOV/DEC 1979

RECEIVER FEATURES

BY FRED PETRAS

Choose the ones that respond to your needs



quency readouts (and also time readouts). A third trend is the growing numbers of receivers with automatic station scanning capability, and station pre-set capability. Yet another trend is the broader availability of receivers offering more than just bass and treble controls for tonal adjustments; midrange controls, selectable frequency turnover points, five-frequency graphic equalization (JVC, Fisher), and even para-

RECEIVER FEATURES

down into four main categories covering features generally offered in the indicated price ranges. A *precise* breakdown is not possible since companies will often offer an extra feature or two generally found in a higher-priced category, or several features may be traded off in favor of others. An example of the latter is evident in the Kenwood KS-4000R receiver (basic category) that does not offer switching for two pairs of speakers, but instead, offers tape dubbing and mic input/mixing.

BASIC RECEIVER (\$170 to \$250)

A basic stereo receiver will have power on/off switch; volume, bass, treble, balance controls; mono/stereo switch; tuning dial; signal strength tuning meter; and selector switches for AM, FM, phono, auxiliary, and tape monitor; two-speaker system capability with appropriate switch, and a stereo headphone jack—all on the front panel.

You'll find receivers with most of the above mentioned features in the following models (power output capabilities are indicated as—wpc):

Aiwa AX-7300U, 25 wpc, \$230; Fisher RS1022, 22 wpc, \$250; Harman Kardon hk340, 20 wpc, \$250; Hitachi SR-2010, 15 wpc, \$200; JVC R-S5, 25 wpc, \$220; Kenwood KS-4000R, 14 wpc, \$199; Marantz 1520, 15 watts per channel, \$215; Nikko NR-519, 20 watts per channel, \$250; Onkyo TX-1500 Mk Two, 17 watts per channel, \$215; Philips AH784, 20 watts per channel, \$200 (and \$210 in black); U.S. Pioneer SX-580, 20 wpc, \$225; Sanyo 2016, 16 wpc, \$170; Scott 320R, 15 wpc, \$220; Sherwood S-7250 CP, 20 wpc, \$250; Sony STR-V1, 15 wpc, \$220; Technics SA-200, 25 wpc, \$240; Toshiba SA-725, 25 wpc, \$250; Yamaha CR-220, 15 wpc, \$235.

Sony's STR-V1 receiver provides 15 watts per channel of amplifier power and offers both center station and signal strength meters as well as FM muting, tape monitor, and headphones jack. \$220. Circle No. 94.

Hitachi's SR-4010 receiver offers 25 watts per channel and features loudness compensation, tape monitor, LED power indicators that double as signal strength/tuning indicators. \$250. Circle No. 72.

BASIC/PLUS (\$260 to \$335)

A basic/plus receiver will have a few additional features beyond those of a basic model, as well as a few watts more of output power. Among the extras may be: loudness control, FM muting, dual tuning meters, 25 micro-second Dolby de-emphasis switch, and filter switches.

Basic/plus receivers with all or nearly all of the above features include the

following: Akai AA-R30, 38 wpc, \$310; Fisher RS2002, 20 wpc, \$280; JVC R-S7, 50 wpc, \$300; Kenwood KR-3010, 27 wpc, \$280; Marantz SR-1000, 20 wpc, \$265; Nikko NR719, 35 wpc, \$320; Optonica SA-5201/5205, 45 wpc, \$330; Philips AH-785, 30 wpc, \$270 (and \$280 in black); U.S. Pioneer SX-680, 30 wpc, \$275; Rotel RX-404, 30 wpc, \$290; Sanyo 2050, 50 wpc, \$300; Scott 330R, 25 wpc, \$265; Sony STR-V3, 35 wpc, \$300; Technics SA-300, 35 wpc, \$300; Toshiba SA-735, 35 wpc, \$300; Yamaha CR-420, 25 wpc, \$310.

BASIC FULL-FEATURE (\$350 to \$500)

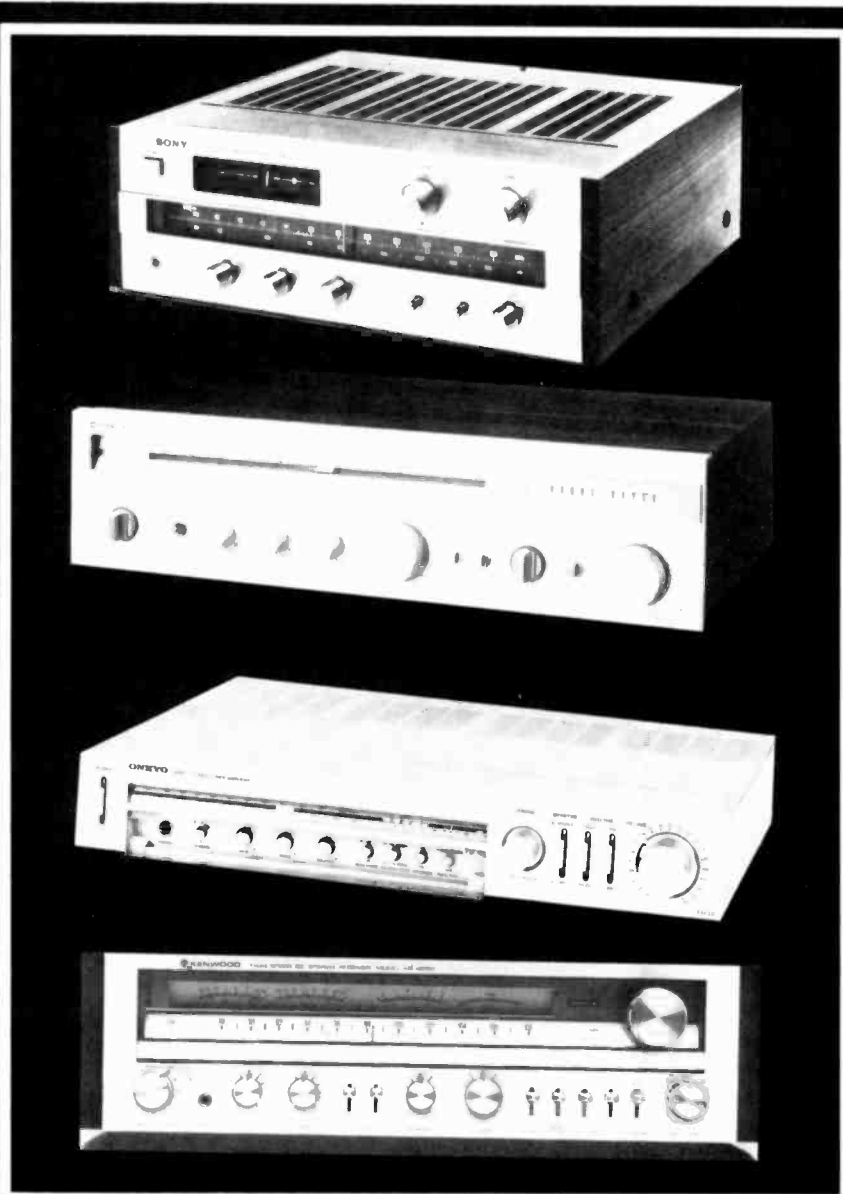
A basic full-feature receiver will, essentially, satisfy the needs of the average music lover/audiophile who wants the necessary features for listening as well as recording, but within the framework of a modest budget and modest power needs.

Such a set will provide the features of the basic and basic/plus models along with some other niceties such as: dual tape monitor switches for dubbing from one deck to another, power output meters, high and low filters, midrange tone control, quartz (or variant) locked tuning, as well as higher power output.

Basic full-feature receivers include: Aiwa AX-7700U, 40 wpc, \$340; Akai AA-R50, 62 wpc, \$465; Fisher RS-

Onkyo's TX-20 "midi" receiver puts out 30 watts a channel and includes Servo-Lock tuning circuitry, high filter, FM mute, and loudness compensation on its features. \$330. Details in Test Reports. Circle 80.

Kenwood's KR-6050 receiver includes a high speed DC amplifier that puts out 60 watts per channel. Subsonic and high filters, wide/narrow bandwidth selection, are among its features. \$499. Circle 75.



2004A, 45 wpc, \$450; Hitachi SR804, 50 wpc, \$449; JVC JR-S301, 60 wpc, \$480; Kenwood KR-6050, 60 wpc, \$499; Lux 1040, 40 wpc, \$495; Marantz SR-4000, 50 wpc, \$400; Nikko NR-815, 55 wpc, \$480; Onkyo TX-4500 Mk Two, 60 wpc, \$460; Optonica SA-5401 (SA-5405 in black) 65 wpc, \$450; Philips AH787, 60 wpc, \$430 (and in black, \$440; U.S. Pioneer, SX-880, 60 wpc, \$425; Rotel RX-604, 50 wpc, \$400; Sansui G-5500, 60 wpc, \$465; Sanyo Plus 55, 55 wpc, \$400; Scott 370R, 60 wpc, \$450; Sony STR-V4, 55 wpc, \$390; Technics SA-500, 55 wpc, \$430; Toshiba SA-750, 50 wpc, \$350; Yamaha CR-840, 60 wpc, \$495.

FULL FEATURE/ PLUS

(\$500 and up)

This receiver will be the ultimate model, offering the essentials of the preceding categories, as well as some niceties, for full listening and recording capabilities, additional convenience, along with lots of amplifier power.

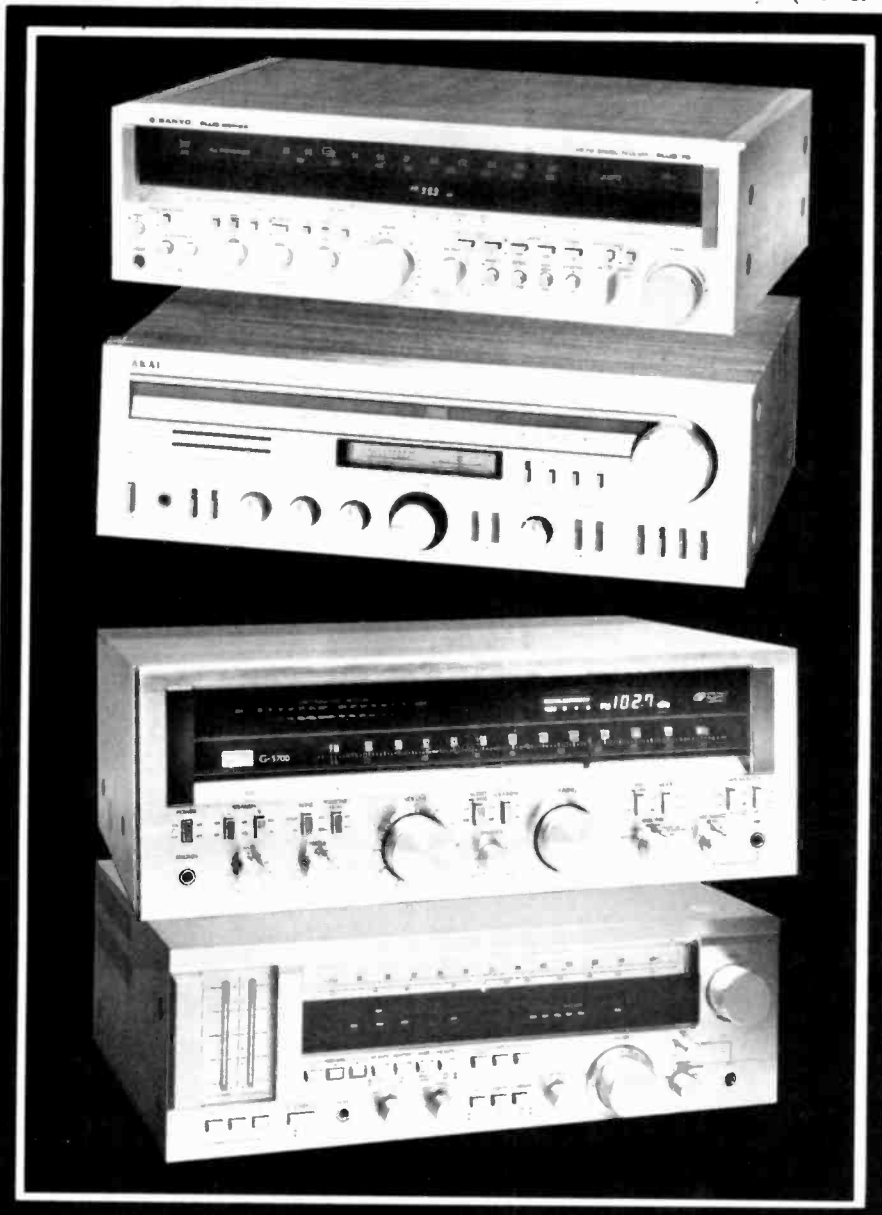
Among features not covered in our glossary that you may find in a full-feature/plus model are: tone defeat, narrow / wide-band tuning, mic jack with mic mixing, digital time readout, touch-sensitive controls, lighted moving dial pointer, air-check calibration for pre-setting FM recording levels, power display range control, phono cartridge

loading selector, dual phono inputs (one for moving coil phono cartridge). Some of these features are exclusive (at this time), or proprietary—such as Sanyo's moving digital display of frequency offered in its Plus 200 receiver.

If you are looking for the "Ultra Super" model combining all these features, forget it. There is no such model. You'll have no trouble finding feature-laden receivers that will satisfy your

Sanyo's Plus 75 receiver (75 wpc) offers bass and treble controls with three selectable turnover points each, midrange control, high and subsonic filters, plus more. \$500. Circle Number 96.

Akai's AA-R50 receiver offers tape monitors for two tape machines; low and high filters; 25 uSec FM de-emphasis; bass, midrange, and treble tone controls; among other features. Output: 62 wpc. \$465. Circle 62.



Sansui's G-5700 75-wpc receiver offers DC amplification, digitally quartz-locked tuning, digital frequency readout, microphone mixing control with front-panel mike jack. Details in Test Report. \$630. Circle 89.

Philips' AH901 receiver (80 wpc) offers mike mixing knob and microphone jack, two tape monitors and dubbing, FM mute, 20dB AF mute, high and low filters, other features. \$550. Circle Reader Service 84.

particular needs and desires to the fullest. Fortunately, the selection is wide. A rule of thumb applies here: the more you spend, the more features you'll get.

Following are key examples of full-feature/plus models. Others are pictured elsewhere in these pages. Additionally, you may find other models at price points in between those given that will fit your budget/needs precisely. (Power output figures for this

group have been omitted because of space limitations.)

Aiwa AX-7800U, \$590; Fisher RS-2007, \$550, RS2015, \$850; Hitachi SR-904, \$600, SR2004, \$1,095; JVC JR-S401, \$600, JR-S501, \$700; Kenwood KR-8050, \$820, KR-9050, \$1,150; Lux 1050, \$695, 1120, \$995; Marantz SR-6000, \$550, SR-2385, \$1,000, SR-2500, \$1,250; Nakamichi 530, \$850, 730, \$1,200; Nikko NR-1219, \$650; Onkyo TX-8500 Mk Two, \$1,000; Optonica SA-5601 / 5605, \$600, SA-5901 / 5905, \$800; Philips AH901, \$550, AH-903, \$750; U.S. Pioneer SX-1280, \$900, SX-1980, \$1,250; Rotel RX-2001, \$750, RX-2002, \$850; SAE Two R-9, \$800, SAE Two R-18, \$1,350; Sansui G-5700, \$630, G-9700, \$1,100, G-3000, \$1,900; Sanyo Plus 75, \$550, Plus 200, \$900; Scott 380R, \$580, 390R, \$700; Sherwood, S-110CP, \$750; Sony, STR-

V6, \$650, STR-V7, \$820; Tandberg TR2080, \$1,200; Technics SA-800, \$730, SA-1000, \$1,700 (the most powerful set in the market, 330 wpc); Thorens AT403, \$895, AT410, \$1,195; Toshiba SA-7100, \$630, SA-7150, \$1,100; Yamaha CR-2040, \$860, SR-3020, \$1,500.

ON THE VISUAL SIDE

Among trends in receivers relative

RECEIVER FEATURES

to appearance is a slimming of their profiles, as well as a general downsizing. While this slimming/downsizing is limited at the moment, it is a burgeoning trend. Technology has advanced to the point where there is no need to build receivers in the "traditional" size mold. Keep an eye on the new "micro" audio components being offered by several manufacturers; if consumers like you are attracted to them in significant numbers, you're likely to see a rash of receivers sporting micro - miniaturization, or an even greater degree of the down-sizing now taking place.

Key examples of the smaller receivers are in the Onkyo and Rotel lines. Onkyo's TX-20, 30 wpc AM/FM servo receivers priced at \$330 stands barely three inches high, and is about 17 inches wide. (The average receiver stands about 5½ inches high.) If you're decor-conscious or space is limited, the benefit of slim profile is obvious—and there is no trade-off in terms of performance or features. Further, the TX-20 has a disappearing panel covering all controls except those used for operation—also of aesthetic value. In features, it fits the basic/plus category. Rotel's Macro RX-1000, 35 wpc AM/FM receiver, priced at \$300, is described as being sized "approximately midway between 'micro' and conventional components," which translates out to 3.9 inches high, by 17.2 inches wide, and 11.6 inches deep. This basic/plus model comes in a shiny black finish.

Perhaps the most visually intriguing receivers in the marketplace today are those of Bang & Olufsen. So intriguing indeed, that they are on exhibit at New York's Museum of Modern Art on the strength of their "break(ing) dramati-

The SAE Two R9 receiver features quartz-lock tuning with digital readout, automatic scanning capability, bass/midrange/treble tone controls, FM mute, 20 dB muting, 4-function meters. 90 wpc. \$800. Circle 88.

AIWA's AX-7800U (60 wpc) offers 6-station preset selectors, LED peak power indicators, automatic scanning and hold capability, dual turnover bass and treble tone controls. \$590. Circle Reader Service 112.

cally away from the standard design motifs used for most electronic sound equipment."

The Beomaster Model 2400 and 1900, priced at \$625 and \$525, are both FM-only 30 wpc models housed in long, low slope-fronted teak cabinets measuring 24¼ inches wide by 9¼ inches deep, but only 2½ inches high. Key controls, incorporated in a metal strip, are touch-sensitive—a mere brush

of a finger activates them. Secondary controls are hidden behind an aluminum panel incorporated in each model's top. The 2400 comes with a cordless remote control that allows you to select any of four pre-set FM stations, adjust the volume level, switch to phono input, and turn the receiver on or off. The 1900 is essentially the same, but comes minus remote control.

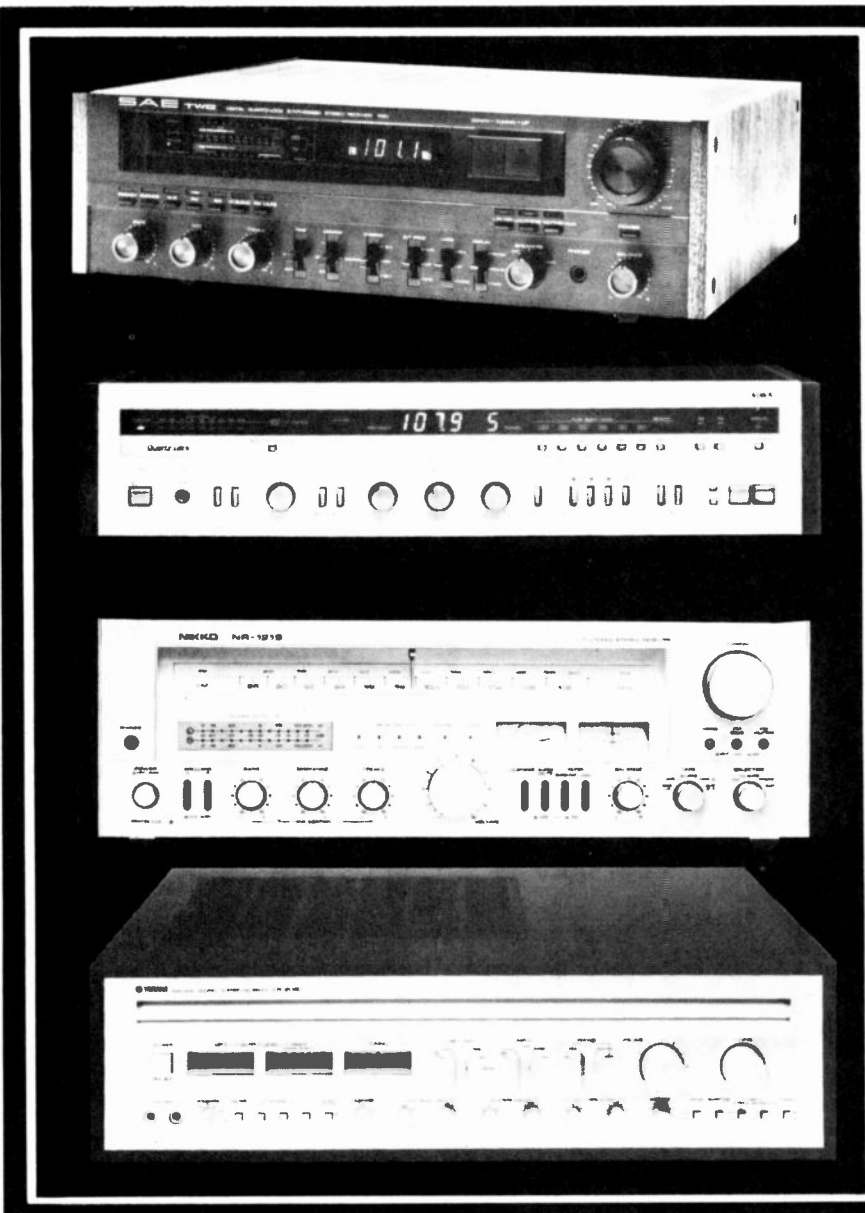
In Summary. With a little luck, a little research, and a bit of compromising, you should have no trouble finding a receiver that both meets your needs and caters to your tastes as far as appearance and non-necessary convenience features are concerned.

Consult our new products column and our regular features, which will be of help in keeping abreast of everything that's new, both in terms of new features and in terms of innovative technological developments.

Check our test reports to find help in evaluating a receiver's performance capabilities.

Try to find a communicative, well-informed salesperson who can help in pinpointing the receiver that will meet your requirements.

Couple all of the above advice with a generous dose of legwork, patience, and a sense of humor, and without doubt you'll soon arrive home with a receiver that will give you years of pleasure. ▲



Nikko's NR-1219 receiver (100 wpc) offers bass, midrange and treble tone controls, 25 uSec FM de-emphasis, high and subsonic filters, tape monitoring and dubbing facility. \$650. Circle Number 79 for details.

Yamaha's CR-2040 receiver (120 wpc) offers continuously variable bass, presence, and treble tone controls, head amp for moving coil cartridges, switch-selectable impedance, more. \$860. Circle 101.

Wharfedale. First and everlasting.



The Wharfedale E's are the newest speakers in an unequalled tradition of excellence that goes back to the early days of music reproduction.

In those days, our speakers—like the unique sand-filled designs of Gilbert Briggs—were received with wide acclaim despite the limited technical resources of that era. Today's Wharfedale E's benefit from our space-age technology, and hold a special position of leadership in acoustic engineering.

The design goal for America's Wharfedale E's was to achieve that elusive combination of crystal-like clarity, strong bass and extremely high efficiency. We met this objective

using computer optimization and holographic research, developing speakers with extremely wide dynamic range and no coloration. They've won the praise of lovers of every kind of music. And seem destined to keep that praise for years to come.

A Wharfedale E can fill a room with just a couple of watts. Or handle hundreds for unusually large areas. At any level, with any music, you won't detect any of the harshness or roughness inherent in lesser speakers.

Each Wharfedale E goes through a stringent Quality Control procedure that rejects all but the most perfect speakers. Those that pass represent

the highest attainable audio technology, enhanced by the skills of old-world craftsmen who make each pair of perfectly matched hand-rubbed, fine wood veneer cabinets.

Many speaker makers have come and gone in the nearly 50 years since the first Wharfedale was made. And when you listen to the E's you'll know why Wharfedale lasts.

The new E90 measures 45-3/8" H x 15-3/16" W x 14-3/4" D and has a typical frequency response of 30-18,000Hz \pm 3dB. The E70 is 32" x 13-1/2" x 14" with frequency response from 35-18,000Hz \pm 3dB. The E50 measures 25" x 13-1/2" x 13-1/2" with a frequency response of 40-18,000Hz \pm 3dB. The new E30 is 22-3/4" x 13-3/16" x 10-5/16" with a 45-18,000Hz \pm 3dB frequency response. Efficiency is 94dB at 1 watt and 1 meter for the E30, and 95dB for the other models.



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Funny thing this stereo business. The world's full of advanced technology—so how do you make a better unit? More features? More power?

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AM/FM cassettes and 8-track. In-dash, under-dash units. Speakers. And something we're especially proud of... the Mitsubishi component separates. Tuners, tape decks, amplifiers, amplifier/equalizers. All engineered as separate units designed to ulti-

mately come together in an awesome collective system.

See your nearest Mitsubishi dealer and point to, poke at and above all, listen to our exciting new line of car audio products.

Shown here are the RX-79 in-dash cassette with AM/FM MPX, the CV-23 control amplifier and equalizer, the CX-20 component cassette deck, the SX-30SA 2-way speaker enclosures and the SB-2SA super tweeters.

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THE METTLE OF METAL TAPE

BY HERB FRIEDMAN

Our testing lab reports on metal tape's performance capabilities

Metal tape is probably the most important technical development in cassette technology since the introduction of the cassette system itself. Obviously, there will be further improvements—there always are—but even now metal tape performance is spectacular.

What Problems Does Metal Tape Solve? Without getting into more technical gobbledegook than needed, what eventually happens when

using even the best non-metal cassette tape is that on playback there are severe high frequency losses if the stereophile attempts to record at maximum recording level (MRL). Luckily, most natural high frequency information has less volume level than midband sounds, but this is not true of music produced by electric instruments and synthesizers. Thus, when dubbing a disc or tape or when making a live recording of non-electric instruments, the high frequency losses might go un-

METAL TAPE

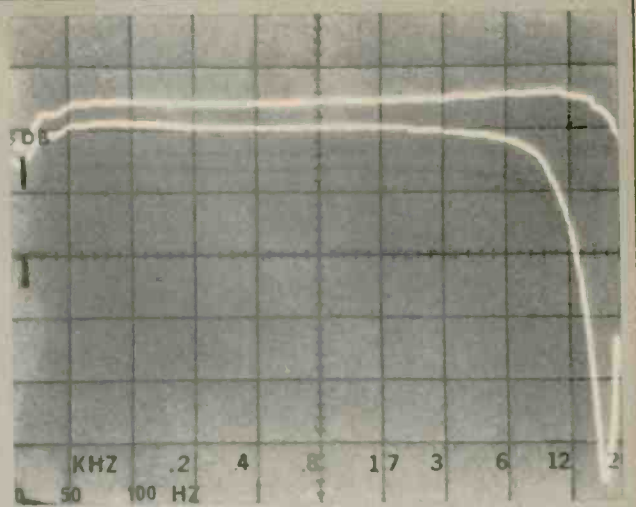


Fig. 1—Bottom trace shows the frequency response of TDK SA tape on the AIWA AD-6700U machine. Top trace shows the frequency response of TDK's MA-R metal particle tape.

noticed. Problems rear their heads, however, with recordings of modern, electronic music.

What we need in these problem cases is a tape that does not saturate at the higher frequencies at maximum recording level (where MRL is defined as the midband recording level that produces from 1 to 3 per cent third harmonic distortion—called H^3 —on playback). The exact percentage of H^3 representing MRL depends on who is doing the testing and the reference levels being used. Three per cent H^3 , which is generally the same value as 3% THD (total harmonic distortion), is the standard reference value.

The performance of metal tape

depends largely on the performance capabilities of the particular tape machine you're using and questions regarding the tape/tape recorder interrelationship formed the basis for our research and testing for this article:

For starters, we obtained three production-run metal tape cassette samples (from Fuji, 3M Scotch, and TDK) and also obtained the first of the available production-run metal tape cassette machines: the AIWA AD-6700 U, which is, incidentally, one of the best cassette machines we've ever tested. It's a two-head model with a combination record/play head. In our testing laboratory we proceeded to explore the im-

portant questions at hand. Figure 1 illustrates the problem of high frequency losses. (The oscilloscope traces are displaced vertically for clarity.) The horizontal axis represents 20 to 20,000 Hz. Each major vertical division represents 5 dB. The bottom trace shows the performance of TDK-SA tape recorded at 0-VU record level on the AIWA AD-6700U using optimized chrome bias. (On this machine, SA tape at 0-VU record level produces about 0.8% THD.)

Note that the response is down— from the midband reference—8 dB at 12,000 Hz, and 28 dB at 15,000 Hz. Under normal music recording conditions (using records,

Fig. 4—Compare this trace of the distortion at 1000 Hz using Fuji's metal particle tape with the same measurement in Figs. 2, 3, and 5. H^3 values are within 2.5 db, worst case.

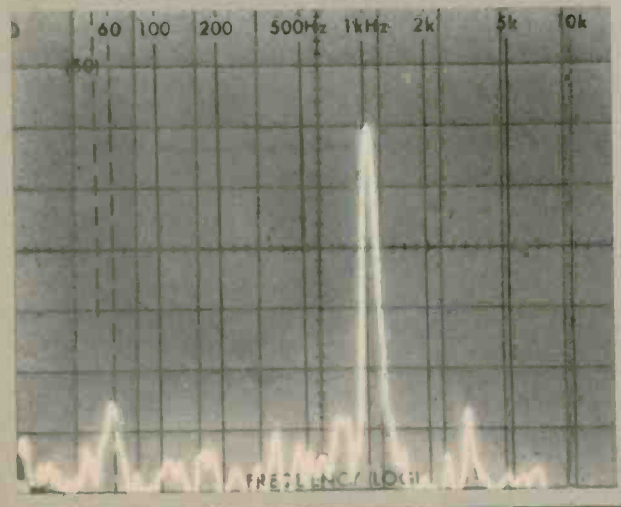
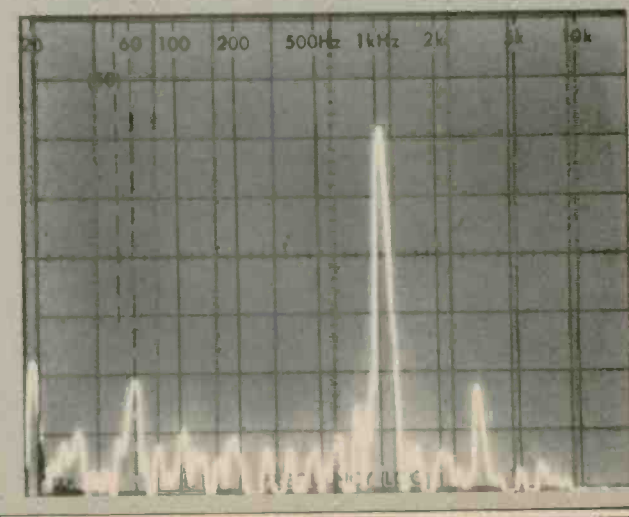


Fig. 5—Distortion trace for 3M's Metafine metal particle tape, under the same conditions as described for Figs. 2-4. Horizontal axis spans audible frequency range (20-20k Hz).



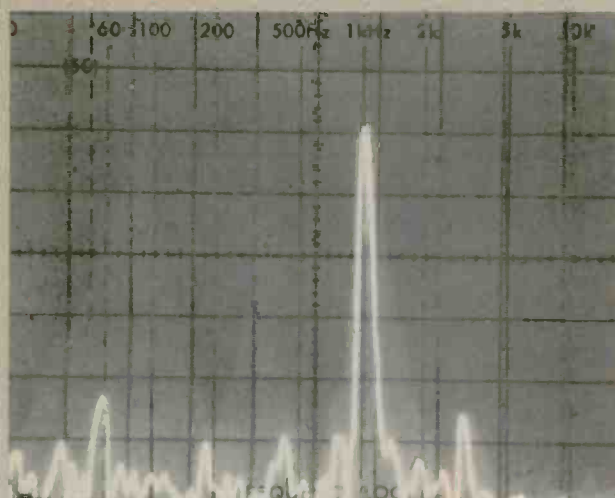


Fig. 2—Oscilloscope trace of the distortion measured for TDK's SA, using 1000 Hz as test tone, and the pre-set bias/EQ adjustments on AIWA machine. Compare with Figs. 3-5.

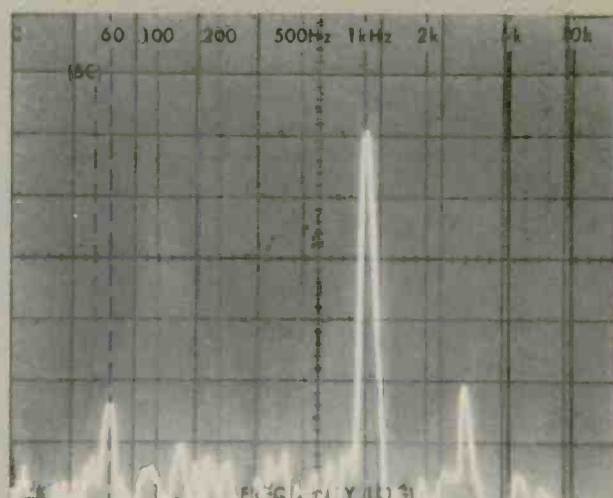


Fig. 3—Oscilloscope trace of distortion using TDK metal particle tape on the same reference machine. Each major vertical division represents 5 dB. Reference tone: 1 kHz.

tapes, FM program material, and live conventional musical instruments as your sound source), this tape and others of equally superior quality are ideal to do a yeoman's job.

Metal Tape Compared With Others. The top trace in Fig. 1 is really what we want and need in tape performance. It is actually +1 dB at 12,000 Hz, and -2 dB at 16,000 Hz. It is only down 3 dB at 18,000 Hz. What is the top trace? The top trace is the frequency response at 0-VU record level using TDK metal tape. It is this improved high frequency response that's the main reason for the excitement over the metal tape concept.

As for distortion and signal-to-

noise ratio, metal cassette tape approximates the performance of the better-quality chrome-bias tapes. The maximum variation in our measurements of signal-to-noise ratio was about 1 dB at almost 60 dB down (Dolbyized)—An unimportant consideration. As for distortion, again it's not worth wasting time discussing it. It's all very close, as shown in Figs. 2 through 5. Using TDK-SA as the reference, using the factory adjustments of the AIWA machine, there isn't 2 dB difference in output level at 1000 Hz, while H^3 is within 2.5 dB worst-case). Depending on the machine adjustments, and the specific cassette of tape, the H^3 values will vary from tape to tape;

while Fuji metal tape has a smidgen less distortion than the Scotch metal tape, on another machine the results could be reversed. All in all, the values are so low that the whole subject of distortion comparison should be left to the nitpickers. In the end we come back to the fact that metal's high frequency performance is the only real difference (there is also a small improvement at the very low bass, but it's insignificant when compared to the high end performance improvements).

Three Metal Tapes Compared.

You can see that at a common 0-VU record level the distortion characteristics of the three metal

(Continued on page 78)

Fig. 6—The frequency response curves for the TDK, Fuji, and 3M tapes. The two that virtually overlap are the TDK and the Fuji. The other is the 3M Metafine trace.

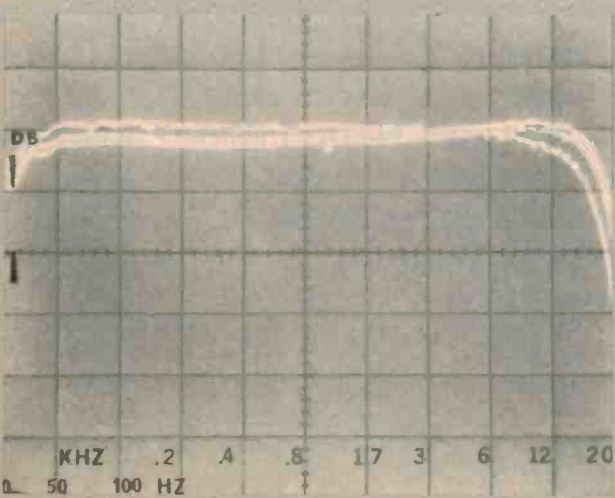
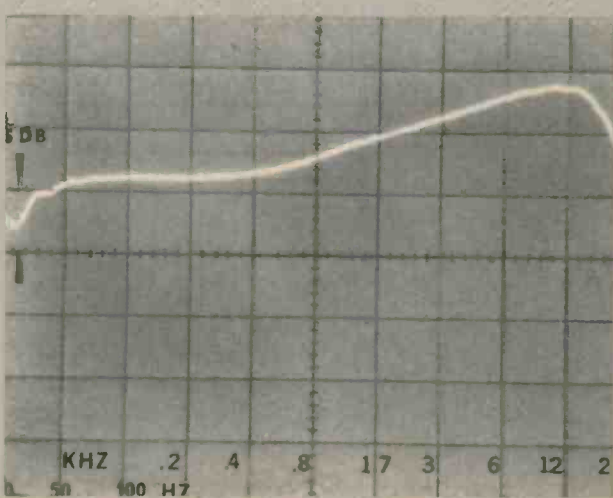
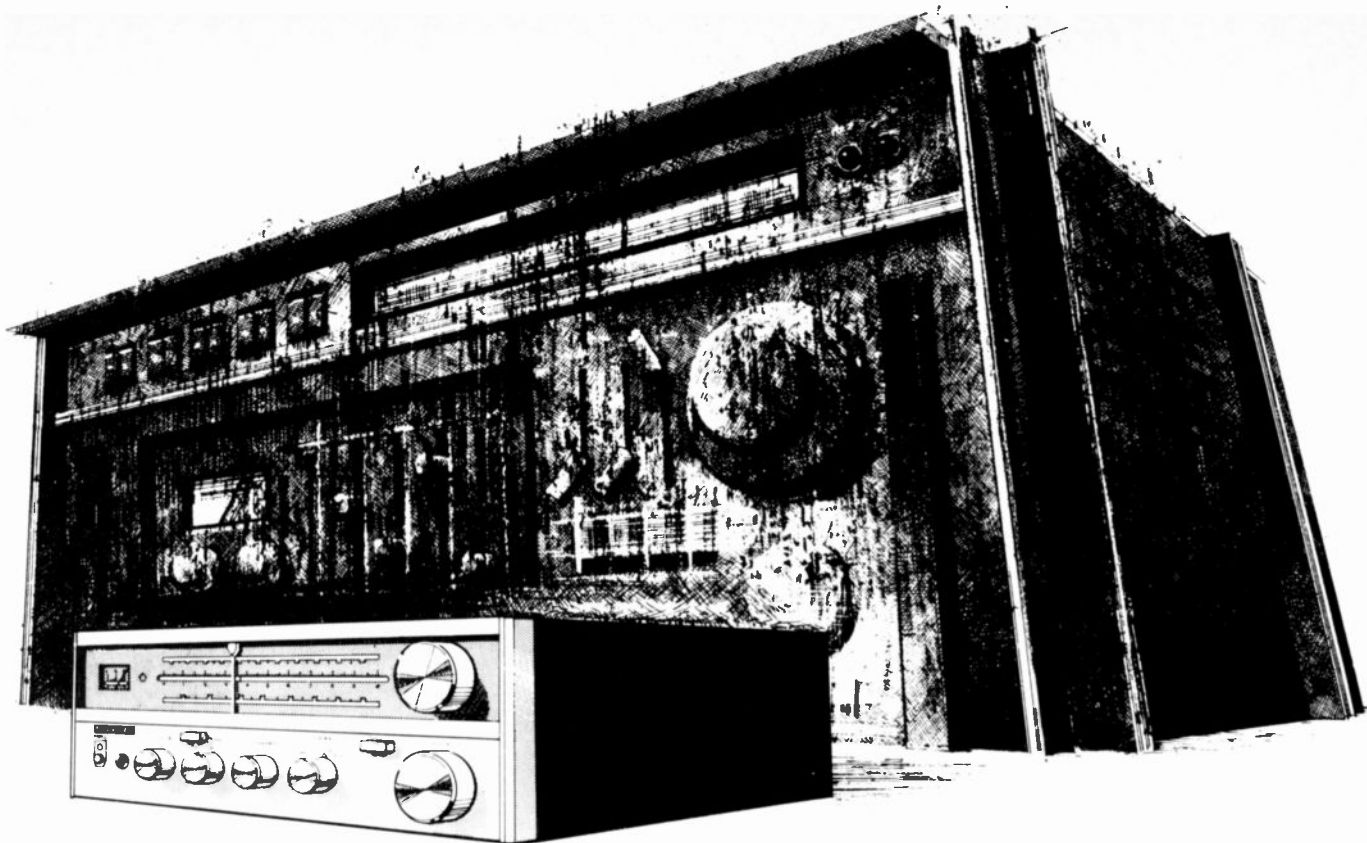


Fig. 7—Shows the frequency response you can expect if you try to record and play back metal tape on a conventional cassette deck. Note the ±8 dB peak at 12,000 Hz.





WOULD YOU BET GOLIATH AGAINST DAVID?

Probably. Goliath certainly looked awesome. Like he could handle any competitor. But David (a musician, of course) took the title in just one round.

The average \$300 receiver looks as awesome as Goliath. Knobs, buttons, lights, doodads and diddlybops. It may even sound...not bad. But most of the effort and money went into catching your eye and high fidelity is about music. So don't place your bet on Goliath just yet.

There's a David around: the Harman Kardon hk340. Don't be misled by its low cost—way under \$250—and its modest appearance. The hk340 performs on the same

level as its more powerful relatives in the renowned Harman Kardon line. Why not? It shares such qualities as an oversized power supply, discrete transistors (instead of calculator-type chips), ultrawideband design and low negative feedback. Transients are crisp, clean and handled with consummate ease. Bass is full and rich. Highs are open and natural.

Visit your Harman Kardon dealer and listen to the hk340 against any Goliath. We won't suggest that only a Philistine would choose Goliath, but we will say that David is a cinch to win. No contest.

Write to us for complete information.

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Circle No. 44 On Reader Service Card



SPEAKER DESIGN CONCEPTS

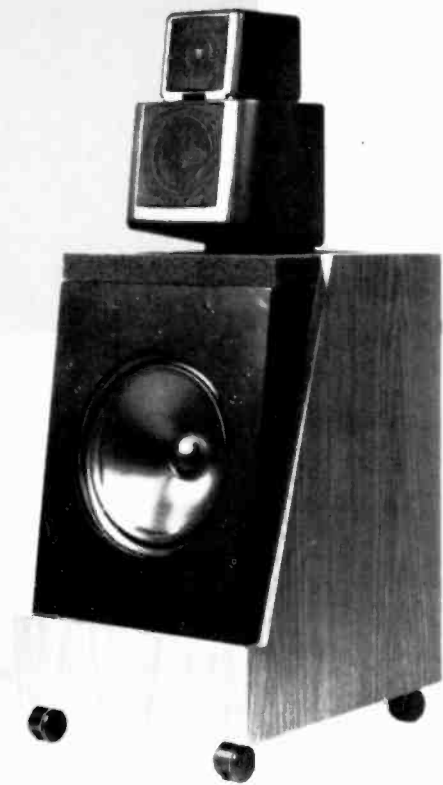
Underlying theories behind a sampling of speakers
BY A. W. MYERS

Of all the component parts of a hi-fi system you may own, the choice of speakers is by far the most personal. A truer statement was never made. If you like the sound coming from a particular box, then all is well, and

Photo courtesy of Epicure Products Inc. and Jack Richmond, Photographers



The Powered Advent speaker is a two-way, bi-amplified acoustic suspension speaker system. A built-in power amplifier, variable input sensitivity control, and overload indicator are all included in its price of about \$450 each. Its measurements are 28 3/8 by 14 1/2 by 11 7/8 inches.



KEF's Model 105 was designed to achieve stereo realism without confining the listener to a preferred listening position. It uses three phase-aligned drivers to achieve that end. \$950.00 each. Circle Number 106 for details.

SPEAKER DESIGN CONCEPTS

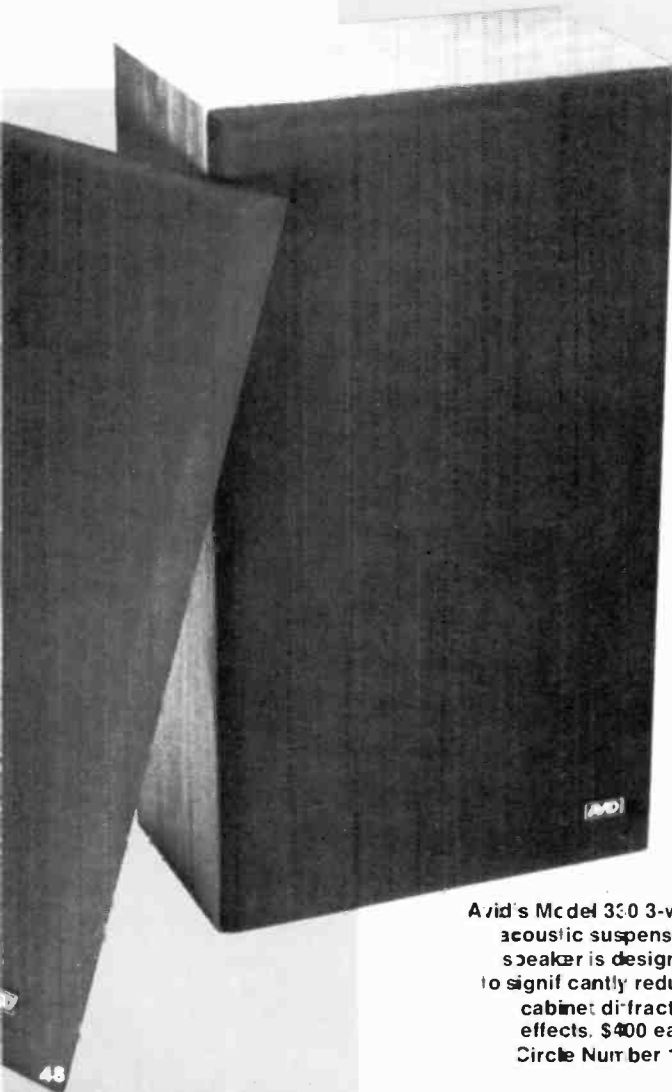
good. After all, *you* are the one who is spending the money and *you* are the one who has to listen to it at home. A \$1,000.00 per channel state-of-the-art speaker that your friend owns may sound no better to you than a system costing half the price. Which of you is right and which is wrong? Answer: you are both right in choosing the speaker that best suits your individual needs and ears.

If you were to assemble an assortment of reputable loudspeaker designers and engineers, you'd no doubt have trouble in getting them to agree on what constitutes a perfect speaker, much less to agree on what is the best way of designing such a speaker. All speakers represent a trade-off or compromise somewhere along the line, and I doubt that there is a single speaker system anywhere that would satisfy every pair of discerning ears.

The following pages attempt to give an overview of some of the innovations in speaker design that have appeared over the years. Because there have been so many, the article naturally cannot even begin to be comprehensive in its coverage of this topic. Our hope is to give you a sampling and a sense of the wide variety of solutions available to you.

WORKING WITH REFLECTED SOUND

Eleven years ago, a "revolutionary" concept in speaker design went on sale—the now-famous Bose 901. So popular was it when first introduced, that purchasers often had to go on a waiting list. The 901 currently being sold is a



Avid's Model 300 3-way acoustic suspension speaker is designed to significantly reduce cabinet diffraction effects. \$400 each. Circle Number 120.



The Bose 901 Series IV speaker uses a combination of direct and reflected sound to recreate the characteristics of a live performance. It must be used in conjunction with the Bose equalizer that comes with it, or with a Bose spatial control receiver that has the equalizer built into it. Price of the 901's with equalizer is \$859 a pair. Circle 66.

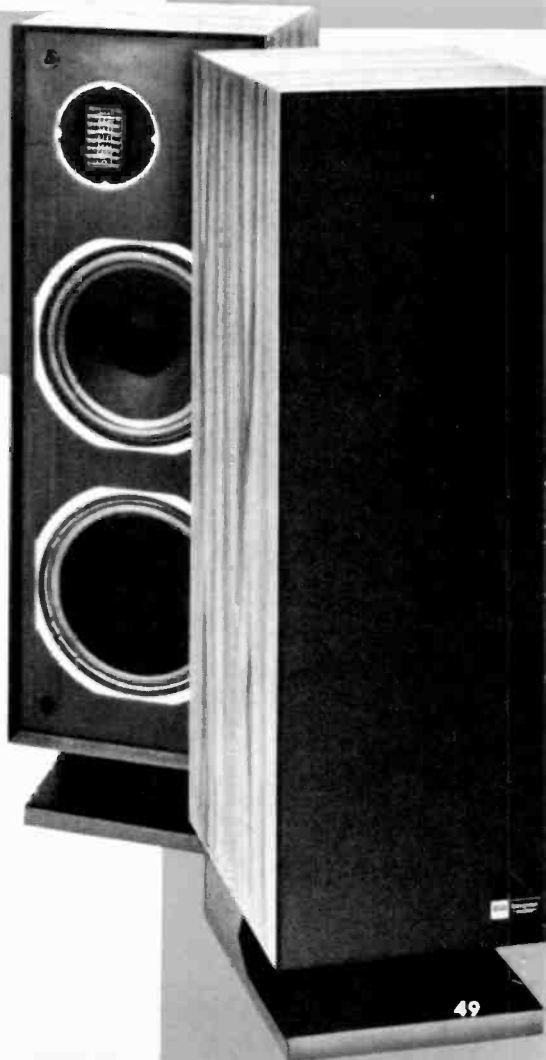
fourth generation model. But, if you compare the latest version with the first, there is a world of difference. The basic concept of the 901 remains the same: thanks to carefully controlled amounts of rear-firing sound waves (that are never perpendicular to the wall) coming from two angled panels at the rear of the speaker, in conjunction with a conventionally mounted driver at the front of the speaker, the listener perceives a much larger sound. The idea is to create the acoustical perception that you have with live music—that is, a combination of direct and reflected sound. Also, instead of utilizing different types of drivers to reproduce specific frequency ranges, the 901 employs nine of the same full-range drivers, each capable of covering the full frequency range.

What are the differences between the "old" and the "new" 901s? First off, in the new version, each driver is mounted in its own "chamber." These chambers are all part of the "acoustic matrix," which is actually a molded piece of plastic. In the earlier version they were all mounted on the wood speaker enclosure itself. However, probably the most important factor in the improved 901 is the vastly improved efficiency of the speaker. In fact, Bose engineers have stated that in a normal sized listening room, a receiver or amplifier with no more than 25 watts per channel will be more than adequate. Like its predecessor though, it is capable of handling several hundred watts per channel—providing that you can take the deafen-



Acoustic Research's AR9 speaker is a four-way floor-standing speaker design which includes two side-firing woofers. It's designed to be placed next to a wall to optimize the quality of the bass response. AR9 includes a 8-inch low midrange driver, a 1 1/2-inch upper midrange driver, and a 3/4-inch dome tweeter. \$750 each. Circle 60.

The ESS Tempest LS-4 speaker uses a Heil air-motion transformer to handle high frequencies, and a 10-inch woofer with 10-inch passive radiator to handle the low frequencies. It measures 35x12 1/2 x12 1/8 inches and costs about \$368 each. Circle No. 103.





Infinity's Reference Standard 4.5 speaker incorporates two dual-voice coil woofers (made of polypropylene), four EMIM drivers and three EMIT tweeters. Two speakers plus room equalization and contour controls in separate enclosure sell for about \$3000. Circle Number 105 on the Reader Service Card.



Technics SB-L200 linear phase speaker systems incorporate a 10-inch woofer, tapered-flare radial-horn tweeter, and a 4-inch midrange driver. Its power handling capacity is 100 watts. \$200 each. Circle 98.



Ohm's F speaker has no woofers, midranges or tweeters. A single electrodynamic driver, 12 inches in diameter and 17 inches deep handles 30 to 20,000 Hz. \$950. No. 104.

SPEAKER DESIGN CONCEPTS

ing volume. The current price of the 901 is \$859.00 per pair including the equalizer.


RECEIVER TO MATCH

Even though the latest 901 performs admirably with even low powered amplifiers and receivers, it is *specially* designed to operate with Bose's own new receiver, the 550 Spatial Control Receiver (\$349.00). Owners of 901 Series III or IV have noticed what appears to be an extra set of connections for a second pair of speaker wires. When used with the new Bose receiver, the user actually does have four individual wires to attach to each speaker. This is because the receiver is actually two separate stereo power amps. Through the use of the appropriate receiver control the user can vary the "feed" of the middle and high frequencies to either of the rear panels; you can direct the signals to the panels that fire out away from the speakers, giving a big full sound for symphonic or popular orchestral music or, by increasing the volume of the inner firing panels, a narrower more intimate sound can be attained. Also, the 550 receiver has the equalizer for the 901's built in. Thus, if you buy the receiver and speakers at the same time, you can pay \$734 for the speakers without the equalizer (for a savings of about \$125).

BUILT-IN POWER AMPS

Another design approach has been adopted by at least two manufacturers of quality speakers: internal power. By having the power amplifier built into the speakers, you

(Continued on page 76)



Our recording tape is considered by most audiophiles to be the world's finest tape.

Our tape window is welded in to keep dust out.

Our pressure pad is locked into a special four-sided retainer to maintain perfect tape-to-head contact.

Our slip sheet is made of a substance that's so slippery, even glue can't stick to it.

Our leader not only keeps you from making recording errors, it also keeps your tape heads clean.

Our special guide rollers make sure our tape stays perfectly aligned with your tape heads.

Our cassette is held together by steel screws to assure precise alignment and even distribution of pressure on all sides of the cassette

Our standard cassette shell is finished to higher tolerances than industry standards.

Our tape is anchored to our hub by a special clamping pin that makes slippage impossible.

There's more to the world's best tape than the world's best tape.

Our reputation for making the world's best tape is due in part to making the world's best cassettes.

and more work into our cassettes than most manufacturers put into their tape.

we believe in a simple philosophy.

To get great sound out of a cassette takes a lot more than just putting great tape into it.

In fact, we put more thought

We do all this, because at Maxell

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Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074

Most direct drive turntables are a Cog'n' Pull Story.

There's a common problem shared by most direct drive motors: cogging. They cog because the spaces or "slots" between the magnetic poles of the motor exert a different force than the poles themselves. So you get cog and pull, cog and pull. Uneven rotation. Rumble.

Two new turntables from Garrard. And no cogging!

Garrard's two new direct drive, single play turntables—the DD131 and DD132—are free of cogging. But more. Garrard engineering has designed and incorporated the ingenious Fail-Safe Drive System that assures the user a powerful thrust and absolutely steady rotational speed.

Three key elements.

One. The motor is the heart of any direct drive turntable. The new DC Servo-controlled motor, developed and built by Garrard, is brushless, coreless and slotless. It ends cogging by exerting a constant magnetic force during the entire 360° rotation of the platter!

Two. State-of-the-art speed monitoring. A Time-Integral-Velocity monitoring system instantly detects the slightest variation that could affect speed,

Three. "Hall effect" circuitry gives final assurance of precise speed by making instant correction of any rotational irregularity.

There it is. Garrard's Fail-Safe Drive System with a cogless motor, constant monitoring and instant correction.

And still more.

The Fail-Safe Drive System by itself makes for a great turntable. But, in addition, both models boast the same ultra-light, 12-gram tonearm (including magnesium headshell!). Moreover, the drive system and tonearm are integrated with the silent, smooth and dependable Delglide® system. (You've seen the rave reviews.) and both turntables come with the now-famous Garrard three-year warranty. Differences? The DD131 is semi-automatic, the DD132 fully automatic.

A great value.

Finally. There's the good news that provides as much reason to buy one of these turntables as their quality and features. The price: under \$200!

Write to us. We'll forward complete information about both of these handsome models. And we promise. No cog and pull stories.



Garrard
More than ever.

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17 GIFT PICKS: SUPER DISCS FOR DISC-OPHILES

□ Picking a "super disc" from a growing selection of direct-to-disc and digital recordings, either for yourself or for a friend, can be difficult because both the recording quality and the program materials vary so widely. And at \$15+ per shot (on the average), you'd just as soon avoid making a mistake. You may already be familiar with the difficulties one always has in returning a genuinely defective recording, and you can imagine what's bound to happen

if you try to get a refund on an expensive disc on the basis of not liking the musical content.

In reviewing a wide selection of audiophile discs to come up with a collection of recommended discs, one generalization arose immediately: while most audiophile recordings are *technically* state-of-the-art (boasting wide dynamic

range, freedom from background and surface noise, etc.), the musical content often leaves a lot of room for improvement . . . for example,

how many audio buffs are truly interested in adding a direct-cut recording of improvisational percussion music to their permanent record collection? Likewise, while

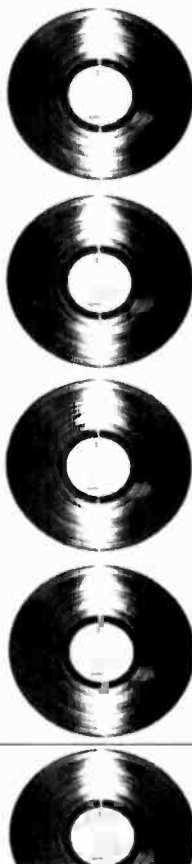
I occasionally enjoy watching a flamenco dancer, listening to an entire two record sides of nothing but flamenco music leaves me quite cold.

Keeping this in mind led me to use two criteria for recommended recordings: (1) They must be technically superior to "run-of-the-mill" albums and at

least equal to other "super" discs and (2) they must have musical appeal to a large number of potential listeners. And, while it is doubtful that all of the albums mentioned herein will appeal to everyone, there is certainly something for everybody, and they are all enjoyable. Without any further

Seventeen direct-to-disc or digital recordings that earned the distinction of our critic's recommendation

BY A. W. MYERS



SUPER DISCS

ado, here are my choices, which are incidentally, *not* mentioned in any order of preference.

The Missing Link—Lincoln Mayorga and Distinguished Colleagues Vol. II. is a classic in the direct-cut field. This more than any other album brought about the whole idea of direct-cut and audiophile recordings. First released in 1972, it has been out of print for several years. Many readers will probably be overjoyed to learn that it is being re-issued, in a direct-cut state by Sheffield Lab at the original low price of only \$12.00. When Sheffield was in the process of moving to newer facilities they evidently found metal stampers for this rare disc, that had been mis-filed several years ago. Selections include *Limehouse Blues* (listen for the bass drum at the close of this song), *Norwegian Wood*, *We've Only Just Begun*, *If* (note the clarity of the harpsichord), and others. Side Two of this album features the Miraflores String Quartet used to compliment the brass, guitar, piano and drums. This album is a real winner, both musically and technically, and it offers the consumer a chance to get a true collector's item for a relatively low price.

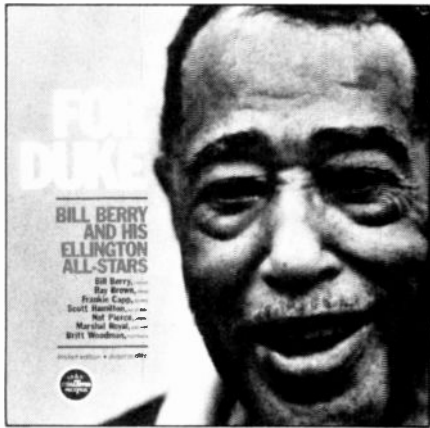
Live from Beautiful Downtown Burbank (Direct-Disk Labs #DD-108) features Tommy Newsom (with a guest appearance by Doc Severinson). Most of the other musicians are regulars of the NBC Tonight Show Band, and if you've enjoyed their all too-infrequent full-length performances on the Carson show, this disc will certainly make up for it. The six selections include *Stayin' Alive*, *Send In The Clowns*, *Just The Way You Are* and a must-hear jazz arrangement based on the NBC three chime musical logo, brought to life by the trumpet and flugelhorn of Doc Severinson. Along with the dead-quiet disc surface, the stereo spread is perfectly balanced with just the right amount of reverberation. All in all, an excellent disc.

Orchestrations Astromantic (RCA #RDCE-6) is a direct-cut disc by the Tokyo Philharmonic. Back in the 1950s, RCA released a record titled *Classical Music for People Who Hate Classical Music*. This might well be considered a "today" version of that earlier disc. While I don't remember if the older record had any sort of memorable sound, this one certainly does. Classical purists will undoubtedly shudder at what was done on this album, but it is very enjoyable and technically excellent. Compositions such as *Also Sprach Zarathustra*, *Concierto de Aranjuez* and *The Light Cavalry Overture* (and others) have been combined into a symphonic medley along with themes

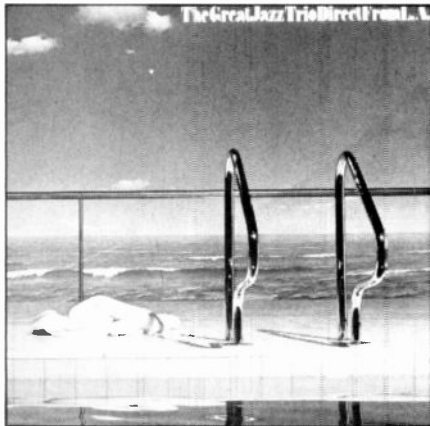
from *Gone With The Wind* and *Star Wars* (both classics of another type). Admittedly on paper it all sounds rather silly, but pouring forth from a good stereo system, it sounds glorious. My one complaint with what would otherwise be a perfect disc is that the replacement of the usual 32 foot organ pedal (at the beginning of *Also Sprach Zarathustra*) with less thunderous bass. Of special interest are the liner notes which are an education in the perils and problems encountered in producing a direct-cut disc. Good as the overall sound on this album may be (and it is good) it is even more improved by the addition of a time delay system—as are many of the discs mentioned here.

For Duke (M&K Real Time Records, #RT-101) is a tribute to Duke Ellington by long-time members of his band. The sound is exceptionally clean and tight, with very close miking, although it could have used a wee bit more reverb (but that is a part of direct-cut recording; you can't go back to the master tape and tweak up the reverb or echo electronically). If you've ever enjoyed the close-up miking on Project Three albums by Enoch Light, you'll love this album. The selections are all Ellington "standards" including *Satin Doll*, *Take the A Train*, *Mood Indigo* and five others. Soloists include Bill Berry, Ray Brown, Frankie Capp, and Scott Hamilton.

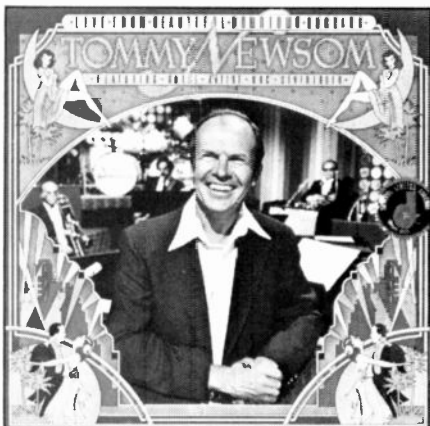
The Living Legend Plays the Chicago Theatre Organ features George Wright, organist, at the Mighty Wurlitzer (four manual, 29 rank). It is a real pleasure to hear this album for several reasons: it is the first direct-cut album of theatre organ (after a seemingly inexhaustible string of classical organ direct-cut discs), it is Mr. Wright's first recording in several years and it is just a plain, *great* recording. Older readers may remember the best selling series of organ albums done by Mr. Wright on the now-defunct Hi-Fi-Record label, back in the 1950s. This new Wright recording proves that he is still the undisputed master of the theatre organ. At first hearing, unprepared listeners may question what seems to be a lot of background noise and hiss. The liner notes claim that this is "air noise" caused by the organ itself. It sounds reasonable, but to be sure I checked with Robert A. Neyland, one of the nation's leading authorities on the refurbishing and maintenance of theatre pipe organs. Yes, it really is the sound of air, and his opinion, like mine, is that this is an exceptional disc. The twelve selections include *Yesterday*, *Liza*, *Black Moonlight*, a Wright favorite called *Vera Dero* and a humorous



FOR DUKE



GREAT JAZZ TRIO DIRECT FROM L.A.



TOMMY NEWSOM: LIVE FROM BURBANK

treatment of the Mickey Mouse March. This is another disc that cries out for a time-delay system and a sub-woofer. This disc is released on the Century Records label (formerly Great American Gramophone Co.). *Note:* fans of Mr. Wright may be interested in knowing that Doric Records, P.O. Box 482, Monterey CA 93940, has acquired the master tapes to those older Wright recordings and is re-equalizing them and selling them through the mail.

Prokofiev—Excerpts from Romeo and Juliet (Direct-Cut, Sheffield #LAB-8) features Erich Leinsdorf conducting the Los Angeles Philharmonic. Also of interest is a companion album (#LAB-7) in which we have a selection of Wagner compositions including *Ride of the Valkyries*, *Tristan und Isolde: Prelude to Act I*, *Siegfried's Funeral Music* and *Forest Murmurs*. Both of these albums employ a single-point miking system. This yields a very realistic, life-like sound and natural stereo balance—as opposed to some multi-mike, multi-track classical discs that sound over-processed. One of the most important ingredients in any direct-to-disc endeavor is the choice of recording site and the amount of natural reverberation the site yields. These classical albums were done on a sound stage at M-G-M studios in Culver City California, and the excellence of their choice shows up on both discs. These are albums that should appeal to anyone who likes classical music. Like all Sheffield discs, these have absolutely no surface noise—and in case you have doubts as to the similarities between “reviewer pressings” and those sold in stores, my two copies of the Sheffield classical discs were purchased locally.

Limited Edition: Arthur Fiedler and the Boston Pops (Crystal Clear #CCS-7003) is another exceptional direct-cut classical recording. The late Mr. Fiedler was probably the most well known (and loved) classical conductor in this country (if not the world) and his other recordings on RCA, Polydor and London have sold millions. However, this has got to stand out as the best recording he has ever done. The enthusiasm that Fiedler instilled in the orchestra is always evident, making these two “war-horses” more enjoyable than ever before. As with the two above mentioned Sheffield classical discs, we have another ideal recording location: Boston's Symphony Hall, providing a natural “you-are-there” sound. Tchaikovsky's *Capriccio Italien* and Rimsky-Korsakov's *Capriccio Espagnol* are perfect selections for the direct-cut recording process: big, boisterous finales and quiet, delicate interludes. The liner notes say

that this record sounds better at high listening levels. Maybe this is a demonstration of what one speaker manufacturer means when they say “loud is beautiful, if it is clean.”

Live on the Wire is at the opposite end of the musical spectrum, featuring rock singer Jeff Campbell. This is a digital recording from a new company: Oneiric Records (available via mail order at 920 East Haley St., Santa Barbara, CA 93103), and if the quality of their future releases remains this high, they deserve much success. There are two unique things about this album—(1) it is the first real rock album to be released which was produced via the digital process and (2) it has the very low price of just \$7.00. Campbell has a good, strong voice that is well suited to this type of music, which is all original compositions. Most other digital albums produced in this country have used the Soundstream process, this disc is done on the new Sony PCM-1 digital encoder. How this company can turn out such a superior product for such a low price is a mystery to me, but it has a totally quiet surface and the wide dynamic range that one usually pays twice the price to try and obtain. Whether you buy this album for the musical content, the digital technique or the low price, it's a wise investment.

Anita Kerr Performs Wonders (#CRD-1160) on the Century Records label is another audiophile recording to make use of the Sony digital encoder. To the best of this listener's knowledge, none of the Stevie Wonder compositions performed here ever became big hits, but all are melodic, interesting songs made very listenable by Anita Kerr's arrangements and performances. The ultra-lush background of strings, piano, brass and guitar is conducted by Joe Reisman (who has produced many of Henry Mancini's RCA albums). Even if this disc were not musically enjoyable (which it definitely is), it serves to show that the digital recording process works well with “middle-of-the-road” music as well as with classical blockbusters and jazz or rock “screamers.”

A Cut Above by the New Dave Brubeck Quartet (Direct-Disk Labs #DD-106) is a two-record set and is, therefore, one of the more expensive audiophile albums on the market. But, it is worth every penny. It is sure to eventually become a collector's item, both with jazz enthusiasts and with audiophiles, since the direct-cut process brings you as close as possible to attending a live performance. All of the necessary requirements to make this a special album are present: ultra-quiet

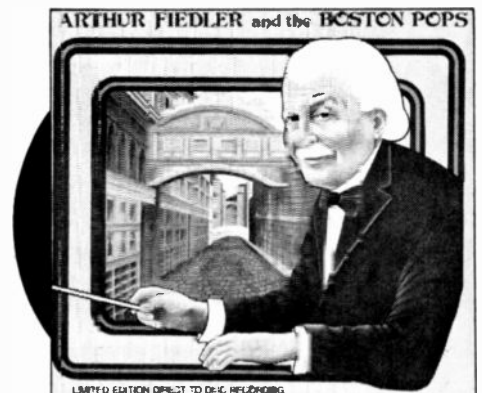
(Continued on page 75)



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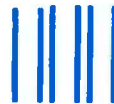
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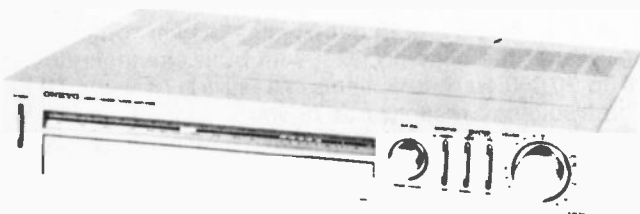
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There are inputs for magnetic phono, aux, and tape. Outputs for two speaker systems, tape, and phones.

Controls are provided for tuning/autolock, volume, balance, ganged bass, and ganged treble. There are switches for power, speaker selection, high filter, FM

muting/"lock" on-off, loudness compensation, tuner/phono/aux selector, tuner/phono selector, tape source monitor, and AM/FM selection.

The FM antenna input is 300 ohms. A rod antenna and external connection are provided for AM. Switched and unswitched AC outlets are provided.

Overall dimensions are 16-9/16 in. wide x 2-61/64 in. high x 13-7/16 in. deep. Weight is 15.8 lbs.

PERFORMANCE—FM TUNER: Full limiting was attained with 2.4 uV. The monophonic high fidelity sensitivity (60 dB quieting) measured 7.5 uV. The stereo high fidelity sensitivity (55 dB quieting) was 38 uV. Full mute release was attained with 1.7 uV. (Stereo reception does not switch in—from mono—until the signal strength is 28 uV.)

At standard test level, the stereo frequency response measured +0.5/-1 dB from 30 to 15,000 Hz (rated frequency response range), down 2 dB at 20 Hz. Monophonic distortion measured 0.08% THD. Stereo distortion measured 0.45% THD. The signal-to-noise ratio was 69 dB. Stereo separation was 40+ dB. Selectivity was good. (Note: Pilot signal rejection was somewhat low, the leakthrough was -48 dB. While this cannot be heard, it can affect an associated recorder's Dolby tracking if the recorder's Dolby mpx filter isn't used.)

The FM tuning lock is unusually effective—it literally grabs onto the signal and holds it precisely tuned for optimum distortion/separation characteristics.

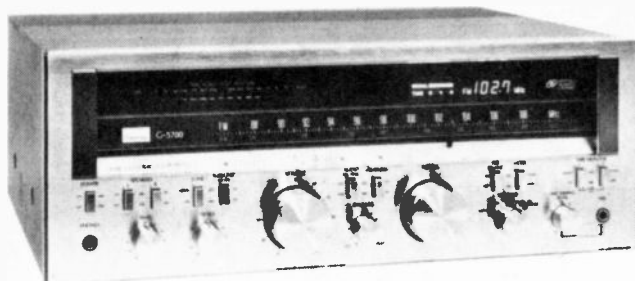
PERFORMANCE—AM TUNER: Background noise level was considerably higher than average.

PERFORMANCE—AMPLIFIER: Power output at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 34 watts RMS. The frequency response at 34 watts/8 ohms measured +0/-0.5 dB from 20 to 20,000 Hz at a distortion no higher than 0.075% THD at any frequency.

The tone control range measured ±12 dB at 50 Hz; ±10 dB at 10,000 Hz.

The magnetic input hum and noise measured -63 dB; stereo separation was 59 dB. ▲

TEST REPORTS/RECEIVERS



Circle No. 89 On Reader Service Card

SANSUI G-5700 AM/FM RECEIVER

A 75-watts per channel receiver that features both digitally quartz-locked tuning and digital frequency readout. AM tuner performance is notably excellent. Features include peak-reading power output indicators. \$630.00.

DESCRIPTION: An AM/FM stereo receiver FTC-rated for 8 ohms at 75 watts RMS per channel, 20 to 20,000 Hz, at a distortion no higher than 0.03% THD.

Features include: conventional and digital readout AM and FM tuning indicators; an FM stereo beacon; 7-step LED-type signal strength indicator; normal (75 uSec) and Dolby (25 uSec) FM de-emphasis; LED-type triplex FM tuning meter; peak reading light-bar left and right output power indicators calibrated from 0.006 to 75 watts into 8 ohms; a monophonic microphone input that can be mixed with other signal sources; a subsonic filter; tone control defeat; an output hold-off that prevents power supply turn-on transients from being fed to the speakers; and auto-dubbing between two recorders.

There is a front panel monophonic microphone input. Stereo inputs for magnetic phono, aux, and two tape. Outputs for two speaker systems, two tape, and phones.

Controls are provided for tuning, volume, balance, ganged bass, ganged treble, and microphone mixing level. Switches for power, speaker system A, speaker system B, tone control defeat, subsonic filter, 20 dB audio mute, loudness compensation, FM muting, stereo/mono mode, tape monitor 1, and tape monitor 2. (Tape 1 auto-dubs to tape 2 when both switches are depressed.)

The FM antenna input is 75/300 ohms. A rod antenna and external connection are provided for AM. There are switched and unswitched AC outlets.

Overall dimensions are 18-5/16 in. wide x 7 in. high x 16 in. deep. Weight is 30.4 lbs.

PERFORMANCE—FM TUNER: For 300 ohm and "tee" antennas: full limiting was attained with 3 uV. The

monophonic high fidelity sensitivity (60 dB quieting) measured 9.5 uV. The stereo high fidelity sensitivity (55 dB quieting) was 85 uV. Full mute release was attained with 3 uV

At standard test level, the stereo frequency response with 75 uSec de-emphasis measured +0.1/-1.8 dB from 30 to 15,000 Hz (the rated frequency range), down 3 dB at 20 Hz. With the front panel selector set to the Dolby FM position (25 uSec de-emphasis) the stereo frequency response measured +0/-3.5 dB from 30 to 15,000 Hz (down 3.5 dB at 15,000 Hz). Monophonic distortion measured 0.2% THD. Stereo distortion was 0.25% THD. The signal-to-noise ratio measured 71 dB. Stereo separation was 40 dB. Selectivity was good. (Note: The stereo "carrier" of 38 kHz was -40 dB, an unusually high value. Though it has no effect on listening sound quality, make certain the mpX filter is switched in when making Dolby recordings even though most recorders have the filter connected at all times.)

PERFORMANCE—AM TUNER: Notably excellent. Very high sensitivity and unusually low background noise level.

PERFORMANCE—AMPLIFIER: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 78 watts RMS. The frequency response at 78 watts/8 ohms measured +0/-0.4 dB from 20 to 20,000 Hz at a distortion no higher than 0.025% THD.

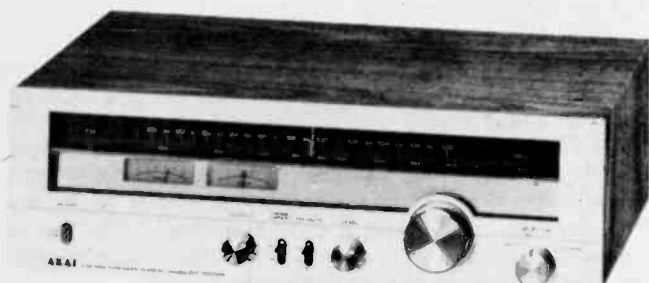
The tone control range measured +11/-12 dB at 50 Hz; +9/-10 dB at 10,000 Hz. The subsonic filter was down 2 dB at 20 Hz.

The magnetic input hum and noise measured -64 dB. Separation was into the noise level.

PERFORMANCE—OUTPUT METERS: The peak reading output meter calibrations are approximate. Each LED indicator, which represents a "power step," covers a relatively broad range. The frequency response appears to be essentially flat from about 100 Hz to 20,000 Hz; there is moderate rolloff in response below 100 Hz. (The meter is quite adequate for estimating power delivered to the amplifier load. It is not sufficiently accurate to be relied upon as a test or measurement device.)

PERFORMANCE—DIGITAL DISPLAY: The digital display steps up in 1 kHz increments on the AM band, and 100 kHz increments on the FM band. The indicated AM frequency was not precisely "right on the mark" as we attained slightly better reception by rocking the tuning. Best AM results were generally attained when the AM frequency read 2 kHz low. The FM display is precise. When the digital display indicates the station frequency, distortion is lowest and separation highest. Overall, the digital display tuning aid performance is good (AM) to excellent (FM); it sure beats tuning with the conventional dial. ▲

Worst case: The test results that we report within these pages are always the *worst case* measurement for the piece of equipment being evaluated. For example, if the frequency response of an amplifier's left channel is 20 to 20,000 Hz, ± 2 dB, while the response of the right channel is ± 3 dB from 20 to 20,000 Hz, the test report will show the worst case measurement, that is, ± 3 dB. Similarly, if an FM tuner's stereo separation measurement is 40 dB left-to-right and 32 dB right-to-left, the test report will show a separation figure of 32 dB. This method of reporting allows you to be certain that performance in all other cases was equal to or *better than* the published results.



Circle No. 62 On Reader Service Card

AKAI AT-2650 AM/FM TUNER

An AM/FM tuner that features outstanding AM reception and notably excellent stereo alignment, according to our lab's findings. User-adjustable FM muting threshold is among its features. \$299.00.

DESCRIPTION: An AM/FM stereo tuner featuring a stereo beacon, FM center channel tuning meter, AM/FM signal strength meter, user-adjustable FM muting level, and a variable line level output.

There are controls for tuning, output level, and FM muting threshold. Switches for power, FM muting,

AM/FM selection, and *noise cancel* (suggested for elimination of impulse-type noises).

The FM antenna input is 75/300 ohms. A rod antenna and external connection are provided for AM.

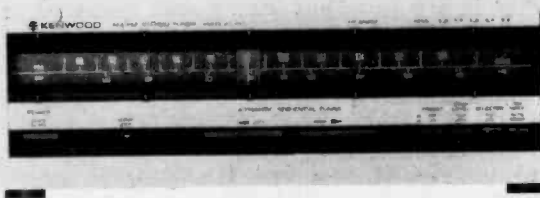
Overall dimensions are 17.3 in. wide x 5.7 in. high x 14.5 in. deep. Weight is 16.5 lbs.

PERFORMANCE—FM TUNER: For 300 ohm and "tee" antennas, full limiting was attained with 2.2 μ V. The mono sensitivity (60 dB quieting) measured 7 μ V. The stereo high fidelity sensitivity (55 dB quieting) was 41 μ V. Full mute release could be user-set over the range of 10.5 to 120 μ V. The *noise cancel* feature appears to be nothing more than an ordinary fixed-type FM mute that releases at 10 μ V. Suppressed noise is any noise below the 10 μ V release level. Once the *noise cancel* mute releases, there is no noise suppression.

At standard test level, the stereo frequency response measured $+0/-1.5$ dB from 20 to 15,000 Hz. Monophonic distortion measured 0.5% THD. Stereo distortion was 0.12% THD. The signal-to-noise ratio measured 71 dB. Stereo separation was 40+ dB. Selectivity was excellent.

The maximum output level corresponding to 100% modulation of the transmitter was 1.4 volts.

PERFORMANCE—AM TUNER: Notably superior (well above average) sensitivity. Extremely low background noise level; one of the most quiet AM tuners we have ever tested. ▲



Circle No. 75 On Reader Service Card

KENWOOD KT-413 AM/FM TUNER

An AM/FM tuner with motor-driven, all-electronic automatic tuning system. Also included are 5-station pre-set capability that works extremely well and an interstation noise mute that may be set at either of two threshold levels. \$250.

DESCRIPTION: An AM/FM stereo tuner with motor-driven automatic tuning. An electronic "servo-lock" stops tuning on the next station (AM or FM band) or on one of five preset FM or five preset AM stations as determined by the user. (The tuning dial is conventional. If the tuning pointer does not locate or sense a station, the pointer and tuning travels to the end of the dial and then reverses to search out the next station.) An interstation noise mute for both AM and FM is always active, at one of two user-determined threshold levels (low or high).

Other features include a stereo beacon, 5-step LED signal strength indicator, and a dual-purpose LED indicator that shows either that the servo-lock has tuned

a station correctly, or that a preset tuning indicator has been set correctly.

The presets are two rows of five sliders (one row for FM, the other for AM) above and below the tuning dial. When a station has been tuned the preset is set by moving a slider directly above or below the dial pointer until the servo-lock LED illuminates. In the preset mode, the tuning and dial will stop only where there is a slider. Moving a slider(s) to the extreme right or left of the dial sets it beyond the range of the preset search, and the individual slider(s) is turned off.

One output is provided at line level.

Touch switches are provided for: power, sequential tuning left (lower in frequency), sequential tuning right (higher in frequency), AM/FM preset tuning (sequential tuning switches search out only the preset stations), stop level (mute level), AM/FM, and auto stereo/mono FM.

The FM antenna input is 75/300 ohms. An adjustable internal antenna and external antenna are provided for AM.

Overall dimensions are 15 $\frac{3}{4}$ in. wide x 5-15/32 in. high x 11 in. deep. Weight is 9.26 lbs.

PERFORMANCE—FM TUNER: For 300 ohm and "tee" antennas, full limiting is already in at the lowest factory-set mute level of 3.5 μ V. The monophonic high fidelity sensitivity (60 dB quieting) measured 8 μ V. The stereo high fidelity sensitivity (55 dB quieting) was 50 μ V. Full mute release was attained with 3.5 or 12 μ V.

The stereo frequency response measured $+0/-1.2$ dB within the rated frequency range of 30 to 15,000 Hz. Monophonic distortion measured 0.5% THD. Stereo separation was 40+ dB. Selectivity was very good. The

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output level corresponding to 100% modulation of the transmitter was 1 volt.

The servo-lock tuning is very accurate. Though almost impossible to expect, if the broadcast station's carrier frequency started to drift, the servo-lock tuning tracks the station. The preset station search was as effective as the sequential tuning. As with the sequential tuning, if there should be a station below the threshold level (mute release) you would never know it existed because there is no way to turn off the mute. (A minor inconvenience because such a station's signal would be buried in the noise level and would be unpleasant to listen to.)

PERFORMANCE—AM TUNER: Sensitivity is better than average. Background noise is extremely low. An excellent AM tuner. The comments on the FM servo-lock tuning apply for AM. Also, the AM tuner utilizes an unusual internal antenna. You can't see the antenna. On the rear apron is a rotator knob that adjusts the

AM antenna for optimum reception. The knob moves more or less from side to side, and the complete system requires much less extra clearance than the typical AM rod antenna. (Nice feature, especially if you're short on space.)

PERFORMANCE—PRESET TUNING: To adjust a preset you first tune a station in the normal manner and then move a slider directly over (FM), or under (AM) the dial until the dual-purpose LED illuminates. That's the whole adjustment. When you press the tuning switch the dial moves to the nearest slider, stops, and the servo-lock tunes the station. Unfortunately, the sliders have very little friction and are easily disturbed. If the slider moves out of position, even slightly, the pointer can stop well off the station frequency and there's nothing for the servo-lock to lock onto. The preset sliders could benefit from considerable tightening. The servo-lock tuning works extremely well, however. ▲

INTEGRATED AMPLIFIERS



Circle No. 62 On Reader Service Card

AKAI AM-2650 INTEGRATED AMPLIFIER

A 65-watts-per-channel integrated amplifier whose distortion as measured by our laboratory is considerably less than even the low value specified by the manufacturer. Features 3-position phono input impedance selector. \$299, metal cabinet.

DESCRIPTION: An integrated stereo amplifier FTC-rated for 8 ohms at 65 watts RMS per channel, 20 to 20,000 Hz, at no more than 0.08% THD.

Features include: left and right output power meters calibrated from 0.01 to 130 watts into 8 ohms and -40 dB to +3 dB, with 0 dB representing 65 watts; a three-position phono input impedance selector for 33K, 47K and 100K ohms; automatic dubbing to and from either of two tape recorders; and an output hold-off that prevents power supply turn-on transients from being fed

to the speakers.

There are inputs for two magnetic phono, tuner, aux, and two tape. Outputs for two speaker systems, two tape, and phones.

Controls are provided for volume, balance, ganged bass, ganged treble, speaker selection, input selection, and tape monitor/tape dubbing selection. There are switches for power, tone control defeat, low filter, high filter, 20 dB audio mute, stereo/mono mode, and loudness compensation.

One unswitched and two switched, AC outlets are provided.

Overall dimensions are 17.3 in. wide x 5.7 in. high x 13.6 in. deep. Weight is 23.5 lbs.

PERFORMANCE: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 69 watts RMS. The frequency response at 69 watts/8 ohms measured +0/-0.4 dB from 20 to 20,000 Hz at a distortion no higher than 0.03% THD at any frequency.

The tone control range measured ± 11 dB at 50 Hz; ± 9 dB at 10,000 Hz.

The low filter—which is not a subsonic filter—had an attenuation of 1.5 dB at 50 Hz, 6 dB at 20 Hz.

The magnetic input hum and noise measured -64 dB; stereo separation was 50 dB.

The output meter power calibrations were accurate to better than 10% from 0.01 to 65 watts into 8 ohms. The frequency response was almost ruler flat from 20 to 20,000 Hz. Accuracy is good enough to permit the meters to be used as "test equipment" if needed. ▲

Please note: All prices listed in the test reports section, as well as prices listed elsewhere in this issue, are approximate and subject to change. Use them only as a ballpark guide to what you can expect to pay for a piece of equipment. It is assumed that prices vary at the discretion of individual dealers and that advertised prices may change without notice.



Circle No. 75 On Reader Service Card

KENWOOD KA-405 INTEGRATED AMPLIFIER

A 55-watts-per-channel integrated amplifier whose features include a monophonic microphone input that allows you to cross-fade the mike input with other signal sources. Other signals are attenuated as the mike level increases. \$299, metal cabinet.

DESCRIPTION: An integrated stereo amplifier FTC-rated for 8 ohms at 55 watts RMS per channel, 20 to 20,000 Hz, at no more than 0.05% THD.

Features include left and right output power meters calibrated 0.001 to 100 watts into 8 ohms, a monophonic microphone input that can be blended (mixed) with other signal sources, automatic dubbing to and from either of two recorders, and an output hold-off that prevents power supply turn-on transients from being fed to the speakers.

There are stereo inputs for magnetic phono, tuner, aux, and two tape. Outputs for two speaker systems, two tape, and phones.

Controls are provided for volume, balance, ganged bass, ganged treble, microphone mixing, input selection, and speaker selection. There are switches for power, tone control defeat (labeled "Power Amp Direct"), loudness compensation, tape dubbing selector, and tape monitor selector.

An unswitched and two switched AC outlets are provided.

Overall dimensions are 15 $\frac{3}{4}$ in. wide x 5-15/32 in. high x 11-21/32 in. deep. Weight is 16.8 lbs.

PERFORMANCE: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 58 watts RMS. The frequency response at 58 watts/8 ohms measured +0/-1 dB from 20 to 20,000 Hz at a distortion no higher than 0.015% THD at any frequency.

The tone control range measured +11/-10 dB at 50 Hz; ± 10 dB at 10,000 Hz.

The magnetic input hum and noise measured -72 dB. Stereo separation was into the noise level.

The output power meter readings were essentially accurate up to 10 watts. 25 watts actual output indicated 50 watts. 55 watts actual output indicated 100 watts. The meter's frequency response was essentially flat from 100 to 20,000 Hz, down 10 dB at 20 Hz. The meters have a fast rise and slow decay. ▲

CASSETTE DECKS



Circle No. 65 On Reader Service Card

B.I.C. MODEL T-4M CASSETTE DECK

A feature-laden two-speed three-head cassette decks that is fully equipped to record/play back on metal particle tape. Due to its many capabilities, exceptional recording quality may be attained in several ways. \$850, wood cabinet.

DESCRIPTION: A front-loading two-speed (1 $\frac{7}{8}$ and 3 $\frac{3}{4}$ ips), three-head system (simultaneous record/play-back capability), dual capstan Dolby cassette deck featuring special bias for 3 $\frac{3}{4}$ ips speed and equaliza-

tion and bias selectors for normal, high bias (chrome-type) and metal tapes. Other features include: a bias trim adjustment on the front panel; front panel left and right Dolby calibration controls; a two tone (400/10,000 Hz) test oscillator system for bias and Dolby calibration; peak-indicating, bar-graph, record level meters; an LED peak record level indicator (called a "clipping" indicator); microphone/line input mixing; an electronic LED digital tape counter with two computer memories that can be user-programmed to provide auto rewind, replay, or continuous play between two predetermined tape locations; automatic end of tape stop/disengage, rewind, or rewind any replay; a front panel "pitch" control (tape speed adjustment); a remote control connector (though no remote control unit is currently supplied by B.I.C.); and a record mute that disables the record signal source while the tape drives.

There are inputs for microphones and line. Outputs for line and phones.

Controls are provided for concentric-clutched left and right microphone record level, concentric-clutched left and right line level, "pitch," headphone level, output level, and bias trim. There are recessed screw-driver adjustments for left and right Dolby tracking calibration (using 400 Hz tone). Switches are provided for power, speed select, tape type (equalization), bias, record safe/ready/muting, Dolby on-off, mpX filter,

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tape/source monitor, 400/10,000 Hz test oscillator on-off, counter clear, counter memory 1, counter memory 2, memory inhibit, auto rewind, and auto play.

The tape mechanism has micro-touch buttons for record preset, REW, play, FF, stop, and pause. There is a pushbutton for eject.

Overall dimensions measured 17-15/16 in. wide x 6-7/16 in. high x 10 1/2 in. deep. Weight is 20 lbs.

PERFORMANCE: The playback frequency response from a standard test tape produced severe high frequency loss, caused by a non-standard head alignment. While the machine proved to be in alignment to itself, it is not in alignment to prerecorded tapes.

(Note: The metal tape tests were specifically made using Scotch Metafine because this tape was supplied with the machine.)

At 3 1/4 ips: Using TDK-AD tape: with Dolby, the record/play frequency response measured +0.9/-2 dB from 20 to 15,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.05% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 51 dB wideband; 59 dB narrowband.

Using TDK-SA tape (chrome-type): with Dolby, the record/play frequency response measured +3/-2 dB from 20 to 15,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.05% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 54 dB wideband; 64 dB narrowband.

Using Scotch Metafine (metal) tape: with Dolby, the record/play frequency response measured +0.6/-2 dB from 20 to 20,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.05% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio measured 54 dB wideband; 64 dB narrowband. At 0-dB record level (rather than the -30 dB level normally used for Dolby cassette tests), the frequency response measured +0/-3 dB from 20 to 12,000 Hz.

Wow and flutter measured 0.07% steady.

At 1 1/2 ips. Using TDK-AD tape: with Dolby, the record/play frequency response measured +2.8/-2 dB from 20 to 13,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.07% THD with 6 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 54 dB wideband; 60 dB narrowband.

Using TDK-SA tape: with Dolby, the record/play frequency response measured +3/-0 dB from 20 to 15,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.09% THD with 7 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 52 dB wideband; 60 dB narrowband.

Using Scotch Metafine tape: with Dolby, the record/play frequency response at the standard -30 dB test level measured +2.5/-3 dB from 20 to 16,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.09% THD with 7 dB headroom to 3% THD. The

signal-to-noise ratio referenced to 0-dB record level was 54 dB wideband; 61 dB narrowband.

At 0-dB record level, the Metafine record/play frequency response measured +2.5/-3 dB from 20 to 11,500 Hz.

Wow and flutter measured 0.1%.

The maximum output level corresponding to 0-dB record level was nominally 2 volts.

The peak record level ("clipping") indicator turns from green to red 4 dB above 0-dB record level.

At 1 1/2 ips, the pitch control provided a range of +6.9/-7.1%. The control is detented in the position corresponding to standard tape speed. Since the control affects both record and play speeds you must be certain it is detented if you want to make a "standard" recording.

The microprocessor-controlled tape counter/memory system works very well. Each memory "remembers" (for as long as the power is turned on) the counter readout at the moment the memory switch is depressed. You can then run fast wind to the counter reading, or program the machine to rewind or auto-play when the tape reaches the programmed count, or even repeat play between two programmed locations. It's a somewhat time-consuming job to learn all the ins and outs of the "computer," but once learned it is easy to use, and very efficient. The only limitation is that there is approximately 5-seconds between counter increments (in units of 1), so you cannot program for excessively tight cues. The counter cannot be pre-programmed to a known readout unless you actually run a tape through at high speed and depress the memory switch at the instant the counter shows the desired readout. (Yes, the counter follows the tape at high speed. It is not a "clock" that works at its own pace regardless of the tape speed.)

For many reasons—metal tape handling, peak indicators, higher speed—it's possible to turn out notably excellent recordings with this machine. Results are superb under some conditions. It's important to remember that if you utilize the 3 1/4 ips speed, a C-90 cassette will provide about 23 minutes recording time per side, which might not be sufficient for dubbing some LPs. (It will generally accommodate pop LPs.) In general, performance with high quality "standard" tapes at 3 1/4 ips is about equal to that of metal tape at 1 1/2 ips. We leave the economics of the situation up to you.

The calibration test oscillator system was excellent; one of the very best. Extremely easy to use and extremely accurate. Almost the equal of the computerized test/adjust models in some respects, and better in others. Virtually insures optimized performance from any type of tape. Since there's only one adjustment control, best bet is to standardize on one particular type of tape. ▲

Readers often ask what we mean when we say that the performance of a piece of equipment is average. We have established high critical standards for all pieces of equipment that are reviewed on these pages. After all, we are concerned with high fidelity components—not just any gear that produces sound. An average rating means that the component meets our rigid performance standard and is a good buy in its price range. For example, if a \$1000 receiver is rated average, this means that it is the equal of other average \$1000 receivers, superior to an average \$600 receiver, and far superior to an average \$200 receiver.



Circle No. 74 On Reader Service Card

JVC KD-A8 CASSETTE DECK

Features built-in computer system, which selects the best bias, equalization and sensitivity to ensure optimum performance from any tape you choose to use. It is capable of handling metal particle tape (both record and play). \$750.

DESCRIPTION: A front-loading computerized stereo cassette deck featuring: JVC's ANRS/Super ANRS noise reduction system (Dolby compatible); compatibility with normal, Ferrichrome, chrome-bias, and metal tapes; individual tape type selector with preset parameters as well as computer adjustment of bias, equalization and sensitivity to the particular tape being used; left and right calibrated VU meters; a 5-step peak record level indicator calibrated at -10 dB, -5 dB, 0 dB, $+3$ dB, $+6$ dB; automatic maximum record level set when dubbing tape or disc (called S&L); timer-controlled record or play (with computerized tape adjustments when recording); built-in remote control connection for optional accessory; automatic end of tape stop/disengage; and a memory reset counter with automatic stop or play after rewind. Most of the operating controls and selectors are concealed behind a front panel door.

There are inputs for microphones and line. Outputs for line and phones.

Controls are provided for left record level, right record level, and ganged output level. There are switches for power, tape type, ANRS/Super ANRS, manual/auto S&L record level set, computer/manual tape type preset; computer start; record mute (kills input signal while tape is driving); timer operation; counter memory on off; and counter memory operation (stop/play).

The tape mechanism has touch push-buttons for the record interlock, REW, play, stop, FF, and pause. There is a pushbutton for eject.

Overall dimensions are $17\frac{3}{4}$ in. wide x $4\frac{7}{8}$ in. high x $15\frac{1}{2}$ in. deep. Weight is 24.2 lbs.

PERFORMANCE: Note: All tests were conducted only in the computerized mode because this provides the optimum performance.

The playback frequency response from a standard test tape with a 40 to 12,500 Hz range measured $+1.3/-0.5$ dB.

Using TDK-D tape: without ANRS, the record/play frequency response measured $+0.5/-2$ dB from 40 to 15,000, down 2.5 dB at 30 Hz. Distortion at the meter-

indicated 0-VU record level measured 1.1% THD with 5 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 47 dB.

With the Dolby active, the record/play frequency response was $+0/-2.5$ dB from 30 to 10,000 Hz, down 3 dB at 11,000 Hz. Distortion and headroom remained the same. The signal-to-noise ratio referenced to 0-VU record level measured 54 dB wideband; 58 dB narrowband.

Using BASF Type III (Ferrichrome-bias) tape: with ANRS; the record/play frequency response measured $+0.1/-2.5$ dB from 40 to 15,000 Hz; down 3.5 dB at 30 Hz. Distortion at the meter-indicated 0-VU record level measured 1.4% THD with 5 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level was 54 dB wideband; 59 dB narrowband.

Using TDK-SA (chrome-bias) tape: with ANRS; the record/play frequency response measured $+1.5/-2$ dB from 30 to 15,000 Hz. Distortion at the meter-indicated 0-VU record level was 0.9% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 54 dB wideband; 59 dB narrowband.

Using Scotch Metafine (metal) tape: with ANRS; at the standard -30 dB level commonly used for cassette tape tests, the record play/frequency response measured $+0/-9$ dB from 30 to 13,000 Hz. At 0-VU record level, the frequency response measured $+0/-3$ dB from 30 to 11,500 Hz. Distortion at the meter-indicated 0-VU record level measured 1.1% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 54 dB wideband; 59 dB wideband.

The maximum output level corresponding to a 0-VU record level was nominally 0.3 volts.

The calibration of the LED peak record level indicators was exact. Also, they snap, rather than fade, on and off (good operation).

Wow and flutter measured a "rock steady" 0.07%.

PERFORMANCE—COMPUTER: Simply load a tape, select the general tape type, and press the computer start switch. The tape starts by itself, runs its own tests, sets the proper bias, sensitivity and equalization, and rewinds to the starting point, ready for operation. Panel lights blink while the computer is testing as an indication that "something is going on." If the tape's characteristics are beyond the range of the computer, say if you have loaded a metal tape with the tape type selector set for normal, an error lamp turns on. This lamp illuminates whenever the computer cannot adjust to a particular tape.

The overall precision of the computer is quite good, though we found it more accurate with some tapes than others. One problem is finding suitable tape: the tape must be uniform. If the computer runs its tests on a poor section of tape the computer gets programmed incorrectly ("garbage in = garbage out"). Among the most consistent tapes were the Maxell UD/XL types and the TDK AD and SA types. Some of the best known tapes proved too inconsistent for computerization.

The computer does not have a memory for "remembering" its adjustments to a particular type of tape. Unless you use the manual selection, the computer

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tests (which take but a few seconds) must be run each time the recorder is powered up for recording.

PERFORMANCE: S&L: The S&L system automatically sets the record level, starting from maximum gain, to the maximum level of the input signal when dubbing. For example, to dub a tape you need simply feed it into the machine. The KD-8A locks onto the loudest

input level and uses this as the maximum record level value. (The circuit is not a compressor; it doesn't amplify the lower input levels.) Surprisingly, it works quite well if you have the time to test each input program for maximum volume. When dubbing many programs onto one tape it does a good job of keeping the playback level constant from program to program. ▲



Circle No. 96 On Reader Service Card

SANYO PLUS D62 CASSETTE DECK

A Dolby cassette deck that handles record and playback of metal particle tape and also includes an Automatic Music Select System that permits quick location of any selection on the tape. Peak-hold level meters, too. \$330, metal cabinet.

DESCRIPTION: A front-loading Dolby cassette deck for normal, ferrichrome, chrome-bias, and metal tapes. Features include: tape bias and equalization selectors; left and right bar-graph record level meters with optional peak-hold; automatic end of tape stop/disengage; a memory reset counter; a record mute that disables the input signal as long as the key is held down; microphone/line input mixing; and an Automatic Music Select System (AMSS). The AMSS operates in the rewind and FF modes, locating the beginning or end of a program by the "dead air," which must last from three to five seconds for proper operation of AMSS. When the AMSS detects dead air it switches to normal play speed and plays the program following the "dead air." During the fast wind using AMSS the "tape chatter" is heard for cueing purposes.

There are inputs for microphones and line. Outputs for line and phones.

Controls are provided for: concentric-clutched left and right microphone level, concentric-clutched left and right line level, and ganged output level. There are switches for power, tape bias selection, tape equalization selection, Dolby/Dolby mpx filter, record meter peak hold, counter memory on-off, record mute, and AMSS on-off.

The tape mechanism has lever controls for the record interlock, REW (AMSS), FF (AMSS), play, stop, eject, and pause.

Overall dimensions are 17-5/16 in. wide x 5 1/2 in. high x 11 1/8 in. deep. Weight is 12.8 lbs. Unit is supplied with adaptors for converting to 19-inch rack mounting.

PERFORMANCE: The playback frequency response from a standard test tape with a 40 to 12,500 Hz range measured +1/-0.5 dB from 63 to 12,500 Hz, up 2.5

dB at 40 Hz.

(Note: Since Scotch Metafine tape is factory specified, it was the only tape tried for the metal tape mode.)

Using TDK-AD tape: with Dolby, the record/play frequency response measured ± 3 dB from 20 to 12,000 Hz. Distortion at the meter-indicated 0-dB record level was 1% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 52 dB wideband, 58 dB narrowband.

Using BASF Pro II (Ferrichrome bias) tape: with Dolby, the record/play frequency response measured +1.8/-1.5 dB from 20 to 15,000 Hz. Distortion at the meter-indicated 0-dB record level was 1.5% THD with 7 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 53 dB wideband, 61 dB narrowband.

Using TDK-SA (chrome-bias) tape: with Dolby, the record/play frequency response measured +0/-3 dB from 20 to 11,000 Hz. Distortion at the meter-indicated 0-dB record level was 1% THD with 6 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 57 dB wideband, 63 dB narrowband.

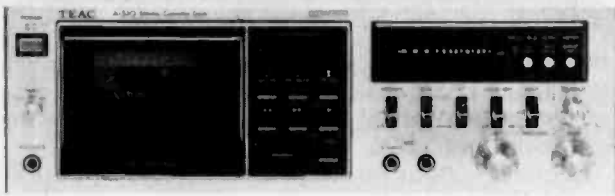
Using Scotch Metafine metal tape: with Dolby, the record/play frequency response at 0-dB record level, a level that is not used for standard cassette tape because standard tape has severe high frequency saturation, measured +0/-3 dB from 20 to 10,000 Hz. At the standard -30 dB test level when using Dolby, the record/play frequency response measured +3/-1 dB from 20 to 15,000 Hz. Distortion at 0-dB record level was 1.2% THD with 5 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 52 dB wideband, 60 dB narrowband.

The maximum output level corresponding to a 0-dB record level was nominally 460 mV.

Wow and flutter measured 0.09% steady.

The peak-hold feature on the record level meter holds the maximum reading for up to 3 seconds, allowing the user to "see" the true peak level which is not normally visible from the record level indicator. The peak reading meter more or less "tracks" the program peaks, allowing the user to easily keep the record level in the low distortion area. Overall, an excellent metering system.

The AMSS works very similar to other systems which sense the "dead air" between programs. Naturally, if there is a gap within a normal program it will sense the gap as the beginning or end of the program and resume play. Unlike some other sensing systems, the AMSS provides full time monitoring as the tape runs at the higher speed, so its easy to know, or recognize, whether the AMSS has detected the proper "dead air." Overall, the system was unusually reliable. ▲



Circle No. 10 On Reader Service Card

TEAC A-510 CASSETTE DECK

A Dolby cassette deck offers a programmable timer function and a bar-graph meter with peak hold and automatic/manual reset option. Soft-touch mode controls are also included. \$499, including a metal cabinet.

DESCRIPTION: A front-loading Dolby cassette deck featuring peak-reading fluorescent light bar level indicators with instantaneous and peak-hold modes. Other features include: bias and equalization selectors for NORMAL, ferrichrome, and chrome-bias tapes; pre-wired socket for optional plug-in remote control unit; a record mute that disables the input signal while the tape drive continues in the record mode; automatic end of tape stop/disengage; a record/play timer control switch; and a memory reset counter.

There are inputs for microphones and line. Outputs for line and phones.

Controls are provided for left record level, right record level, and ganged output level. The separate record controls are simultaneously driven through a friction "belt"; after the basic adjustments are made, adjusting one control also adjusts the other. There are switches for power, record/play timer control, bias selection, equalization selection, Dolby, input selection, counter memory on-off, peak-meter modes, and meter brightness.

The tape mechanism has touch-buttons for the record interlock, REW, forward, FF, stop, pause, and eject. The logic-controlled mechanism allows "flying start" recording in addition to the usual safety interlock. For example, with the tape playing, it is possible to go directly into the record mode, without stopping, by

depressing the forward and record buttons simultaneously. The unit will not shift from play to record if only the record button is pressed.

Overall dimensions are 17-5/16 in. wide x 5 3/4 in. high x 13 1/2 in. deep. Weight is 20 lbs.

PERFORMANCE: The playback frequency response from a standard test tape with a 40 to 12,500 Hz range measured +0.5/-3 dB.

Using TDK-D tape: without Dolby, the record/play frequency response measured +1.8/-1.4 dB from 30 to 15,000 Hz. Distortion at the meter-indicated 0-dB peak record level was 1.5% THD, with 2 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 49 dB.

With the Dolby active, the record/play frequency response measured +2.8/-2 dB from 30 to 15,000 Hz. Distortion and headroom remained the same. The signal-to-noise ratio referenced to 0-dB record level was 52 dB wideband; 58 dB narrowband.

Using Sony ferrichrome tape: with Dolby, the record/play frequency response was +3/-0 dB from 30 to 15,000 Hz. Distortion at the meter-indicated 0-dB peak record level was 1.5% THD with 3 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 49 dB wideband; 59 dB narrowband.

Using TDK-SA chrome-bias tape, for which this machine was factory adjusted: with Dolby, the record/play frequency response measured +2/-3 dB from 30 to 15,000 Hz. Distortion at the meter-indicated 0-dB peak record level was 1% THD with 6 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 52 dB wideband; 61 dB narrowband.

The maximum output level corresponding to a 0-VU record level was nominally 560 mV.

Wow and flutter measured 0.09%.

The fluorescent level indicators form a light bar pattern. They can be set to track the peak level, or peak hold. In the hold mode the peak reading will hold until a higher peak comes along, or the indicators can be set to hold for about 2.5 seconds and then release for tracking the next peak.

The peak calibrations are notably precise, as evidenced by the small difference in signal level needed to produce 3% THD once the signal exceeds the 0-dB peak level indication. This means you can operate the record level right up against 0-dB, thereby maximizing the signal-to-noise ratio while avoiding record level overload. ▲

RECORD PLAYERS



Circle No. 90 On Reader Service Card

SCOTT PS-97XV AUTOMATIC TURNTABLE

An automatic two-speed turntable that incorporates quartz-locked speed control under most record playing conditions. If users want to fine-tune the speed with the pitch controls, the quartz-locked mode may be switched off. \$260

TEST REPORTS / RECORD PLAYERS

DESCRIPTION: A two-speed (33, 45 rpm) automatic or manual start record player with integral base and dust cover. Tonearm always recycles to off at the end of play regardless of the starting mode unless the user selects continuous repeat play. The motor speed is locked to a quartz reference, which can be turned off to provide variable speed control through separate 33 and 45 pitch controls. A full-time illuminated strobe for both speeds is provided around the platter's rim.

There are controls for speed selection, quartz-lock on-off, 33 pitch, 45 pitch, play, reject, single/repeat play, tonearm lift, and record size 7-, 10-, or 12-inch tonearm indexing).

The tonearm has a micro-adjust counterweight that also serves as a 0 to 3 gram vertical tracking force (VTF) adjustment calibrated in 0.1-gram increments. There is a calibrated anti-skate. The pickup mounts in a universal plug-in carrier for which no overhang gauge or measurement is provided. The tonearm rest

has a positive lock. The output cable capacity is 180 pF. (Note: Manufacturer suggests pickups rated for 1.5 to 3 grams VTF.)

PERFORMANCE: Both speeds remained constant with total immunity to transient line voltage variations over an applied test range of 90 to 140 volts. Wow and flutter measured 0.06%.

The pitch control range measured $\pm 6\%$ at 33 rpm, $\pm 8\%$ at 45 rpm.

The tonearm's VTF calibrations were accurate to 0.1 gram.

This record player's sensitivity to external shock and vibration is somewhat higher than average, and it is recommended for use where it can be mounted on a firm surface, with no shaky floors. The lack of an overhang gauge or measurement can be a problem. Best bet is to leave the mounting screws loose and slide the pickup back and forth until you hear the best sound; then tighten the screws. ▲

PHONO PICKUPS



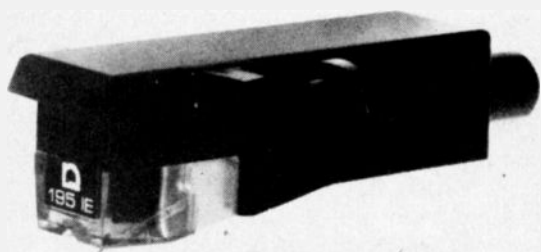
AUDIO-TECHNICA AT-25 PHONO PICKUP

A very good pickup. At this level of quality you must look for your own nuance in sound quality. Headshell is integral part of the pickup, with a wide-range calibrated stylus overhang gauge built in. \$275.

DESCRIPTION: A magnetic stereo pickup integrated in a universal headshell that has a user-adjustable rear-of-shell-to-stylus spacing of 47 to 55 mm. A built-in calibrated gauge and lock allows the overhang to be set within 0.5 mm accuracy. The recommended verti-

cal tracking force is 1.0 to 1.5 grams, with a nominal setting of 1.2 grams. Essentially similar results were attained anywhere within the vertical tracking force range.

PERFORMANCE: The frequency response at 55 mm (standard) spacing measured within ± 2 dB from 20 to 20,000 Hz. Channel balance and separation measurements could not be made because the pickup caused instability on one channel of our test equipment, though no instability was heard during listening tests when the pickup was connected to the amplifier. The listening panel judged the sound quality to be equal to that obtained from typical "high performance" pickups. Depending on the record player the sound was even better than attained with other high performance pickups because the overhang could be literally "fine tuned" for the tonearm. It is simply a fact that a "universal" tonearm is not universal. (The rear-of-shell-to-stylus-tip measurement for proper overhang really does vary.) The ability to "tune" the overhang gives this pickup an extra edge in attaining best performance from a tonearm/pickup combination. ▲

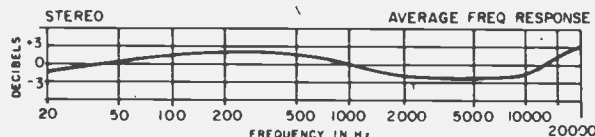


Circle No. 77 On Reader Service Card

DESCRIPTION: A stereo magnetic pickup with a 0.3 x 0.7 elliptical stylus. Pickup is supplied factory-installed in a universal headshell with 55 mm. (standard) between rear of shell and stylus tip. Recom-

NAGATRONICS 195IE PHONO PICKUP

Meets our stringent requirements for phono pickups in this price range and offers the additional convenience of an integral headshell. \$55.



TEST REPORTS / HEADPHONES

mended vertical tracking force is 1.5 to 2.0 grams and essentially similar results were attained anywhere within this range.

PERFORMANCE: The frequency response measured within ± 2 dB from 20 to 20,000 Hz. Channel balance was exact, the frequency response from each channel

overlapped. The worst-case stereo separation measured 21 dB at 1000 Hz; 22 dB at 15,000 Hz. ▲

This report appeared last issue with a frequency response curve and price that belong to a different cartridge. Correct copy appears here. *Mea culpa.*



Circle No. 93 On Reader Service Card

DESCRIPTION: A magnetic pickup with a "Hyper-elliptical" stylus and built-in "hinged" stylus guard. Recommended vertical tracking force is $\frac{3}{4}$ to $1\frac{1}{2}$ grams and best results were attained in the $1\frac{1}{4}$ to $1\frac{1}{2}$ gram range.

PERFORMANCE: The frequency response measured

SHURE M95HE PHONO PICKUP

This is the next-to-the-top-of-the-line Shure pickup, which incorporates the same stylus as is used in the top-of-the-line model. Overall the sound quality is very good, with slightly hot highs. \$90, with user-replaceable stylus (which may also be used by those who now own the M95 pickup) at \$34.

± 3 dB from 20 to 15,000 Hz, rising to +4.5 dB at 20,000 Hz. Overall channel balance was within 2 dB. The worst-case stereo separation was 23 dB at 1000 Hz; 20 dB at 15,000 Hz. (This pickup sounds a lot better than it measures.) ▲

HEADPHONES



Circle No. 91 On Reader Service Card

DESCRIPTION: 5-ounce stereo headphones with suspension headband and pressure ear cushions. A 9-foot cord is provided.

PERFORMANCE: An unusually light pair of head-

SENNHEISER 420 HEADPHONES

A five-ounce pair of headphones in the Open-Aire® line. They are exceptionally comfortable and have higher than average efficiency. They come with a one-year warranty (repairs will be made free of charge). \$84.80.

phones. Suspension headband is somewhat difficult to adjust for optimum fit. Sound quality is generally well balanced. Transient response is lower than average for headphones in this price range. Efficiency is much higher than average and these phones can be driven to high sound levels with relatively little power. They are exceptionally comfortable, which is something to consider if you will be wearing headphones for extended periods of time. ▲



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pop discs

(Continued from page 22)



kick-out-the-jams numbers. Hopefully this fine work will not be crushed to death between the forces of ho-hum disco and megaton hard rock.

Lene Lovich: "Stateless." Stiff/Epic. \$7.98.

Stiff Records, distributed here by CBS, is the British "new wave" label that launched Elvis Costello, Nick Lowe, Devo and other non-mainstream rockers. Lene (pronounced Lay-na) Lovich seems to be next in line for stardom. Her vocal style is similar to that of Patti Smith. Her six-piece band plays highly spirited, yet disciplined, no-frills rock. After three blistering tunes on side one, Lene shines on a lovely ballad, "Too Tender (To Touch)," with Don Snow providing a catchy piano riff.

Dire Straits: "Communique." Warner Bros. \$8.98.

Mark Knopfler's moody guitar lines and Dylan-like vocals continue the pattern that was set in the group's out of nowhere smash debut last year. Much of Dire Straits' music bears the brood-



ing, understated intensity of the early works of Jim Morrison and the Doors. Mark Knopfler's vocal on "Follow Me Home" sounds eerily like Morrison.

Carole King: "Touch The Sky." Capitol. \$7.98.

If you always knew that Carole King could make it big again, you were right. After too many years of personal and professional hardships, Carole is back with her strongest set since the "Tapestry" chartbuster. With Jerry Jeff Walker's excellent band supporting her, Carole sings with more vigor, tenderness and hope than she has in quite a while. She touches all bases, with a sampling of rock, disco, country and, of course, ballads, with "You Still Want Her" a moving standout in the last category.

Willie Nelson & Leon Russell: "One For The Road." Columbia. \$13.98, two-record set.

"Willie and . . ." is a phrase that spins pure gold. First it was "Willie and Waylon." Now Leon Russell shares the spotlight with the fuzzy-faced outlaw. One of the two discs in the set finds the duo alternating lead vocals on such good-timey Texas swing classics as "Detour," "Don't Fence Me In" and "You Are My Sunshine." The sec-



ond record is a fine continuation of Willie's lush "Stardust" album of last year. With Leon providing all instrumentation, Willie eases his way through the likes of "Danny Boy," "Tenderly" and "Stormy Weather."

Jeremy Spencer Band: "Flee." Atlantic. \$7.98.

Spencer is a founding member of Fleetwood Mac and a superb guitarist. Side one of this exceptional disc is comprised of three disco cuts, and their impact can be partly attributed to the

Aphex Aural Exciter used in the mixing. Side two is more mainstream rock, in which Spencer cultivates his aforementioned musical roots.

Rachel Sweet: "Fool Around." Stiff/Columbia. 7.98.

It's Brenda Lee all over again. You remember Brenda from the 1950s. You were too young? Brenda Lee was an



iddy-biddy girl of 13 who belted out a rock song and oozed a ballad like someone twice her age, height and sophistication. Rachel Sweet, 16, powers out rockers like "Who Does Lisa Like?" and croons ballads like "Wildwood Saloon" just the way Brenda did. Her cover of Dusty Springfield's "Stay Awhile" is a nostalgic highlight for all you 60s freaks.

Abba: "Voulez-Vous." Atlantic. \$7.98.

The masters of pop-modified church choir harmonies, Abba delivers a polished package with a little for everyone: rock, romantic and disco. The sound is room-filling.

Bram Tchaikovsky: "Strange Man, Changed Man." Polydor. \$7.98.

Like his more famous namesake (no, not Bram Stoker), Tchaikovsky delivers a wrenching blow to the gut, only he employs his powerful hard rock trio to achieve the effect. A thick guitar sound supports strong vocal harmonies in what is basically the epitome of the current English rock sound.



Karl Ratzer: "Street Talk." Vanguard. \$7.98.

A gifted guitarist who plays disco-funk-rock-jazz-ballad and can sound alternately like Jimi Hendrix and George Benson is what Karl Ratzer is all about. His licks sound largely improvisational. Keyboards, horns, bass and percussion provide solid backup.

Missouri: "Welcome Two Missouri." Polydor. \$7.98.

A belting lead singer, Ron West, backed by the close harmonies of Web Waterman and Gary West, make this LP one of the better mainline rock debuts of the year. Ron composed and arranged all of the mostly upbeat tunes. Lead guitar by Waterman is exceptional—his searing strings are clearly heard weaving through the strong, up-front rhythm tracks.

Night: "Night." Planet. \$7.98.

Night's debut album was produced by veteran helmsman Richard Perry and bears his heavy drumming style, executed by Rick Marotta. Other well-known session players include Nicki Hopkins and Steve Porcaro on piano. The basic group consists of Stevie Lange, who shares lead vocals with Chris Thompson; Robbie McIntosh on guitar and Billy Kristian on bass. The album contains original group-composed songs, plus interpretations of the works of Walter Egan and Marvin Gaye. The music is rock and soul, with a very Fleetwood Mac-ish sound.

Best of the SuperDiscs

Ry Cooder: "Bop Till You Drop." Warner Bros. \$7.98.

Cult guitarist Ry Cooder, along with a tight rhythm section and soulful male background singers, weaves a tapestry of down home rhythm-and-blues, plus the ultra-funky "Look at Granny Run Run." The solo guitar intros to several songs are stunning in their clarity, as are the percussive elements. Get yourself a fresh stylus, fine-tune your system and enjoy the sound of Ry, crisp! (3M digital master)

Merl Saunders: "Do I Move You." Crystal Clear.

Best known for his early 1970s association with the Grateful Dead's Jerry Garcia, master keyboardist Saunders teams up with horns, percussion and background voices. The result is a fine mixture of rock, soul and jazz. Saunders plays no less than six of the very latest electronic synthesizers on this disc. (Direct to disc) ▲

STEREO RECORDINGS

(Continued from page 29)

major consideration being that by utilizing this speed it would be possible to put up to a half-hour of program material on one side of a disc.

Now Angel has released a new series of LPs recorded at 45 rpm. The initial series of releases, all taken from previous Angel recordings, has been selected for their superior sound quality: From Holst's *The Planets* we have four movements played by the London Symphony Orchestra conducted by Andre Previn (SS 4500); the same performers also collaborate on a rather incongruous coupling of Gershwin's *Rhapsody in Blue* and Ravel's *La Valse* (SS 450001); Herbert von Karajan and the Berlin Philharmonic perform Ravel's *Bolero* and Strauss's *Blue Danube Waltz* (SS 45002), as well as a collection of Wagner preludes (SS 45008); the Chicago Symphony Orchestra is conducted by Seiji Ozawa in Janacek's *Sinfonietta* (SS 45007), and by Carlo Maria Giulini in Stravinsky's *Firebird Suite* (SS 45003); Lamberto Gardelli conducts the London Symphony in Respighi's *Pines of Rome* (SS 45005). Three other records offer marches of Elgar and Walton played by the London Philharmonic conducted by Sir Adrian Boult (SS 45009), a Ketelbey collection with the Philharmonia Orchestra conducted by John Lanchbery (SS 45012), and Mstislav Rostropovich conducting the Orchestra of Paris in Rimsky-Korsakov's *Capriccio Espagnol*, *Night on Bald Mountain* of Mussorgsky and Glinka's *Ruslan and Ludmilla* overture (SS 45011).

Angel advises that these special discs have been produced with the most controlled conditions, achieving "a spectacular new dimension in classical disc mastering through utilization of the superb dynamic range offered by 45 rpm." This results, according to Angel, in "greater clarity of transient and high frequency response, better definition of midrange inner voicing greater ability to accommodate sound below 100 Hz, a higher recording level, and higher peak dynamic events due to the measurably larger groove geometry during the cutting process."

And, indeed, the new recordings are mightily impressive. They are uniformly clean and distortion free, with a solid bass, dazzling high frequencies, and there is no question that these are superior to Angel's 33½ rpm counterparts. The ugly question raises its head: Why is it necessary for Angel to utilize 45 rpm to achieve such results? Many other companies, though careful mastering, achieve equal results at 33½

rpm.

The sonic advantages of 45 rpm are obvious. But, unfortunately, at this faster speed it is only possible to get a maximum of 16 minutes of music per side. The list price of these records is \$8.98, which means that the collector pays \$1 more for half as much music. I do not mean to negate what Angel has achieved on their new 45 rpm Sonic Series. But it is unfortunate that they cannot achieve similar results at the regular LP speed, or, at the very least, charge less for these "premium discs" which contain only half as much music.

© Viennese Concert by the Vienna Philharmonic Orch., cond. Willi Boskovsky, London LDR 1001-2, two records.

The enormous interest in the highest qualities of sound reproduction, which led first to direct-to-disc and then to digital recordings, has, for the discerning collector, been rather a letdown. Most of the classical direct-to-disc recordings I've heard have been quite disappointing. True, there is a wider dynamic range, and the bass is unusually solid, but often the studios in which the performances were recorded are inadequate acoustically, resulting in thin string sound, and seldom is there any attractive concert hall ambience. Digital recordings surely will replace direct-to-disc recordings, as there is the enormous advantage of editing, (impossible on direct-to-disc), and there is virtually no distinction or loss of dynamic range. This "Viennese Concert" is London's first digital recording, and is quite sensational, although not without some qualifications. Recorded live last New Year's Day, it offers a typical holiday concert, consisting primarily of music of the Strauss family, with Von Suppe's "Beautiful Galatea Overture" thrown in for good measure. Two of the major works are Johann Strauss's "Blue Danube" and "Wine, Women and Song" waltzes, interspersed with lively polkas and marches. The Vienna Philharmonic here has a splendid, solid sound, the dynamic range is quite remarkable and there is a fine stereo spread. Needless to say, I eagerly anticipate future London digital recordings.

© Paderewski: *Piano Concerto in A Minor, Op. 71*; © Scharwenka: *Piano Concerto No. 1 in B Flat Minor, Op. 32*. Earl Wild, pianist, with the London Symphony Orch., cond. Arthur Fiedler (Paderewski) and the Boston Sym-

phony Orch., cond. Erich Leinsdorf (Scharwenka), RCA Victor Gold Seal AGL1-2876.

I am delighted with this reissue, as it couples together two of Earl Wild's very finest concerto performances. The pianism displayed on these virtuoso concertos is positively stunning, as Wild plays in the grand manner, a style that in public performance would be guaranteed to "bring down the house." Paderewski's concerto is very dated to my ears, particularly the final movement, but it is fun to hear occasionally. Fiedler, who conducted the first recording of this concerto several decades ago with Jesus Maria Sanroma as soloist, offers an enthusiastic accompaniment. Wild made a tremendous impression with the Scharwenka concerto in a series of performances some years ago with the Boston Symphony, and this recording, made at that time, captures the excitement of the occasion. The reproduction throughout is excellent, and this medium-priced LP can be recommended without reservation.

© Prokofiev: *Piano Concerto No. 1 in D Flat, Op. 10*; © Ravel: *Concerto for the Left Hand*. Andrei Gavrilov, pianist, with the London Symphony Orch., cond. Simon Rattle, Angel S 37486.

Gavrilov, the latest young Soviet sensation who won the Tchaikovsky Competition at 18 years of age, has often been called "a young Horowitz." He creates a sensation whenever he plays, and is remarkably impressive on this coupling of Prokofiev and Ravel. His playing of Prokofiev's precocious youthful concerto is stunning by any standards, with wit and sensitivity as well, while I don't recall ever hearing a finer performance of Ravel's unique concerto. Simon Rattle, although another youngster on the major musical scene, provides a concise accompaniment. The London Symphony plays brilliantly, and the engineers have done their work well. The LP is filled out with solos by Gavrilov, Ravel's "Pavane for a Dead Princess" and two brief excerpts from Prokofiev's "Romeo and Juliet." This is a major recording debut.

© Prokofiev: *Alexander Nevsky, Op. 78*. Claudine Carlson, mezzo-soprano; Saint Louis Symphony Orchestra and Chorus, cond. Leonard Slatkin, Candide QCE 31098.

Sergei Eisenstein and Serge Prokofiev collaborated on a 1938 film epic "Alexander Nevsky," which depicted episodes in the life of Nevsky, a Grand Duke of Vladimir who was considered to be both a hero and a saint. For this film Prokofiev wrote some of his most powerful as well as some of his most poignant music. Surely the sixth movement, "Field of the Dead," depicting a

young Russian girl searching the battlefield for the body of her lover, is one of Prokofiev's most touching statements, while the preceding movement, "The Battle on the Ice," is possibly his most savage. There has not been a lack of recordings of this colorful score, although never before have the engineers captured the full scope of the music. This new Candide issue easily is the finest of the lot sonically, with a warmth, depth and dynamic range unmatched by any of the others. The Saint Louis Symphony plays as if it were one of America's top five orchestras, with Claudine Carlson making an impressive disc debut in her brief solo. The chorus, trained by Thomas Peck, copes well with the Russian text. In comparison, the Svetlanov Angel Melodiya disc has its own particular kind of authenticity and is vividly recorded while the RCA Gold Seal disc with Reiner has the advantage of the Chicago Symphony Chorus and the disadvantage of a dated reproduction.

© Prokofiev: *Romeo and Juliet Ballet* (excerpts). Los Angeles Philharmonic Orch. cond. Erich Leinsdorf, Sheffield Lab 8.

Direct-to-disc recording, eliminating the distortion and dynamic limitations of tape, can produce a sound quality that is superior to standard recording techniques, but it still cannot reproduce something that isn't there to start with. This recording of excerpts from Prokofiev's colorful ballet was made in July of 1977 in the M.G.M. Studios in Culver City, California, obviously not a very good recording site. The acoustic atmosphere is dry and unflattering particularly to the strings. The dynamic range is wide, percussion sound is very clear, but there is a lack of warmth to the sonic picture. One of the disadvantages of direct-to-disc recording is that there can be no editing, and any mistakes in performance cannot be corrected. It is to the credit of the Los Angeles Philharmonic that they acquit themselves so professionally on this disc. But there are many other recordings of Prokofiev's ballet that are far superior to this musically, and sound more natural even if not reproduced with the dynamic range heard on this new Sheffield disc.

© Puccini: *Turandot* (Opera in Three Acts). Montserrat Caballe (Turandot); Mirella Freni (Liu); Jose Carreras (Calaf); Paul Plishka (Timur); Michel Senechal (The Emperor); and others, with the Rhin Opera Chorus and the Strasbourg Philharmonic Orch., cond. Alain Lombard, Angel SCLX 3857, three records.

This is quite an intriguing recording

of Puccini's last opera, to add to the several superb versions that already exist. The role of the icy Princess Turandot is one of the most demanding for sopranos. One would not expect Caballé, famous for her performances of the *bel canto* repertory, to be ideal for the part. But then I didn't think she would be an effective Salome, and she turned out to be one of the best vocally. Caballé sings Turandot quite magnificently. She must force a bit on occasion, producing a rather strident sound, but there are moments of great sensitivity, and she is a more human princess than Birgit Nilsson, who remains the supreme interpreter of the role. Mirella Freni is magnificent as the slave girl, I have never heard the part sung better, while Carreras' youthful sound and robust vocalism are perfect for the impetuous prince. Plishka is an outstanding Timur, the remainder of the supporting cast more than adequate. I find the reproduction rather disappointing, with too much fiddling of the dials by the engineers. The chorus, so important in this opera, is not particularly well recorded, the orchestral sound not very opulent. There is much competition for this recording, particularly the first of Nilsson's recordings, still available on RCA, in which she is partnered by Bjoerling and Tebaldi. One must not overlook the London set with Joan Sutherland in fine form as the Princess Turandot, Caballé as a sensitive Liu and Luciano Pavarotti as a sterling Prince.

© Stravinsky: *Firebird Suite*; © Borodin: *Overture and Polovtsian Dances* from "Prince Igor." Atlanta Symphony Orch. and Chorus, cond. Robert Shaw, Telarc DG 10039.

The sonic quality of this recording is the prime interest here, and indeed, it is quite fabulous. But it is unfortunate that the musical values are not equally high. America boasts many superb orchestras, and while the Atlanta Symphony is an enthusiastic group it is hardly among the more accomplished orchestras and is incapable of producing the rich sonorities demanded by these colorful Russian scores. Shaw's conducting is decidedly unimaginative, and this is an insensitive *Firebird* with a hopelessly rushed finale. This recording, made with a digital computer, is almost certain to become a demonstration disc for the highest quality audio equipment. The dynamic range is astounding. The solidity of the bass drum, particularly in the Polovtsian Dances, will break many a lease. I eagerly await the day when musical values match the level of sonic excellence now possible with digital recording techniques.

© Tchaikovsky: *1812 Festival Overture, Capriccio Italien, Op. 45, Marche Slave, Op. 31*. Detroit Symphony Orch., cond. Antal Dorati, London CS 7118.

About two decades ago Dorati and the Minneapolis Symphony Orchestra (now the Minnesota Orchestra) recorded for Mercury the *1812 Festival Overture*, a disc that soon became a million seller. Dorati's Minneapolis recording has been reissued on Mercury's Golden Imports Label (SRI 75001), and still enjoys brisk sales. It was an extraordinary record for its time, offering some vividly recorded, dubbed-in cannon shots and massive pealing bells, along with Deems Taylor's explanation of how all of it was put together. The idea captivated the record-buying public. Most succeeding recordings of the overture were made with cannons, some even adding a chorus. Now Dorati has made a brand new recording this time with his new orchestra, the Detroit Symphony. Muzzle-loaded Civil War cannons and bells from the National Cathedral in Washington were dubbed in, as well as the sound of the Bicentennial "Liberty" Bell. The engineers apparently felt the acoustics of Detroit's concert hall were not good enough for the enterprise, so the recording was made in what is described as "an abandoned neo-Moorish cinema," with a platform built for the orchestra, producing results that "astounded the engineers." I wish I could be as enthusiastic. The Detroit Symphony plays as well as the Minneapolis Symphony did on their recording, but interpretively these are quite prosaic performances, with a particularly bland *Capriccio Italien*. The reproduction favors the bass, there is little brilliance in the higher frequencies, and the cannon shots lack impact. If you're looking for a demonstration quality recording of Tchaikovsky's popular score, I would suggest you look elsewhere. A particularly good buy is the budget-priced Quintessence disc with Charles Gerhardt and the National Philharmonic.

© Tchaikovsky: *Francesca da Rimini, Op. 32, Romeo and Juliet Fantasy Overture*. London Philharmonic Orch., cond. Mstislav Rostropovich, Angel S 37528.

Not too long ago Angel issued a seven-LP set of all of Tchaikovsky's symphonies (including *Manfred*) with this orchestra and conductor, an enormously successful venture and rightfully so. Rostropovich has a particular flair for the works of Tchaikovsky, and it was inevitable that he would record more of his music. This new disc of two of the popular symphonic poems is a winner, with incredibly dynamic performances that are perhaps more per-

sonalized than any others put to disc. *Francesca* is outstanding for its intensity—just listen to that attack on the opening notes! The timpani role at the climax of *Romeo and Juliet* is distinctive and powerful. The love motives of both symphonic poems are given a soaring, intensely dramatic treatment. I find the reproduction on this LP to be quite superior to that afforded the complete set of symphonies. This boasts a broad, spacious sound, with plenty of richness and dynamic range, perhaps a bit undefined in the bass, but otherwise outstanding. This disc deserves great popularity.

© *Crystal Rainbows*. Sounds Reasonable Associates, SR 7801.

Here's a rather unique LP that should appeal to those looking for something off the beaten path. Last year there was an exhibition of esoteric American handcrafted musical instruments, called collectively "The Harmonious Craft: American Musical Instruments." This was on display in the Renwick Gallery of the National Collection of Fine Arts of the Smithsonian Institution, and it included such exotic Americana as the Bicentennial Turkey Tambourine, Single String Stainless Steel Cello, Sansa Finger Piano, Portable Organ, and Appalachian Dulcimer. These, along with Cloud Chamber Bowls, an Electronic Jawbone, Acoustic Piano, Finger Cymbals, Rubber Piano, Highland Bagpipes, a synthesizer and various other strange instruments, can all be heard on this new LP performing music especially written for the occasion by Washington composer William Penn. The titles of the pieces are as evocative as the music: "Reflections in a Pastel Vase," "Moonshine," "Gossamer Looms," "Iridescent Stillness Through Curved Space" and "Crystal Rainbow." The music is impressionistic, generally rather subdued and quite imaginative, with the unusual sounds captured by the engineers with uncommon fidelity.

© The Twelve Cellists of the Berlin Philharmonic. Telefunken 6.42339.

Perhaps some collectors will remember a release several years ago on the now defunct BASF label featuring this same group performing music of Funck, Klengel, Blacher and Francaix. An extraordinary display of unusual sonorities and virtuosity were heard, and if you can find a copy of this disc anywhere, grab it quickly; hopefully it may be reissued some time on another label. This new disc is labeled "Volume I," hopefully to be followed by many more. It offers a wide variety of music for these sterling players, comprised of the complete cello section of the world-

famous Berlin Philharmonic. "Windungen" by Xenakis, and "Melodia-Ritmica" by Eder were both composed especially for the BPO cellists, and offer the listener some positively unique sounds, many of which one would never expect would be produced by cellos. "Bachianas Brasileiras No. 1" of Villa-Lobos, originally scored for eight cellos, here is played on twelve; perhaps some collectors will remember the famous Stokowski recording of the second movement, "Modinha," surprisingly still available on Everest. This LP ends with three works one might never expect would be played by members of the Berlin Philharmonic, the traditional "Gospel Train," the Beatles' "Yesterday" and Handy's "St. Louis Blues." Although expertly played, they still don't quite come off. Telefunken's engineering is exemplary, and this LP should interest many collectors. ▲

ON OUR COVER

Sansui's G-5700 feature-laden 75-watts-per-channel receiver is discussed in the *Receiver Features* article that begins on page 57 of this issue. Its performance capabilities are evaluated by our independent testing laboratory in our Test Report section (see page 60). Among its many features are: digitally quartz-locked tuning, digital frequency readout, microphone mixing option with front-panel mike jack, LED peak level power display, audio muting, FM muting, tape monitor and dubbing functions. \$630. For detailed literature from Sansui, circle Reader Service Number 89.

HFSBG UPDATE

Gremlins must have gotten into our September-October issue. Please make note of the following corrections:

RTR 300D Speaker Weight. No, our speaker reviewers are not weaklings—the RTR 300D (\$399 each) weighs 51 pounds, not 15, which is why you might need help carrying it home.

Nagatronics 195 IE-Test Report. Our test report on this \$55 phono cartridge appeared with the wrong frequency curve and an incorrect price. The correct report appears on page 68.

preferred to keep the tweeter control in the -2 dB position.

Suspecting that the speaker's remarkable bass capability might tempt some listeners to drive it very heavily, Mitsubishi has wisely included a foolproof and effective system of overload protection. Whenever dangerous power peaks are fed to the speaker, an attenuator circuit goes into action. It won't cut off the speaker altogether—like a fuse. Rather, it will just reduce the volume to a safe level. At the same time, an LED lights up on the front panel to alert the listener that the speaker is operating in the overload mode. A simple touch on a re-set button at the rear then restores normal function without the need to replace fuses and without any interruption of the music. Since the MS-40 readily ac-

cepts 150 watts' input it's not likely that you'll trigger this circuit often.

Performance:

What really gets us about this speaker is the bass. It would arouse the envy of a howitzer. In fact, it can render a cannon shot realistically enough to make you run for shelter. We mention this not because we're hung up on artillery but because it's a fair indication of what this speaker does with the bottom notes of music. Kettledrums and organ pedal passages came through with a wonderful combination of clarity and depth, and even the softest notes of the bass fiddle had a discreet but undeniable presence. All that clarity and tightness deep down made the rest of the musical spectrum seem uncommonly lucid. For example, in a heavily scored passage for chorus and orches-

tra, every vocal strand stood out clearly.

The top is equal to the bottom: sweet, clean, and open. Voices, strings, and brass all assert themselves in splendidly sharp definition, yet without a trace of harshness. Piano transients are so crisp you can almost feel the hammers hit the strings—yet there is no sense of brittleness and the texture of the sound remains full and solid.

In sum, Mitsubishi's pioneering work in cone design has paid off, and the characteristics of the new material have been successfully integrated into the sonic profile of the entire system. The MS-40 unquestionably ranks among the best speakers we know. Others in class may sound differently, but not necessarily better. At the top, one must choose between superlatives on the basis of personal taste. ▲

AUDIO SHOWCASE

(Continued from page 20)



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phono frequency response, 30 to 15,000 Hz \pm 0.3 dB; S/N ratio, 80 dB for phono and 90 dB for Aux and Tape-In; filters, 30 and 10,000 Hz; input sensitivity/impedance, phono 2.5 mV/47 k ohms, all other 150 mV/47 k ohms; tone control, bass \pm 10 dB (100 Hz) and treble \pm 10 dB (10 kHz). Price: \$300.

Hi-Fi Auto Speaker System

Avid Corporation "takes to the road" with this new Road Driver™ model Ten-Plus high-fidelity speaker system for cars. The Avid Ten-Plus is a complete 4-ohm system consisting of a pair of rear deck Avid model Ten "Back-seat Drivers," each with the company's new 6½-inch woofer and one-inch soft



Circle No. 110 On Reader Service Card

dome tweeter, plus a pair of door-

mounted full-range Avid 4½-inch cone speakers. The drivers have been designed and manufactured by Avid to meet the unique environmental and performance conditions in cars. The system has a suggested retail price of \$250, and has a limited 5-year warranty.

Electrostatic Headphone

This new Beyer ET 1000 headphone, the first electrostatic headphone developed and produced in West Germany, features a wide frequency range of 10 to 25,000 Hz, and is said to be capable of a maximum output of 115 dB SPL at 1 kHz. The acoustical quality of the headphone derives in part from use of



Circle No. 109 On Reader Service Card

sintered-bronze cover plates—the first such application of the material in headphone design. A broad, padded headband helps ensure wearer comfort, as do the soft ear cushions. The unit comes with an 8-foot cord and a standard quarter-inch stereo phone plug. The companion N 1000 power supply, used to drive the ET 1000 and provide

it with polarizing voltage, is capable of driving two sets of ET 1000 headphones. It operates from standard 110-volt AC current. Prices: ET 1000, \$159.95; ET 1000S (the headphone plus N 1000 power supply), \$279.

In-Dash Cassette Deck

Pioneer Electronics' KPX-9500 in-dash component cassette deck with Super-



Circle No. 107 On Reader Service Card

tuner AM/FM stereo radio features Dolby noise reduction for both tape and FM. The unit can be matched with other Pioneer components to provide a totally controllable sound environment for a car, the company claims. The KPX-9500 features five-station pre-set pushbutton tuning and automatic muting on FM stereo. The tape player functions include locking fast forward and rewind, automatic replay after rewind, automatic eject and lighted stereo and Dolby indicators. The electronically governed motor assures low wow and flutter. The unit requires a separate power amplifier such as Pioneer's GM-12, GM-40 or GM-120. The Pioneer AD-307 noise suppression system can also be added to reduce static and multipath interference. Other features include: phase-locked loop multi-

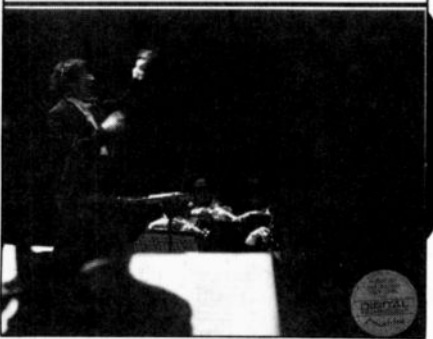
SUPER DISCS

(Continued from page 55)



LIVE ON THE WIRE: JEFF CAMPBELL

MUSSORGSKY RAVEL
PICTURES AT AN EXHIBITION
TOSHIKI FURUKAWA conducting
TOKYO METROPOLITAN SYMPHONY ORCHESTRA



PICTURES AT AN EXHIBITION



WAGNER SELECTIONS

disc surfaces, wide open dynamic range, clean and sharp transients and a "name" performer. While there is a debate amongst jazz lovers regarding the merits of the "new" Brubeck Quartet vs. the "old," I'll simply say that this is a great album. One full side of one disc is devoted to a non-stop medley of Duke Ellington hits, given the Brubeck touch. The remaining three sides feature such Brubeck favorites as *Take Five*, *Unsquare Dance*, *Blue Rondo à la Turk* etc. This album is a joy to hear and even non-jazz listeners will enjoy it.

Smashing by Nobuo Hara and his Sharps and Flats is an album you will undoubtedly sit up and take notice of once you get over laughing at the band's name. Superb sound is packed in the grooves of this big band direct-cut disc. Side One is made up of four Gershwin standards: *Strike Up The Band*, *The Man I Love*, *S' Wonderful*, and *Summertime* while the flip side is devoted to Rodgers & Hart: *Thou Swell*, *Spring is Here*, *My Heart Stood Still* and *My Funny Valentine*. This direct-cut album is imported on the EMI/Toshiba label, #LF-95017. The music is relaxed and swinging and the sound is "alive" with a very quiet disc surface. Just about any audiophile would be happy to receive this record as a gift.

Stravinsky's *Firebird Suite* and Borodin's *Music From Prince Igor* (Telarc digital recording #DG-10039) may become a million seller thanks to the fact that (unlike direct-to-disc recordings) the digital process allows you to make as many records as you need to satisfy consumer demands from a totally noise-free tape. This recording features Robert Shaw conducting the Atlanta Symphony Orchestra and Chorus. The dynamic range of this album is outstanding. The opening notes of *Firebird* might be mistaken for turntable rumble, rather than what it actually is: a very soft bass drum and later, when the bass drum is really whacked, the listener can fully appreciate the capabilities afforded by the digital process. Often a record comes with a silly warning label about how the recorded material might damage a speaker or drive an amplifier into clipping. One of those caution labels accompanies this disc, but this time it should be heeded. While this album sounds spectacular when played at a very loud level, work up to it gradually. This disc is so clean and natural that even at floor-shaking levels, the overpowering sound and volume are not at all objectionable. This album has been nominated for Audio Technica's annual audio excellence award, and it deserves every prize it gets.

The Three (#EW-10001) and The

Great Jazz Trio From L.A. are two of the most exciting direct-cut records of jazz trios. Both are on the East Wind label and are distributed in the U.S. by Nautilus Recordings. The first disc simply titled "The Three" features Joe Sample on piano, Ray Brown on bass and Shelly Manne on drums. The selections include *Yearnin*, *On Green Dolphin Street*, *Satin Doll* and three others. Although this was recorded in Japan four years ago, when the audiophile-disc craze was just starting to catch on, it can stand up to the most technically perfect disc produced today. A companion album "The Great Jazz Trio From L.A." has only two songs per side: *A Night In Tunisia*, *'Round About Midnight*, *Satin Doll* and *My Funny Valentine*. The three musicians (Hank Jones, Ron Carter and Tony Williams) play superbly—to the point of earning words of praise from a "long hair" classical music lover for whom I played this disc. On both of these albums you will hear piano and string bass as neither has likely been recorded before. Both are truly exceptional albums from both technical and musical standpoints. Finally, if you've been put off by the thought of jazz trios or were never terribly impressed by improvisational jazz, these discs will likely change your mind. Chances are, that if you buy one, you'll want the other, too.

Power . . . Rock . . . Direct-to-Disc on the Direct-Disk label (#DD-107) stands out as a super disc both musically and in terms of general audio sound, though I would be very reluctant to call it a true rock album (as the title implies). A group of excellent studio musicians perform recent hits such as *You Should Be Dancin'*, *Superstar*, *Feels So Good* and seven others. A group of back-up singers add occasional lyrics and the light use of a drum synthesizer add a very "modern" sound. The too-infrequent use of the keyboard synthesizer is very exciting and makes this disc even more enjoyable. The combination of close miking, arrangements with a lot of "punch" and high recording levels should satisfy the audiophile who wants blasting sounds and quickly recognizable songs.

Aspen Gold (Nautilus #NR2D) deserves special mention since it is a reunion of the Kingston Trio. Actually, reunion is the wrong word—Bob Shane is the only original member in the trio. The new names are Roger Gambill and George Grove. The album was recorded using the digital process and the title song is enough to bring tears to the eyes of anyone who has been longing for a new album from the Trio. For-

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plex demodulator; FET front end; loudness control; separate center-click bass, treble and balance controls; automatic stereo muting; adjustable shafts.

Expanded Micro Component Line

Heading Toshiba's new micro component line-up is a T10 AM/FM stereo tuner, priced at \$249.95, that offers LED signal strength indicators, as well as a LED stereo indicator for precise, accurate tuning. An integrated amplifier, Model A10 selling for \$299.95, has a signal-to-noise ratio of 85 dB, and phono overload capability of 180 mV

for "superb" reproduction of direct cut discs. Steady power of 20 watts per channel minimum RMS at 8 ohms from 40 to 20,000 Hz is provided, with no more than 0.01% THD; this is achieved through a toroidal-core power transformer. The unit also offers mike mixing for greater versatility. The power amp, Model M12 selling for \$279.95, is contained in an aluminum die-cast body and offers 30 watts per channel, minimum RMS at 8 ohms from 20 to 20,000 Hz with no more than 0.05% THD. The pre-amp, Model C12 costing \$229.95, features a signal-to-noise ratio of 85 dB and a phono overload



Circle No. 99
On Reader Service Card

capability of 180 mV for true life reproduction of direct-to-disc and digital recordings, according to Toshiba. The Model D15 remote controlled micro tape deck with IC logic is tagged at \$549.95. It has a dual flywheel system that reduces wow and flutter to .04%.

SUPER DISCS

(Continued from page 75)

tunately, they have not forgotten the songs that made the original trio famous and have included *Greenback Dollar*, *Tom Dooley* and *MTA*. This is the first Kingston Trio album to be recorded in eleven years, and the sound that has been captured (thanks to the digital encoder) makes it even more special. The reproduction of their voices is so damned accurate that you'd swear they are in the room with you, about ten feet away. Naturally, with the digital process you don't get any tape noise, but the total absence of disc surface noise also adds greatly to the "live" sound of this album. My only gripe is that one of my favorite Kingston Trio "oldies", *Tijuanna Jail*, was not included. But maybe it will appear on a follow-up digital album by them.

Mussorgsky's *Pictures At An Exhibition* and Ravel's *Pavane Pour Infante Defunte* (Denon OX-7072) are on one of Denon's most spectacular-sounding discs. Although audio writers and record reviewers (including myself) continue to wax ecstatic over the results achieved by using Soundstream and Sony digital recording encoders, we often lose sight of the fact that there are also over 200 digitally recorded discs available on the Japanese-import Denon label, all made using the

Denon PCM digital encoder. (And, lest you think that the idea of digital recordings is brand new, the first Denon PCM disc was released in 1972.) The aforementioned has Kurt Sanderling conducting the Berlin Symphony Orchestra. A quick listening comparison between this and the same music recorded on an analog system will demonstrate, very quickly, that there simply is no comparison! The brass drum used frequently and loudly in *Pictures* is absolutely clean and when played loudly gives you the same feeling in your chest as if a live bass drum in a parade just marched by. The upper register strings sound so "live" that it is positively uncanny. On the recording of *Pavane*, the interplay between strings and flutes is beautifully captured. Another Denon PCM album that is very definitely worth hearing features Zdenek Holzer conducting the Czech Philharmonic Orchestra performing two works by Leos Janacek: *Sinfonietta* and *Taras Bulba* (#OX-7110). The opening brass section of *Sinfonietta* is stunning—for a second you'll believe that they are right there in the room with you. Throughout the entire side, the brass and strings practically come to life. While the entire album is one great listening experience, pay

particular attention to the accuracy with which the chimes, very soft harp and triangle is reproduced in *Taras Bulba*. And, if you plan on auditioning some ambient time delay systems in the near future, take one of these albums with you as a test. Such a system really places you in the concert hall. Neither of these discs have any surface noise, at all.

Ray Linn . . . Chicago Jazz (Trend Records #TR-515) is last, but certainly not least, on my recommended list. Readers who are unfamiliar with this type of jazz might at first compare it to Dixieland. Not quite. It is the type of music played in the speak-easies during prohibition. If you've ever seen the Jack Webb movie *Pete Kelly's Blues* and liked the music they played, well, that is Chicago Jazz. The nine selections include *Poor Butterfly*, *Jeepers Creepers*, *Ain't Misbehavin'* and *Keepin' Out Of Mischief, Now*. The musical instruments used include trumpet, clarinet, baritone and tenor sax, trombone, piano, string bass and drums. This is the first time that genre of jazz has been recorded on an audiophile disc. Hopefully, it will not be the last, as it is *hot*, it swings, and is so well done on this album that you can't help stomping your feet. ▲

SPEAKER DESIGN CONCEPTS

(Continued from page 50)

immediately overcome the potential problem of amplifier/speaker mismatch, as the amplifier is specifically meant to operate optimally with that speaker. Of course, there are certain questions about this approach that the consumer must ask. What if he already has a power amp or receiver? The answer is that the power amp is no longer needed (or the amp section of the receiver must be bypassed). In a case like that, however, the answer might be that he does not need a powered speaker. The idea of self-powered speakers has been adopted

by Philips and Advent. The "Powered Advent" is not cheap (at \$450.00 each) but it does fill some gaps in the audio field. People just starting out might well consider this as a viable alternative to a separate power amp. Also, listeners who wish to play remote speakers simultaneously with the main set, and who fear that their main amplifier is not powerful enough can use a powered speaker in the remote location. Finally, with the increasing interest and popularity of ambient time delay systems, the powered

Advent seems like an excellent way to add the rear channel speaker and amplification. (All you need then is the time delay unit). The amplifier portion of the Powered Advent is rated (according to FTC requirements) at 80 WPC. It offers user variable sensitivity controls (a mini-equalizer) for the high and low-end frequency ranges, and a series of "fail-safe" protection devices that protect both the drivers and amplifier in case they are over-driven. While the concept of the powered speaker is certainly not for everybody,

for some audiophiles, they do deserve serious consideration.

MINIMUM DIFFRACTION

Regardless of the popularity of reasonably sized bookshelf speakers, many enthusiasts feel that if you want a BIG sound, you must have a BIG speaker (or speaker enclosure). One particular manufacturer (Avid) of a series of bookshelf speakers is trying to overcome one of the major factors in why small speakers sound small. According to Avid the culprit is diffraction. That is, the sound waves coming out of the front of the box (in addition to projecting out into the listening room) also spread to the sides. In other types of enclosures, the side waves hit the protruding edge of the front of the enclosure and bounce back (diffract) according to the lines imposed by the enclosure. By securing the tweeters and midrange drivers in special mounts (with gently sloping sides) and then installing all of the drivers (and their respective mounts) almost flush with the front of the speaker enclosure, they attempt to eliminate the diffraction patterns caused by conventional boxes. Avid has incorporated their "minimum diffraction" theory into five different models, ranging in price from \$400.00 for their top of the line 330, to a low of \$90.

INSIDE-OUT ELECTROSTATICS

Electrostatic speakers have become favorites with a select (and usually well heeled) segment of the audiophile community. One West German manufacturer, BTM Inc., has come up with a new wrinkle in electrostatic designs, which they have named the ES Translators. There are two main differences between the BTM electrostatics and others. First, unlike other models which require an external polarizing supply voltage (acquired by literally plugging the speakers into AC wall outlets) the new BTMs obtain their needed high voltage directly from the audio input signal. And, while most other electrostatic designs employ a single plastic membrane (diaphragm) mounted between two energized grids, the BTM does the exact opposite: it uses a single powered grid with diaphragms suspended on either side. An inside-out electrostatic driver or, if you prefer, a slice of bread between two slices of ham. The claimed advantage of this design is that you get a higher sound pressure level with lower power requirements. Like most other electrostatic systems, the BTM models are hybrids. The electrostatic elements are used for the midrange and high frequencies while a conventional dynamic woofer is used for the low end. Depending on the system chosen, the woofer module employs either two 10-inch woofers or a single 12-inch woofer,

a single 10-inch or 8-inch. The four different system models range in price from a high of \$499.00 (per speaker) to a low of \$139.00 each—which may well represent a new low price for an



BTM's 310 electrostatic speaker includes a 12-inch woofer element in addition to electrostatic elements that are made up of two plastic membranes surrounding one fixed plate. \$350 each. Circle Number 121.

electrostatic speaker. They are all rated at a nominal impedance of 8 ohms.

CONICAL FUNNEL FOR OMNI-DIRECTIONAL DISPERSION

The Ohm "F" (\$950 each) speaker is deserving of special mention, not only because of its excellent sound and unusual design, but due to its ongoing popularity. Picture a very large inverted funnel that's made out of an alloy of copper and titanium and mounted over a wooden enclosure which acts as an infinite baffle for the bass notes. The actual transducing part of the speaker is at the very top of the funnel (the narrowest part) and when the musical signal is applied, the mid and high frequencies radiate up and down the sides of the metal "funnel." Because the funnel is conical in shape, you get perfect 360° omni-directional dispersion.

HEIL AIR MOTION TRANSFORMER

One of the most radical departures from traditional speaker design is the Heil air motion transformer. This driver was introduced several years ago and is used as a mid and high frequency speaker. While Lafayette has used the Heil driver in their Criterion speakers, the major backer of this unusual item has been ESS. How does it differ from a "regular driver"? To appreciate the Heil workings, it is necessary to remember that the objective of any speaker is to create sound waves by causing air to move in *controlled amounts*. To do this, Heil uses a plastic diaphragm which has been folded in pleats, similar to the folds of an accordion. This is then mounted in, and surrounded by a magnetic "frame" or structure. The musical signal from the amplifier, in the form of alternating

current, causes the pleats to expand and contract, thus forcing air waves into the listening area. Due to the very short excursion of the plastic diaphragm, extremely clean and sharp transient response is achieved.

More recently, a full-range Heil speaker system has been marketed. In ESS's Transar atd speaker, the same mid and high frequency driver is coupled to an equally revolutionary woofer. Instead of the usual speaker cone, Heil uses a set of five circular plastic diaphragms which are mounted in a single vertical row and are surrounded by a wooden frame—which acts to aid the sound dispersion as well improving the cosmetics of what is a very futuristic looking piece of equipment. Each of the diaphragms is connected at four points to a set of carbon fiber "drive rods" which, being highly conductive, carry the electrical signal and cause the round plastic diaphragms to vibrate—yielding air waves and sound. While the very high price of the Transar atd system is in excess of \$5000.00 (for both channels) it *does* include a power amplifier capable of putting out 200 watts per channel.

ACOUSTIC SUSPENSION TOWERS

The name "Acoustic Research" has always been linked with acoustic suspension systems—and rightly so since AR invented them. Now, they are marketing two floor standing "towers" (the AR-9 and the AR-90) which are also acoustic suspension types. It is interesting to note the direction that this type of speaker has taken. While being ideally suited to perform as a small bookshelf speaker, it is only logical that eventually someone would go ahead and design a large, size-is-no-object system using the same concept which has been employed so well in less imposing designs. The two towers were engineered to perform optimally when placed in the proper position. By pre-determining where the speakers should be placed in the consumer's home (and instructing the user regarding placement) the manufacturer can then use the relationship between speaker, wall and floor to improve the characteristics of dispersion and how the room itself will affect the sound. To this end, both the AR-90 and the AR-9 use two side-firing woofers (12-inch and 10-inch respectively) in the base of each tower. These woofers are mounted in a sealed enclosure which is acoustically separate from the other drivers in the tower, but for cosmetic purposes all share the same exterior cabinetry. Both models also have a lower midrange driver mounted in its own sub-enclosure, along with upper midrange drivers and tweeters. The placement of either of these systems is critical to proper performance and

sound reproduction. They are not "free standing" in the sense that they can go anywhere in the room. They should be placed along a reflecting wall, but no closer than a few inches. Additionally, while they can be placed within two inches of a side wall, the manufacturer recommends further distancing. The AR-9 sells for \$750.00 each and the AR-90 costs \$550.00 each.

PHASE COHERENCE ADHERENTS

Several well known and highly respected audio equipment companies are employing the concept of phase integrity in their speaker designs. The general concept has a variety of names. Regardless of the name, the principle remains the same: to have the sounds coming from the various drivers of a speaker system reach your ears simultaneously, as they reached the microphones. If you examine a typical bookshelf speaker with the grille cloth removed, you will usually see two or three drivers mounted flush on the front of the cabinet. Looks O.K. Right? Not if you are aiming for phase coherence. While the outer edges of the drivers may indeed be flush, the actual voice coils are not even. The woofer, with its deeper cone has the voice coil further back into the box than, say, the much smaller tweeter. Although a phase coherent speaker is also designed to prevent phase abnormalities from occurring electronically (in the crossover network) the physical positioning of the

drivers is the most visually obvious indication of this type of design. This also often results in some oddly shaped speaker enclosures (which have been referred to as resembling pregnant kangaroos). The idea of phase coherent (or linear phase) speakers have been adopted by numerous companies which include KEF, Bang & Olufsen, Heath-Kit, and Panasonic/Technics.

DUAL-VOICE-COIL WOOFERS

Several years ago, Infinity Systems began marketing speaker systems employing the "Watkins Woofer" as an improvement upon traditional dynamic woofers. Simply put, a Watkins Woofer is a dynamic woofer with two voice coils. Careful attention to both impedance and resonance points can, according to the manufacturer, lead to a much cleaner and "tighter" bass end. The faith that Infinity has in this design seems to be cast in stone as it has been the basis (for the low frequencies) of almost all of their speakers. At the present time, their top of the line—the Quantum Reference Standard—has a price ticket that makes it truly a special order item: \$6,500.00. A more reasonable price is charged for their top "consumer" speaker system: \$3,000.00. This model, the Infinity Reference Standard 4.5 makes use of a pair of Watkins Woofers in each channel, delivering a claimed flat bass response down to 23 Hz. The woofer cones are made of polypropylene (instead of the more usual

paper) which are said to provide dramatically less mass with a greater degree of internal damping. Infinity also takes a novel approach to the reproduction of higher frequencies. Both the tweeters and midrange drivers are "electromagnetic induction" types, in which the voice coil is actually etched onto the low mass plastic diaphragm and appear, to the eye at least, to be small individual electrostatic drivers. If the price of the 4.5 still seems too high, Infinity makes no less than five other models which include the Watkins Woofer and EMIT and EMIM tweeters and midrange drivers (albeit with fewer drivers per speaker and less imposing physical dimensions). Their newest, and lowest priced model costs only \$175.00 each. It uses a five-inch Watkins Woofer and a single EMIT tweeter. This model, called the "In-finitesimal," measures 11x6½x8 inches.

The proof of the proverbial pudding with these and other speaker innovations is, of course, in the way your ears perceive the overall sound produced by the speaker. When speakers are placed in your home environment, the sonic subtleties offered by the speakers you've chosen become part of your day-to-day life. With just a touch of foresight and good judgement, you can trust your own ears to tell you which design innovations *do something* for you. Pay attention to what your ears are telling you, and you'll be all set. ▲

METAL TAPE

(Continued from page 45)

tapes are similar to each other and also, to non-metal chrome-bias TDK-SA, one of the best tapes of any type, but a non-metal formulation. The signal-to-noise ratios are limited more by the recorder electronics than by the tape. What's left for analysis is output level (for Dolby tracking adjustments) and frequency response and this is where the hassle starts over standards. If you look back at Figs. 2 through 5 you'll see that there isn't enough variation in output level (referred to a constant input) to rate anything beyond a mere mention. This leaves us with frequency response. Frequency response has always been the criterion that really separates the different tapes and tape types from each other. Historically this holds true going all the way back to the introduction of the cassette system.

Metal Tape Frequency Response. The AIWA machine was specifically adjusted with 3M's Metafine tape as the reference tape, so we expected that the Fuji and TDK metal tapes wouldn't perform quite so well. But look at the 0-VU record level frequency curves of all three tapes shown in Fig. 6. The two that virtually overlap are the Fuji

and TDK tapes; looking at Fig. 6 one would be tempted to bet they are the same tape. The third curve, with slightly less high frequency response, is 3M's Metafine, which 3M acknowledges has specs that are about 2 dB less output at 15,000 Hz than TDK. (Actually we measured 3.5 dB but that's normal tape variation.) This is an insignificant difference, the type that could be tweaked out in the next production run if necessary.

Somehow, when we compare frequency response, distortion, output level, and signal-to-noise ratio between three metal tapes there isn't a difference worthy of mention.

A Word About Packaging. The 3M and Fuji metal tapes are packaged in the usual plastic enclosure. The TDK enclosure has a cast aluminum frame and overall construction more representative of a computer data cassette than of an audio cassette. It is designed to be more resistant to deformations that can be caused when a cassette is stored in a vehicle baking in the sun. While this can be of significant value, it has nothing to do with metal tape itself.

Before closing we should take a look at one other aspect of using metal tape. If all you want to do is to playback a recording that's been made on metal tape, any cassette machine—even a conventional pre-metal-tape-era recorder can handle the playback. If, however, you want to record and erase as well as play back recordings, you'll have to be sure that the machine you plan to use performs well in all these areas.

If you try to make a metal tape recording on a conventional cassette deck, using the chrome-bias and equalization, on playback your results will be akin to those shown in Fig. 7. Note the rising high frequency characteristic, with a peak of 8 dB at 12,000 Hz.

Many of the recently introduced cassette recorders are *metal-capable* or *metal-compatible* (the terms seem to be used interchangeably). The crucial question to ask your dealer is, "Can this machine record properly and erase a previous recording properly when using metal tape?" At the very least, a machine you plan to use with metal tape should have a separate bias/EQ position that you can select when using metal tape. ▲

triate, drummer Kenny Clarke, and the French bassist Pierre Michelot in a trio. But in 1963, Powell contracted tuberculosis; on partial recovery, he sought to recoup with a "comeback" trip to the United States. Within months of his return in August of 1964, Powell's wildly varying but usually unsatisfying performances combined with erratic offstage behavior and thereafter he worked only rarely until his death in August 1966.

Powell's career on records began with Cootie Williams. *Cootie Williams: Sextet and Orchestra* (Phoenix) covers most of his work during 1944; and considerable amount of maturity is still looking here. A somewhat over decorative flourish, predominates the early recording sessions, but "Blue Garden Blues," recorded towards the latter part of 1944 is quite recognizable as the Powell of later years.

In 1946, Powell began to record in small-group settings with bop musician Dexter Gordon, who led the sessions that make up *Long Tall Dexter* (Savoy), a two-record set with Powell appearing on most of one side along with a rhythm duo he would use often during his early career: bassist Curley Russell and drummer Max Roach. Other Powell sideman-appearances from 1946 included selections on *Sarah Vaughan* (Archive of Folk and Jazz) and *Mad Be Bop* (Savoy) under trombonist J.J. Johnson's leadership, again with Roach.

Most of Powell's earliest recordings were done with a co-operative band that grew and shrank in size. The group was best known as The Be-Bop Boys, and the album of the same name was recorded on the Savoy label. This two-record set features the core of the Be-Bop Boys group through most of its length—Powell, saxophonist Sonny Stitt, trumpeter Kenny Dorham, bassist Al Hall, and drummer Kenny Clarke. Some selections on the album by trumpeter Fats Navarro *Fat Girl* (Savoy), featured essentially the same group. (Several of these selections "fade" down and up again in mid-track, since they were originally issued as

two-sided 78 RPM discs; still, "Webb City," one of these erstwhile extra-length 78s, has one of the best early Powell solos.)

1947 brought Powell's first recording as leader of a trio, accompanied by Russell and Roach; unfortunately this session, originally issued on Roost and currently owned by Roulette, has been out of print for nearly two decades, with the exception of a single track, "Somebody Loves Me" on *The Smithsonian Collection of Classic Jazz* (Smithsonian Collection).

Powell's only studio recordings with Charlie Parker (along with Roach and Miles Davis) are collected complete in *The Savoy Sessions* (Savoy) under Parker's name. The originally issued takes from this essential session appear on *Master Takes* (Savoy); alternates are on *Encores* (Savoy). Though his meeting with Parker found Powell at the height of his powers, he did not record again for two years. The four years that followed (1949-1953) produced most of his finest work. *The Genius of Bud Powell* (Verve) is certainly the best compilation from these years, comprising three trio sessions from 1949 and 1950 (two with Roach) and a fascinating set of solo piano from 1951.

Valuable though the Verve set is, it does not touch upon Powell's work with the major horn soloists who were in many ways his peers. The two separately available volumes of *The Amazing Bud Powell* (Blue Note) combine trio and solo selections with a 1949 quintet date with Fats Navarro and a very young Sonny Rollins; these quintet pieces also appear on Navarro's *Prime Source* (Blue Note). Equally worth hearing are 1949-1950 quartet sessions with saxophonist Sonny Stitt, duplicated on *Bud's Blues* (Prestige) and the two-record *Genesis* (Prestige).

Also in this vein, but in some ways more remarkable, are two live sessions recently released under Charlie Parker's name. On the two-record *One Night in Birdland* (Columbia), Powell and Parker are joined by Fats Navarro in several

brilliant extended performances from 1950; and half of *Summit Meeting* at Birdland presents a 1951 Parker-Powell-Dizzy Gillespie pickup group, with a Parker quartet session on its flip side.

The Parker-Gillespie-Powell "summit" reconvened on *The Greatest Jazz Concert Ever* (Prestige) in 1953. Half of this two-record set is by the full quintet, while half presents Powell alone with Charles Mingus and Max Roach. The trio disc is also available as *The Bud Powell Trio* (Fantasy). From the same period, a recently out-of-print live Powell trio date on the ESP-Disk label is worth the search required to find it.

The haunting introspection of some of the late trios on *The Amazing Bud Powell* foreshadowed the severely flawed Powell of 1954-1958. *The Genius of Bud Powell Volume Two* (Verve) selects from these years, when the pianist's often sloppy execution served a new range of interpretation that stretched from the "typical" Powell style through a Monkish spareness to a seemingly perverse banality. Several of these pieces are duplicated on *Masters of the Modern Piano* (Verve), which also has collector's-item treasures by Cecil Taylor, Bill Evans, Mary Lou Williams, Wynton Kelly, and Paul Bley. *Strictly Powell* and *Swingin' with Bud* (both French RCA) from 1956 and 1957 are the nadir of Powell's studio work, for completist collectors only.

In Europe, Powell recorded most often at the head of a trio. All of these records are out of print—as is the single record he made on returning to the U.S.—and in no case is the loss to the listener very great. The pianist was summoned to his best efforts in these years by other soloists: Coleman Hawkins on the out-of-print *Essen Jazz Festival All Stars* (Fantasy), Lee Morgan and Wayne Shorter on Art Blakey's out-of-print *Paris Concert* (Epic), Don Byas on the oddly named *A Tribute to Cannonball* (Columbia), and Dexter Gordon on *Our Man in Paris* (Blue Note). ▲

OPERA: REGINE CRESPIN

(Continued from page 30)

cause she could shape a line only so far. At the crucial moment of the high note—say the high C in "O patria mia" in *Aida*—she would blast and break the line. This problem became more acute as the years went on, but it was present when she made her Metropolitan Opera debut, in 1962.

For Miss Crespin's debut in New York, Rudolf Bing had asked Lotte

Lehmann to come back to the Met to coach Miss Crespin for Marschallin in *Der Rosenkavalier*. Though stories have always abounded that Miss Lehmann actually did very little, the public believed that what they saw onstage was inspired by Miss Lehmann, the most famous Marshallin of all time. From that first performance on, however, thanks to interviews, the way her

backstage presence was perceived, and to some degree to her handling of her curtain calls, opera fans began to appreciate the fact that Miss Crespin has another quality, rare and precious in opera. She is a real prima donna, not a woman whom one ever expects to see casually ensconced *en famille*. Wherever she lives, there are flowers, attendants, champagne, all the perquisites of

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theatrical elegance.

This does not mean that her career has been easy. In the first six or seven years in the '60s, all went swimmingly. She moved from the lighter Wagner roles to the major dramatic parts. Her appearances at Bayreuth were extremely successful, and when Herbert Von Karajan set out to make his *Ring* in the Salzburg Easter Festival, he chose Miss Crespin as his Brünnhilde in *Die Walküre*, deliberately and spectacularly passing over Birgit Nilsson. As was often the case with Maestro von Karajan, however, his desires for a sound and his concept of how a part could be sung did not coincide with the singer's capacities. Miss Crespin recorded the role, then sang the young Walküre in Salzburg and a few times in New York, but the strain of the role ate up her voice. And the problem with the high notes became more and more severe. In the late 60s and early 70s she had a severe vocal crisis, all too obvious in some performances in New York of Santuzza and of Giulietta in Offenbach's *Les Contes d'Hoffmann*. She had a wobble and often lost the pitch when she moved anywhere near the top of the staff.

Vocal problems almost always happen to great artists at sometime, however, and Miss Crespin withdrew and studied, coming back in the mid-70s singing mezzo-soprano roles. She is not now any more of a mezzo than before, because the basically warm and rich color of her voice is absolutely a soprano. But she found unknown subtlety and vocal strength in the middle and low register and decided to eschew those roles that move high above the staff. In the years since 1975 she has scored signal triumphs in recital, as Carmen at the Met and also as the Old Prioress in Poulenc's *Dialogues of the Carmelites*. Ever indomitable, her presence enlivens the stage whenever she sets foot upon it.

In this later lower-voiced investiture, listeners have a had a chance to hear more of her French singing and this has been a delight. On records her Carmen exists on RCA (70900/2) and though it is handicapped by the less than brilliant conducting of Alain Lombard, is quite a performance. One can hear the suggestiveness in the Seguidilla, the abandon of the Gypsy Song and the irony in the Card Scene. Miss Crespin's death scene in *Carmen* has changed dramatically since she first sang it four years ago in New York; on records it is very much the dramatic soprano and an exciting aural experience.

Another valuable side of the artist captured in the last few years is her mastery of the operetta genre. Columbia has given us *La Grande-Duchesse*

de Gérolstein (M2-34576) while Angel has offered a rich harvest, *La Vie Parisienne* (SX-3839) and RCA, my own favorite, has *La Perichole* (FRL2-5994). On each record she is funny, sexy and completely in musical control of the French master's subtlety. There is never a moment when she moves outside the form and becomes coarse or lacking in taste. Another disc—not a complete opera—gives much pleasure as well—London Records offers a highlight dis (26248) of Miss Crespin as an artist of the French operetta. The record includes other composers besides Offenbach.

One of the soprano's greatest successes was as Dido in the heavily truncated version of Berlioz' *Les Troyens* at San Francisco. Part of her interpretation with its honeyed sound complete and in rare estate can be heard on Seraphim (S-60263). Others since have made a great success with this marvelous music, but Miss Crespin had a hand in making it popular in the United States.

Of her earlier career she made a recording just before her vocal crisis that stands as one of her best: the Marschallin in a *Der Rosenkavalier* with Sir Georg Solti conducting (London 1435). It is a testament not only to her comprehension of the part but of what she might have received from Miss Lehmann. Miss Crespin, incidentally, never sounds on this recording as though she has planned her emotional outpouring; it is natural and she is from first note to last a real aristocrat, not a singer trying to play a Countess. On this recording, too, there is no blasting on the high B of the Trio, a virtue of recording technique.

Her Wagner recordings are amazingly successful if not too instructive about the real state of her voice. Her young Brünnhilde on Karajan's *Ring* (DG 2713002) sounds easy, but the performance's anemia affects one's enjoyment of it. When the maestro moved on to *Siegfried* and *Götterdämmerung* (with other sopranos) he was much more "Wagnerian." In *Die Walküre* his chamber approach to Wagner was in full flower, and the music often sounds dull.

Miss Crespin is also represented in one of the best of her Wagner roles: Sieglinde. This is the Solti *Ring* performance of *Die Walküre* (London 1509), and here all that was greatest in her Wagner can be heard. The marvelous sweetness of the voice, the power, the range, the expressivity, the command of the text make her Sieglinde rank with the finest of our era. A formidable voice, a larger-than-life presence, a real opera singer—that is Regine Crespin. And, gratefully, her essence is preserved faithfully on record. ▲

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Audio Muting—For reduction of loudness by as much as 20 dB at the flick of a switch. Provides instantaneous change in volume to answer a phone call or the ring of the doorbell without altering basic volume setting.

Balance—Permits adjusting individual channel sound levels to compensate for unbalanced program material, acoustical conditions, etc.

Bass—Permits emphasizing or deemphasizing the lower end of the frequency spectrum to tailor the sound to your personal tastes.

Equalizer, Graphic or Parametric—Permits adjustment of various frequency ranges for more precise tonal control. Graphic equalizers utilize slide controls at five or more fixed frequency ranges; parametric equalizers allow you to select which frequency range you want to adjust.

Headphone Jack—Gives you the option of personal, private listening via stereo headphones. When headphones are connected to the jack, speakers are silenced on most receivers.

High Filter—Reduces record scratch, tape and FM hiss, yielding improved overall sound clarity.

Loudness Compensation—Allows balanced, natural-sounding hi-fi listening at normal or low volume levels by automatically boosting bass (and sometimes treble) response.

Low or Subsonic Filter—Reduces the effects of turntable rumble, vibrations, extraneous noise.

Midrange Tone Control—Permits adjustment of those frequencies in the middle of the audible frequency range to emphasize or de-emphasize vocal music or to create a more "forward" kind of response.

Mode Switch or Function Selector—Often a single rotary control that selects a receiver's mode of operation: FM, AM, phono, tape, etc. Sometimes these functions are controlled by individual switches or push-buttons.

Mono/Stereo—Permits single or double channel listening. Mono position effects combination of right and left stereo channels, which sometimes can improve the sound quality of weak FM reception.

Output Level Meter—An indicator in meter, LED or fluorescent form, that indicates power output peaks during receiver operation. Some offer individual channel readouts, some a combined readout.

Power—For turning receiver on and off.

Selectable Frequency Turnover—Allows adjustment of response at bass and treble frequency extremes with no effect on the midrange frequencies.

Speaker Selector—Enables switching from one pair of speakers to another, to a position that combines both pairs and/or to a headphone setting.

Tape Dubbing or Dual Tape Monitor—Permits a tape being played on one deck connected to the receiver to be dubbed (copied) on a second deck that is also connected to the receiver.

Tape Monitor—Allows listening to program material as it's being recorded. Also allows monitoring from a tape as it is being recorded via a three-head machine, which permits adjustment of recorder controls for optimum results.

Treble Tone Control—For emphasis/de-emphasis of higher end of the frequency range.

Volume Control—For raising or lowering sound levels.

TUNER SECTION

Automatic Tuning/Scanning—Tuning or scanning of station frequencies via a motor-driven system that moves to the next available station, pauses, then moves to the next available station, pauses, then moves on to the next, until the desired station is located and locked in.

Center Channel Tuning Meter—Indicates best reception when pointer registers at the center of the meter scale.

Digital Readout—Station frequency indication via lighted numerals, most often in conjunction with a quartz crystal oscillator that generates a reference frequency.

Multipath Meter—Indicates multipath distortion, to suggest repositioning of the rotatable FM antenna, if used.

Quartz-locked Tuning—A circuit that "locks in" with utmost precision to a station frequency in conjunction with a quartz crystal oscillator that generates a reference frequency.

Signal Strength Meter—Displays strongest reception point on the dial when tuning in FM stations.

Station Pre-Select—Permits setting of favorite AM and/or FM stations for instant recall at the press of a button or switch.

Tuning Knob—Rotates tuning capacitor to various station frequencies to "bring in" the stations you want to hear.

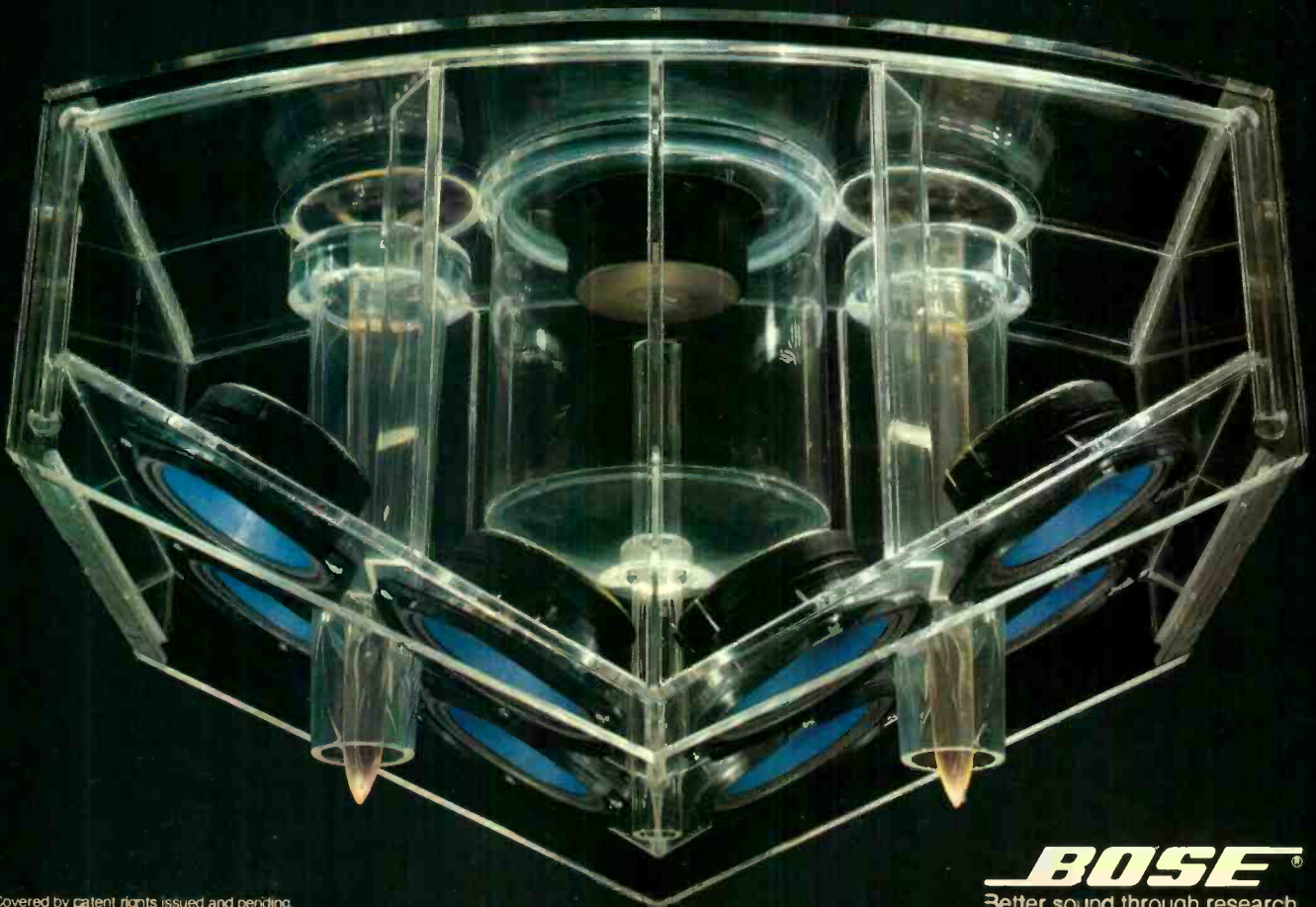
25 Microsecond Dolby Deemphasis (25 μ S Dolby)—For proper decoding of Dolbyized FM broadcasts in conjunction with an external Dolby adaptor.

The Bose® 901® – past, present, future.

Past The first Bose 901 Direct/Reflecting® speaker was introduced in 1968. It was the result of research started twelve years before at M.I.T. under the direction of Dr. Bose. This speaker introduced the fundamental advances of a balance of reflected and direct sound, nine matched, full-range speakers, active equalization and uniform power response — all very controversial concepts at the time. But the performance produced by this new technology soon earned for the 901 speaker its international reputation as the most highly reviewed loudspeaker regardless of size or price.

Present The founders of Bose, all from the field of science, decided that Bose would reinvest 100% of its profits back into the company to maintain the research that was responsible for the birth of the 901 loudspeaker. The unprecedented success of the Bose® 901® in world markets, coupled with this 100% reinvestment policy, has created what we believe is by far the best research team in the industry. This team has made over 300 design improvements in the 901 speaker since its introduction — including such basic developments as the Acoustic Matrix™ Enclosure (illustrated), the helical, low impedance voice coil and the advanced full-range precision drivers. And the new concept of controlling the spatial properties of the 901 speaker has just been introduced via the unique Bose Spatial Control™ Receiver.

Future At Bose we have decided that “901” will continue to be the designation of the product that represents the state-of-the-art of our technology — whatever size, shape or form that product may take. In our research we continue to look at any and all technologies and product concepts that might hold possibilities for better sound reproduction. Consistent with the past, we will introduce new technology into the 901 speaker as it is developed — often without announcement. This is our dedication to the goal that whenever you invest in the Bose® 901® system you will receive the latest technology and the best in music reproduction.



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BOSE®
Better sound through research.

Technics

It's simple. Just get into Technics SU-8011 stereo amplifier, ST-8011 AM/FM stereo tuner and SH-8010 stereo frequency equalizer. You'll get a lot of performance out of them, without pouring a lot of money into them.

Try our SU-8011 amplifier on for size. You'll get a lot more than *25 watts RMS per channel, into 8 ohms from 20 Hz to 20 kHz, with no more than 0.08% total harmonic distortion*. A lot more. Like 13,600 microfarads worth of high-capacitance filtering for plenty of reserve power. Like a two-stage, direct-coupled phono equalizer with the kind of S/N ratio (80 dB) that doesn't know the meaning of noise. And 11 fast-acting LED peak-power indicators that let your eyes share the performance your ears hear.

With our ST-8011 AM/FM stereo tuner, your eyes get in on the action, too. Take its tuning indicator for example. It not only tells you what station you're tuned to, it also tells you how well you're receiving it. Two green LED's indicate ideal signal strength, while one LED tells you the stereo quieting level is at least 50 dB. You also get a frequency response of 20 Hz to 15 kHz (+1, -2 dB) and a 50 dB stereo quieting sensitivity of 38.6 dBf.

But whether you're listening to your favorite station or your favorite records, our SH-8010 stereo frequency equalizer will let you make the most of each. By dividing the audio range into 5 bands with each center frequency set 1.6 octaves apart, you can tailor the sound to match your speakers, your room and your own taste. You can also add tops to the highs, bottoms to the lows, or vice versa, by as much as 12 dB.

Technics SU-8011 amp, ST-8011 tuner and SH-8010 equalizer. It's as easy to get into their performance as it is to keep out of debt.

How to get into the performance of separates without getting into debt.



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