

Facts on
AMPLIFIERS

SEPTEMBER-OCTOBER 1978 \$1.35

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hi-fi stereo

BUYERS' GUIDE

AMPLIFIER ACQUIRERS

HERE'S HOW TO MAKE A WISE BUY

DECODING THE
BUZZWORDS

WHAT TO EXPECT IN
SPECS

WIDE WORLD OF
**PRODUCTS &
PRICES**

**FALL
FORECAST**

THE
DATA OF
PRODUCTS
KERS
D
RTS
SPEAKER
EVALUATIONS

FDM02FPLE1380--E-0 01 110SEP78*

KERS

RTS

**SPEAKER
EVALUATIONS**



DIRECT-TO-DISC DIRECTORY

A DAVIS PUBLICATION

Select what you want in a record cleaner.

Convenience in use and storage.

You shouldn't need a separate shelf, elaborate motions or an act of Congress to clean your records. A comfortable, hand-held instrument that works best on a rotating turntable is ideal.

Effectiveness against micro-dust.

Tiny, invisible dust particles hide in delicate record grooves and can be ground into the vinyl. Only a slanted (directional) fiber using special ultra-small fiber tips can scoop up, rather than rearrange, this micro-dust contamination.

Effectiveness against chemical contamination.

Fingerprints and vapor-borne oils will deposit into channels of a record groove. Such contamination hides from adhesive rollers and all dry cleaning systems. Only a special fluid plus micro-fibers can safely remove such audible, impacted deposits.

Total removal of contamination/fluid.

Capillary action—the lifting of fluid by small fiber surface tension—is totally effective. You want to get contamination off the record, along with any fluid traces.

Lasting construction.

You want quality. A record cleaner can last a lifetime. A plastic wonder can crack into oblivion—or you can purchase the hand-rubbed elegance of milled walnut befitting the rest of your audio system.

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The value of a truly fine record cleaner is justified by the cost of replacing your record collection. Fifteen dollars is a small investment in long-term protection.

All of the above.

**DISCWASHER, the Superior
Record Cleaner.**

See the finer audio dealers for a demonstration.



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

real to reel...



sounds best on ReVox B77

Real to reel means live performance recording, and that's where the ReVox B77 dramatically demonstrates its superiority over other tape recorders. Only the B77 has the wide dynamic range and generous record headroom you need to capture without compromise the full detail and dimension of live music.

Only the B77 delivers the "ruler-flat" frequency response you get from Willi Studer's legendary head design. Only the B77 combines the convenience of push-button digital logic control of tape motion, professional VU meters with built-in peak level indicators, and a self-contained tape cutter/splicer.

If you're thinking of upgrading your real to reel performance, try the ReVox B77. It's available in half or quarter track, 3 $\frac{3}{4}$ -7 $\frac{1}{2}$ or 7 $\frac{1}{2}$ -15 IPS. For complete information and list of demonstrating dealers, circle reader service number or contact us at the address shown below.

REVOX

hi-fi/stereo

BUYERS' GUIDE



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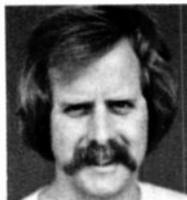
Cover Photo by Neal Slavin

Cover Components:

Nikko Beta II Preamp/ifier

Nikko Alpha II Power Amplifier

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“ About the only thing I have that's better than a Koss Pro/4 Triple A are some extremely expensive electrostatics. ”

David Driskell
Audio Salesman
Los Angeles, California



“ I think the Pro/4 Triple A sounds really similar to an electrostatic headphone, very crisp, very good in the midrange and the highs, yet very dynamic and full in the bass. ”

There are few stereophones of any kind that can match the full-bandwidth sound of the new Pro/4 Triple A. That's because the Triple A's oversized voice coil and extra large diaphragm reproduce recorded material with a life-like intensity and minimal distortion never before available with dynamic stereophones.

“ If there's any clipping, it's in your amp. ”

With a frequency response from 10Hz to 22KHz, a highly efficient element and a perfect seal for low bass response to below audibility, the new Triple A lets every note blossom to its fullest

harmonic growth. You'll hear so much more of your favorite music you'll think you're listening to a whole new record.

“ The pneumatic ear-cushions do three things; they're a lot more comfortable, they eliminate listening fatigue, and they develop a deep, clean bass response. ”

What more can we say except that the unique dual suspension headband makes the Triple A one of

the most perfectly fitting, perfectly comfortable stereophones you'll ever slip on.

“ I talk a lot about the private listening experience. Especially with couples where she wants to watch a TV program and he wants to listen to Bach. They can be together and still do their own thing. ”

One of the beautiful things about the Sound of Koss stereophones is that

you can listen to your favorite music at any volume without disturbing anyone else. And that's beautiful.

“ The workmanship of the Triple A is beautiful. Even the inside which most of my customers never see is very machined, very precision made. ”

Why not stop by your audio dealer and take a good, long look at the new Koss Pro/4 Triple A. And while you're there listen to the Koss CM line of loudspeakers. They're in a class by themselves, too. Or write c/o Virginia Lamm for our free full-color catalogue. Better yet, listen to a live demonstration of the Sound of Koss with your own favorite record or tape. We think you'll agree with David, that when it comes to the Pro/4 Triple A, and other Koss stereophones and speakers: hearing is believing.

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KOSS® stereophones/loudspeakers
hearing is believing™

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

Bi-Polar FET Preamp

Dynaco's model 2510 preamplifier is said to provide "exceptional" frequency response of 10 Hz to 60,000 Hz $\pm .5$ dB, 2V out. The unit has considerable built-in flexibility as well, including precision detent-action volume, bass and treble controls; volume has 32 detents while bass and treble each have 21 positions. Accuracy, transparency and high definition of sound reproduction are in part attributed to use of solid tantalum capacitors in audio circuits and close-tolerance mica and polycarbonate capacitors in the phono equalization network. An audio relay at turn-on/turn-off eliminates potential noises and thumps while a speaker control can safely switch any power amplifier up to 200 watts per



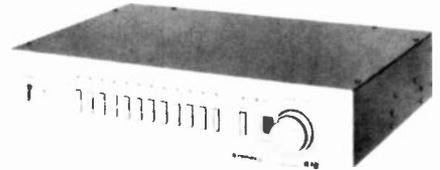
Circle No. 37 On Reader Service Card

channel at full power. Other specifications: gain, selectable 37 or 43 dB, ref. 1 kHz; signal/noise ratio, 85 dB below a 10 mV input; input impedance, 47 k ohms; output impedance, 100 ohms nominal; THD, 0.005%, 20 to 20,000 Hz, 2V out; IM distortion, 0.002%, 2V out; gain in the high level/tone section, 20 dB. Price: \$499.

TV Sound Tuner

TV listening as well as TV watching can be rewarding if you use Pioneer's TV tuner component to upgrade that "pretty awful" normal sound to hi-fi levels. According to the company, the TVX-9500 tuner will enable you to "hear a gunshot that is a gunshot, a whip that cracks like a whip," and presumably music that sounds like something created with musical instruments. The unit can receive all current TV broadcasts, including VHF channels 2 through 13 and UHF channels 14 through 83. Soft-touch switches are used for these channels to activate the

electronic station tuning system. A muting circuit automatically eliminates hiss when a no-broadcast channel is selected. Some of the same circuitry used in high end FM tuners is employed to achieve a signal-to-noise ratio of



Circle No. 85 On Reader Service Card

65 dB at 85 dBf while at the same time achieving much the same high quality sound heard in FM radio broadcasts, according to Pioneer. Frequency response is put at 50 to 10,000 Hz (+0.5 dB, -1.0dB) with distortion below 0.1%. The capture ratio is 1.0 dB. The TVX-9500, priced at \$250, can be connected to the tape monitor, auxiliary or tuner input of any receiver or amplifier.

Car Speaker System

Advent's EQ-1 car stereo speaker system is powered and frequency-equalized "to sound right in a car" according to the company. The unit includes two full-range 6-by-9-inch loudspeaker drivers with integral power amplifiers, and may be used with any car radio or tape sound source. Separate inputs are provided for operation with an existing system's speaker outputs, or the line-level outputs of component-type tape decks. A remote power on/off switch, wiring, hardware, and grilles are included in the \$180 retail price. The EQ-1 is designed for rear package



shelf placement so that the car trunk serves as a large acoustic-suspension speaker enclosure for extended bass response that includes the lowest musical octave.

TDK Super Avilyn Video Tape

TDK, already a major supplier of video tape to home video cassette deck manufacturers who sell it under their



1½" Mylar® dome tweeter for extrawide 170° high frequency dispersion.

Two 3½" midranges with individual tuned isolation chambers.

High and mid frequency controls are continuously variable to adjust response to suit any room, program material or individual taste.

Low frequency driver with specially treated polyurethane foam suspension for lower distortion, free cone movement, and smoother response.

An inside look at Jensen's Total Energy Response.

You're looking at the heart of one of the most uniformly accurate sound reproducers made today. A Jensen Lifestyle Speaker.

Unlike many speakers that require special on-axis listening positions—or others that bounce the sound all over your room—Lifestyle is engineered to deliver a wide spectrum of musical information throughout the listening area. In proper perspective. With all the depth and imaging your source material is

capable of. And at real-life volume levels. That's what Total Energy Response is all about.

In fact, for perfectly integrated speaker systems and total quality control, we make every element that

JENSEN

LIFESTYLE SPEAKER SYSTEMS

Division of Pemcor, Inc.
Schiller Park, Illinois 60176

goes into the manufacture of our Lifestyle speakers. From the heavy duty magnets to our handwound, high power voice coils. Even the computer-designed crossover network. And of course, all of our precision woofers, midrange drivers and 170° dispersion dome tweeters.

But please, give a critical listen to these speakers in person. We think you'll agree, a notably superior design concept has resulted in audibly superior sound reproduction.



Circle No. 20 On Reader Service Card

In the Black II



Performance, beauty, quality — three attributes that have always been the hallmarks of SAE products. SAE systems in the past have had them, this system's predecessor had them, and the new In The Black system has them and much more.

The 2900 Parametric Preamplifier offers our new flexible parametric tone control system, full dubbing and tape EQ. New phono and line circuitry results in unparalleled clarity and definition with distortion of less than 0.01% THD & IM.

The 2200 Stereo Power Amplifier with fully complementary circuitry delivers 100 Watts RMS per channel from 20-20K into 8 ohms; at less than 0.05% Total Harmonic Distortion, from 250mW to full rated power.

The 8000 Digital FM Tuner has linear phase filters, phase-lock multiplex, and of course, our famous digital readout tuning indicator system.

Combine these products together and you have a system that ensures superior performance in all areas, excellent control flexibility, and the sonic quality that is typically SAE.

For Complete Information Write:

SAE

Scientific Audio Electronics, Inc.
P.O. Box 60271 Terminal Annex, Los Angeles, CA 90060

Circle No. 14 On Reader Service Card

AUDIO SHOWCASE

own brand names, now offers TDK Super Avilyn video tape directly to consumers. The company claims that this is the only video tape which is quality-approved for use in four-hour capability VHS machines. The suggested retail value for model VA-T60 two-hour cassette (that plays one hour at

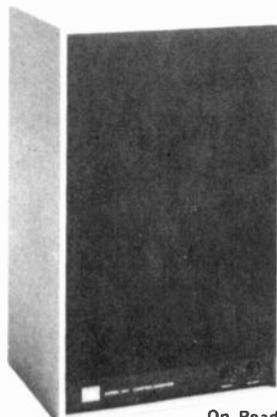


Circle No. 107 On Reader Service Card

standard speed) is priced at \$27.95. The company claims that the image quality in recording is "crisp, with color-fast stability and excellent color resolution." Other claims include: low headwear and low oxide shedding or tape stretching. The tape is fully compatible with all VHS format machines including two-hour units from JVC, Hitachi and soon from Akai and MGA; it can also be used on machines with short and long play options for two- and four-hour recording, made by RCA, Panasonic, Quasar, Sylvania, Magnavox, Curtis Mathes and an upcoming unit by GE.

Professional Hi-Fi Monitor

JBL's model 4311 professional control monitor, the acoustical counterpart of the recently-discontinued L100 loudspeaker system, retails for \$327. The



Circle No. 73
On Reader Service Card

4311 has a 12-inch woofer, a five-inch midrange and a 1.4-inch tweeter in a textured grey or oiled walnut enclo-

sure. Specifications: Power capacity 75 watts RMS continuous power; frequency response, 45 to 15,000 Hz \pm 3 dB; distortion, less than 1% third harmonic generation from 100 to 15,000 Hz; sensitivity, 91 dB, 1 watt, 1 meter and 42 dB, 1 mW, 30 feet.

"World's Smallest" Car Receivers

Jensen Sound Laboratories offers six AM/FM receivers for in-dash installation in cars by those who want to "bridge the gap" between home and car electronics. The line includes three cassette and three 8-track models ranging in price from \$299.95 to \$469.95. The top-of-the-line cassette model, R430, provides 60 watts RMS output. It has a separate high-power amplifier with bi-amplified audio output and incorporates Dolby "B" noise reduction circuitry, independent bass and treble controls with loudness compensation, and interstation muting. Electronic



Circle No. 104 On Reader Service Card

micro switches with solid state memory and logic permit precise feature control. This unit is priced at \$469.95. The tape decks incorporate electronically controlled motors with belt drives and hard permalloy tape heads. The cassette has an auto stop system with tape "run" and "end-of-tape" lights. There's also an automatic tape alarm that reminds you to remove the cartridge or cassette to prevent damage to pinch roller and capstan. Specs: frequency response, 30-18,000 Hz; FM stereo separation, 30 dB; capture ratio, 1.5 dB; signal-to-noise ratio, 73 dB with Dolby; total harmonic distortion less than 1.0% at 1 kHz.

SAE Cassette Deck

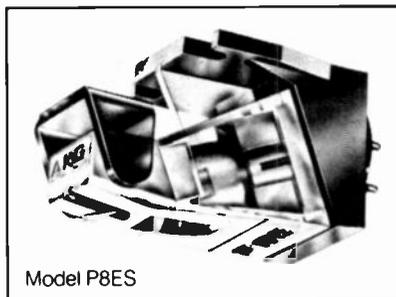
Scientific Audio Electronics (SAE) offers the C3D Cassette Deck, one of the premier models in a new line of



Circle No. 88 On Reader Service Card

moderately-priced "SAE Two" audio products. It features solenoid operation and full logic control to assure the "utmost in tape protection." Guaranteed: extended flat frequency response

Sooner or later
one of the remarkable
AKG TS* Phonocartridges
will end your search
for the pick-up system
that most perfectly
re-creates the sound
your recordings were
originally made from.



Model P8ES

**Why put it off?
Hear one at your dealer today.**

The following AKG Phonocartridges
are available to meet a range of budgets
and sound systems

Models P8ES, P8E, P7E, P6E and P6R



*The Mark of
Professional Quality...
in microphones, headphones,
phonocartridges, reverb units.*

*Transversal Suspension System
U.S. Patent No. 4054758

PHILIPS AUDIO VIDEO SYSTEMS CORP.
A NORTH AMERICAN PHILIPS COMPANY
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AC DIRECT DRIVE
The best of both worlds: smoothness of belts, accuracy of direct drive.

AC Direct Drive is an exclusive DENON system that senses the moving platter with a tape-recorder head.

The actual platter speed is then clocked and made perfect—with a smooth-running AC motor.

Advantages?

No DC motor pulsing. No heavy flywheel platter needed for motor smoothing. (A lighter platter means faster starts and quicker response to speed correction as well as less wear on bearings). No cartridge sensing of tiny motor jerks. No belt to wear out.

AC Direct Drive.

On all DENON turntables from \$298 to \$930.

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Columbia, MO 65201

AUDIO SHOWCASE

of 30 to 16,000 Hz \pm 3 dB with wow and flutter specified at 0.06%. The unit's Dolby noise reduction circuit provides up to 65 dB signal-to-noise ratio. There's a separate tape bias and EQ selector to compensate for low noise, FeCr and CrO₂ tape. A frequency generated servo-controlled motor features auto-stop in all models, and a timer switch permits use with any conventional AC timer. The suggested retail price is \$400.

TEAC Tape Decks

From TEAC, a new four-channel open reel deck and two reversing units as variations of existing two-channel units, plus an improved version of the half-track A-6100 two-channel stereo deck. Model A-3440 is a three-head, three-motor, two-speed (15 and 7½ ips) unit featuring a completely new transport, circuitry and logic boards. This 10-



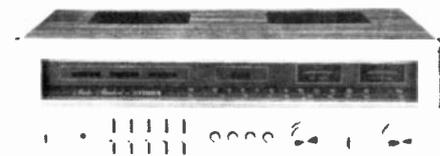
Circle No. 10 On Reader Service Card

inch-reel unit retails for \$1,500. The company's least expensive 10-inch reversing reel model, A-3300SR, sells for \$1,050. It features a rugged three-motor transport system, manual cueing for easy editing, feather-touch control buttons, mic/line mixing, separate bias and equalization switches for any kind of tape, and large VU meters. Wow and flutter is 0.06%, the signal-to-noise ratio is 57 dB, and frequency response is said to be 30 to 22,000 Hz.

Receiver With 5-Band Graphic Equalizer

Fisher's RS2004 "Studio Standard Receiver" featuring a 5-band graphic equalizer is list priced at \$450. For this investment you not only get an equalizer that enables you to "design the music to suit your ears," but also

such additional features as a new "panic logic" control system that permits following the logical sequence of the display to select desired functions. Other features include: three-function control system (phono, tuner, tape); Dolby de-emphasis switch; integrated Darlington power pack output stage; five 11-position detented equalizer controls, 2 dB stepped. Specifications: 45 watts continuous RMS power into

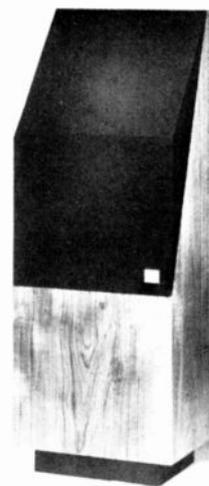


Circle No. 69 On Reader Service Card

8 ohms, from 20 to 20,000 Hz; no more than 0.1% total harmonic distortion; FM sensitivity, 1.9 microvolts (IIF)/10.3 dBf.

Three-way Equalized Speaker System

This Thiel Model 03 loudspeaker is a floor-standing, three-way equalized system said to possess highly accurate phase and amplitude response. Wide range drivers are vertically aligned on a sloping baffle to provide proper offset to correct for time delay distortion over a wide horizontal listening field. The offset drivers, together with 6 dB/octave crossover slopes, produce completely phase coherent (minimum phase) reproduction according to the company. Bass frequencies are produced by an electronically equalized ported system. Although the speaker occupies only one square foot of floor space, the 3 dB down point is 27 Hz and the efficiency is 93 dB/watt-meter. Fundamental tones are produced by a



Circle No. 103 On Reader Service Card

10-inch long-throw woofer. The equalizer provides very deep bass response, and also operates at high frequencies in conjunction with the upwardly-angled one-inch soft dome tweeter to

WOW!

and other comments by stereo critics about Ohm loudspeakers.

Comments about the Ohm C2.

"Surely, all things considered, the design of the OHM C2 represents a fine achievement. With classical music its performance is adequate with something to spare. And with popular music — wow!"

High Fidelity - Nov./1976

Comments about the Ohm F.

"In our simulated live-vs-recorded test it rated A to A+. The sound began to warrant the use of such words as 'awesome'. The low bass, too, was extraordinarily clean and powerful. The Ohm F achieves state-of-the-art performance."

Stereo Review/November 1973

"The Ohm F's are in a class by themselves. The sound is most unusual inasmuch as it is complete, full, natural and transparent. The bass reproduction is clean and perfect."

*Hi-Fi Stereo
(Published in Germany)
October/1974*

"It may well be the finest speaker on the market and is certainly without a doubt among the top few."

The Complete Buyer's Guide to Stereo/Hi-Fi Equipment/1977

Comments about the Ohm H.

"Ohm managed to get prodigious bass response out of a small box without sacrificing efficiency. The high end is handled by conventional drivers and is everything one might ask from a speaker. Dispersion is excellent and the overall sound quality is exemplary."

The Complete Buyer's Guide to Stereo/Hi-Fi Equipment/1977

Comments about the Ohm D2.

"The OHM D2 is designed to provide the identical response as

the C2, sacrificing only the ultra-wide high frequency response of the latter."

The Complete Buyer's Guide to Stereo/Hi-Fi Equipment/1977

Comments about the Ohm L.

"The upper mid-range and high frequencies were virtually perfect."

"In summary, the OHM L . . . is easily good enough to meet the sort of critical standards usually applied to much larger and considerably more expensive speaker systems."

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Comments about the Ohm E.

"Let me assure you, it handles Chopin and pretty well anything else from accordion to zither with equal dexterity. For anyone looking for 'just an ordinary speaker' at a modest cost as Hi-Fi speakers go — this could be it."

Canadian Stereo Guide/Winter 1974



You can get a free 28-page brochure and complete reviews at any Ohm dealer, or by writing us at:
OHM ACOUSTICS CORP., 241 Taffy Place, Brooklyn, N.Y. 11205

Circle No. 9 On Reader Service Card

AUDIO SHOWCASE

provide better high frequency ambience. The overall amplitude response is put at a flat ± 2 dB and the phase response is minimum $\pm 15^\circ$ from 27 to 20,000 Hz. Price per pair including equalizer: \$775.

Two-channel Parametric Equalizer

Sontec's new HF-230 two-channel

Parametric Equalizer for home audio applications utilizes all discrete operational signal amplifiers, instead of integrated circuits, "for truly state-of-the-art low distortion and low noise performance." Total harmonic distortion does not exceed 0.002% from 20 to 20,000 Hz at any level from -30 to



Circle No. 106 On Reader Service Card

+24 dBV, and IM does not exceed 0.002% when measured by the SMPTE method. Noise is 84 dB below a 1 volt output level, and 26 dB of



AM/FM STEREO RECEIVER

RX-203

20 watts per channel, min. RMS, both channels driven into 8 ohms from 20 to 20,000Hz with no more than 0.5% total harmonic distortion.

If you know about ROTEL You know about Hi-Fi

Quality. Uncompromised.

ROTEL

ROTEL OF AMERICA, INC.

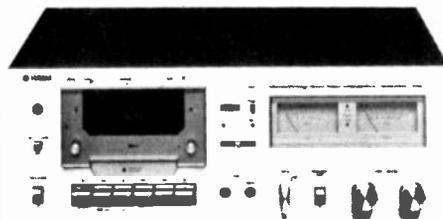
1055 SAW MILL RIVER ROAD, AROSLEY, NEW YORK 10502 (in Canada—NORESCO, Downsview Ontario)

Circle No. 13 On Reader Service Card

headroom below clipping gives the HF-230 on "unprecedented" 110 dB of usable dynamic range. The broad-band electronics have frequency response from DC to well past 1 MHz and are intentionally rolled off beyond 200 kHz at 6 dB/octave. The slew rate is greater than 200 V per microsecond to deliver fully transparent transient response. The HF-230 is basically a single ended RCA phono terminated version of Sontec's professional studio equalizer, and has a suggested retail price of \$900.

Front Loading Cassette Deck

Yamaha's Model TC-520 front loading cassette deck utilizes superhard perm-alloy heads to provide "excellent" sig-

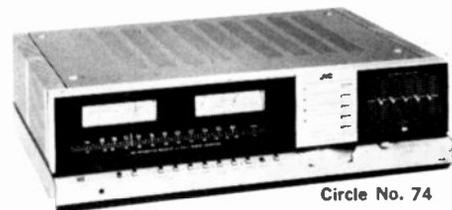


Circle No. 101 On Reader Service Card

nal-to-noise ratio as well as high abrasion resistance. The heart of this tape transport mechanism is a DC motor with high torque and smooth rotation that is unaffected by variations in the tape's holdback tension or changes in frictional resistance, says Yamaha. The exceedingly smooth wow and flutter of less than 0.07% WRMS meets critical listening demands. The unit incorporates a muting switch and special circuitry to avoid unpleasant clicks and thumps when power is applied or shut off to other components. The universal headphone amplifier may be used with headphone impedances from 8 to 600 ohms. There's a bias adjustor on the front panel, as well as a three-position recording bias and record/playback equalizer selector. Specs: frequency response, 30-15,000 Hz with CrO₂ tape; total distortion at 1,000 Hz with CrO₂ tape, less than 1.5%; signal-to-noise ratio, 57 dB; Dolby noise reduction effect, 9 dB (5 kHz). Price of the TC-520 is \$295.

DC Integrated Stereo Receiver

JVC's Model JR-S501 AM/FM stereo receiver incorporates a newly design-



Circle No. 74



Yes, the new Dual 604 is direct drive. Now let's talk about something really important.

You may have noticed that most turntable stories begin and end with the drive system. The tonearm is more or less an afterthought.

But not with Dual. Because the tonearm can make a big difference in how records sound and how long they last. Which is why Dual is very serious about tonearm design and performance. And why we can be very serious about tonearms in our advertising.

Let's consider the 604 tonearm.

The straight-line tubular design provides maximum rigidity with minimum mass. The four-point gimbal centers and pivots the tonearm precisely where the vertical and horizontal axes intersect. And the counterbalance houses two specially-tuned anti-resonance filters that absorb parasitic resonances originating in the tonearm/cartridge system and chassis.

Operation is semi-automatic, with another unique

Dual difference: the mechanical sensor. Switch it in and you feel when the stylus is positioned precisely over the 12" and 7" lead-in grooves. At the end of play, the tonearm lifts and returns to its post, and the motor shuts off. Automatically.

Now let's talk about the drive system. It employs a newly developed DC electronic motor with a highly sensitive CMOS regulator circuit and integral frequency generator. Platter speed is checked against rated speed 120 times per revolution. Wow and flutter are less than 0.03 percent, rumble is better than 70 dB. Well beyond the limits of audibility.

But the important story with any turntable is simply this. The drive system merely turns the record. It's the tonearm that plays it.

Dual 604, semi-automatic, less than \$260. Dual 621, fully automatic plus continuous repeat, less than \$300. Both with base and cover. Actual resale prices are determined individually and at the sole discretion of authorized Dual dealers.



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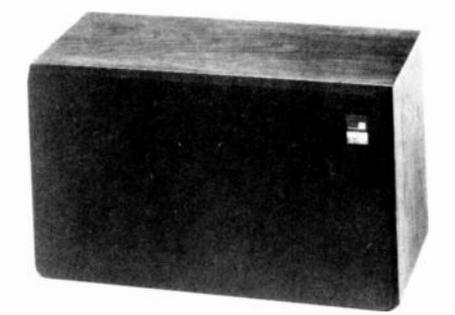
Circle No. 16 On Reader Service Card

AUDIO SHOWCASE

ed DC power amplifier for expanded frequency range and reduced distortion, according to the company. This top-of-the-line model, selling at \$699.95, includes JVC's exclusive built-in five-zone tone-control S.E.A. graphic equalizer, as well as a "unique" S.E.A. recording facility which permits the equalizer section to be switched into the tape recorder circuit for simultaneous equalization while recording. The unit delivers 120 watts per channel of continuous (RMS) power into 8 ohms, from 20 to 20,000 Hz, with no more than 0.03% total harmonic distortion. Other specifications: IM distortion, 0.01% at rated output; damping factor, 70 at 8 ohms; phono signal-to-noise ratio, 75 dB; FM sensitivity (IHF), 10.3 dBf; signal-to-noise ratio, 78 dB (mono) and 70 dB (stereo); alternate channel selectivity, 80 dB; capture ratio, 1.0 dB.

"Computer Maximized" Loudspeaker

This Koss CM/530 bookshelf-size loudspeaker is priced at \$175 and offers a "very flat and smooth" frequency response range from 36 to 17,000 Hz, deep bass, high efficiency, excellent treble dispersion and profes-



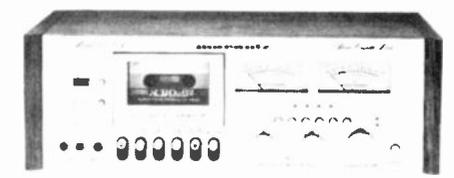
Circle No. 76 On Reader Service Card

sional styling, according to the company. Bass response is claimed to be "deeper" than for any other speaker in its price range, and the speakers are made in mirror-imaged pairs so that sound from both right and left speakers is identical. The system employs a true, third order Butterworth crossover at 3,000 Hz to provide maximally flat response. A critically-damped one-inch silk dome tweeter and an exclusive response-smoothing annular ring provide uniform response from 3,000 Hz to beyond 17,000 Hz with very wide dispersion. Bass response is achieved with a high-power eight-inch driver in conjunction with a matching eight-inch passive radiator. The alignment is a

B 4 at 36 Hz. A three-position treble contour switch permits adaptation of response to room characteristics, source material and personal taste.

Front Load Cassette Deck

Marantz designed this front-load cassette deck to match the company's entire line of separate components. It's priced at \$419.95 as the leader of three decks introduced simultaneously. Model 5030B features a DC servo transport and three-head, full process Dolby noise reduction system, to provide full

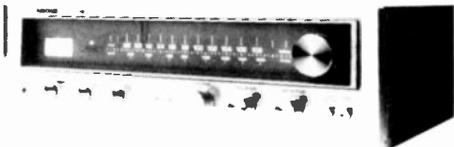


Circle No. 77 On Reader Service Card

capability for tape and source monitoring during the recording process. There's an extra master level/fader control for easier mic and line mixing, and a convenient memory counter to rewind tape to a predetermined spot. Other features include a three-button tape EQ and Bias switch, large extended range VU meters, and a defeatable peak limiter circuit to protect recording from distortion by sudden volume surges, when recording levels are not being personally monitored by the operator.

Nikko Receiver

Nikko's NR-615 receiver delivers 28 watts RMS per channel, both channels driven into 8 ohms, from 20 to 20,000 Hz, with no more than 0.3% total harmonic distortion. FM sensitivity is 2.0 uV, FM selectivity is 75 dB, and stereo separation is 45 dB. Included in the unit's features: direct coupled OCL pure complementary power amplification section and high gain IC's for the equalization amplifier section.



Circle No. 79 On Reader Service Card

They are said to provide extended frequency response and minimal noise and distortion. Price: \$270.

Automotive Delay System

The AD 1060 Concert Machine, by Sound Concepts, is the "world's first automotive time delay system" which is *not* a reverb or an effects synthesizer,

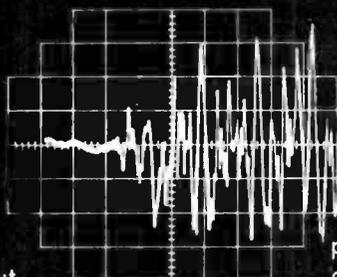
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If you keep up with the latest in hi-fi successes, you already know about Technics Linear Phase Speaker Systems. The Technics speaker systems with waveform fidelity: The ability to reproduce a musical waveform that's virtually a mirror image of the original. Now you can know Technics Linear Phase Speakers for something else: Beautiful simulated walnut wood cabinetry. Introducing the SB-4500A.

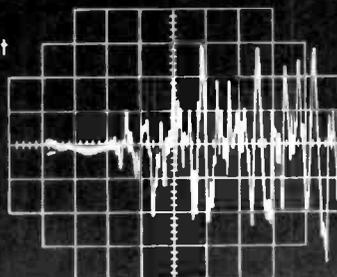
Like our other Linear Phase Speakers, the SB-4500A is capable of achieving not only a wide frequency response, but also flat amplitude and precise linearity.

And if seeing is believing, look at the waveforms. On top is the oscilloscope reading (the fingerprint) of a live piano waveform.

The other, the piano waveform as reproduced by the Technics Linear Phase



Live Piano Waveform.



Piano Waveform reproduced by SB-4500A.

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How did we do it? First by conducting exhaustive amplitude and phase studies in acoustically perfect chambers. Then by developing a unique new phase-controlled crossover network that not only compensates for the time delays caused by different frequencies, but simultaneously corrects any acoustic differences in the drivers. And finally by staggering each driver unit for the optimum acoustic position.

Technics Linear Phase SB-4500A. Your ears will love the way it sounds. Your eyes will love the way it looks.

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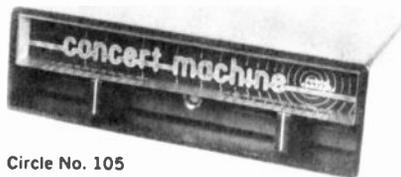
Professional Series

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AUDIO SHOWCASE

according to the company. Instead, it extracts the ambience information from music played through a car radio or tape deck, and distributes it throughout the interior of the automobile to create the illusion of live performance. There are three controls: an on/off switch, rear level and continuously variable delay. The delay control permits selection of a delay setting from 5 to 70 milliseconds corresponding to sound path lengths of 5 to 70 feet. The Concert Machine takes its signal from the front speaker leads and inter-



Circle No. 105
On Reader Service Card

faces perfectly with the four factory installed stereo setups offered by American auto manufacturers. The

unit contains two 10-watt amplifiers to power the rear speakers. Price: \$300, with remote control \$340.

Digital Synthesizer Receiver

Toshiba's SA-7150 new receiver features a digital, quartz-locked, PLL synthesizer tuner, and provides 150



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On Reader Service Card

watts minimum RMS per channel at 8 ohms, from 20 to 20,000 Hz, with no more than 0.05% total harmonic distortion. It is said to be the first receiver of its class to offer a frequency synthesized tuner. Frequency readout of the unit is digital with large, green, seven-segment LEDs that spell out the tuned-in frequency precisely. Tuning is simplified several ways: memory channels allow instant tuning of six FM and six AM channels; the receiver automatically scans the whole FM and AM broadcast bands through use of up and down buttons; the scanning process

automatically reverses at the ends of the bands. Separate transformers are used for Class A and Class B amplifier sections. Signal level is indicated by five LED indicators. Specs: usable FM sensitivity, 9.8 dBf; stereo FM distortion at 1 kHz, 0.1%; FM signal-to-noise ratio, 75 dB for mono and 70 dB for stereo. Price of the SA-7150 is \$995.

High Performance Cassette Tape

Memorex says the new MRX₃ Oxide cassettes, which replace the company's MRX₂ Oxide line, offer "outstanding" sound reproduction on all types of equipment "without the need for special biasing." Specific advantages cited: lower distortion for superior high-level recording; low noise and increased



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maximum output; higher output at saturation resulting in wider dynamic range and broader recording flexibility.

fact: the Shure/SME Series III is the state of the art in tone arms.

new!

Breakthroughs & Improvements.

The Series III is the culmination of research and development extending over more than seven years. It embodies a number of significant breakthroughs as well as evolutionary improvements over its distinguished Shure/SME predecessor.

Notable among these is an exotic nitrogen-hardened titanium tubing arm (with wall thickness only twice the diameter of the average human hair) providing a previously unattainable strength-to-weight ratio. The arm has a soft core annular cross-section with an internal fibrous lining which results in an efficient, natural damping of the vibration fed into the arm by the cartridge.

Cartridge Carrier.

The Series III "cartridge carrier," a combination tone arm and shell in one piece, is removable and interchangeable for multi-cartridge use. Coupling is close to the fulcrum so the carrying arm makes a minimum contribution to the Series III total effective mass (only 5.05 grams measured at 9 inch radius!).

Fluid Damper.

A built-in highly efficient F.D. 200 Fluid Damper gently but effectively resists spurious or potentially damaging stylus forces in both planes, yet does not interfere with normal arm motion.



Incomparable High Fidelity Performance!

THE SME SERIES III PRECISION PICKUP ARM WITH THE NEW SHURE V15 TYPE IV CARTRIDGE

The combination of the Shure V15 Type IV cartridge and the SME Series III tone arm transcends previous tone arm-cartridge system performance, and sets dramatic new standards in connoisseur-class high fidelity reproduction.

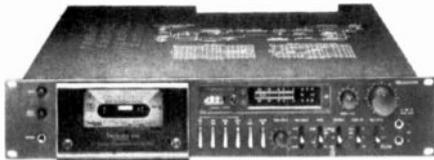


"The best pickup arm in the world."

Suggested retail prices: C-30, \$2.29; C-45, \$2.49; C-60, \$2.69; C-90, \$3.99; C-120, \$5.39.

Quartz-Locked Direct-Drive Deck

Technics Model RS-M 85 cassette deck combines a quartz-locked-planer-opposed DC brushless, coreless, slotless direct drive capstan motor with its servo-controlled circuit. This system is



Circle No. 98 On Reader Service Card

said to provide wow and flutter of less than 0.035% WRMS, while speed deviation is kept at no more than 0.3%. This performance, it's claimed, is maintained through changes in ambient temperature, power supply, load or passage of time. The two-motor unit has a separate, coreless reel motor. Other notable features include: full IC logic control; laminated sendust head; low noise equalizer and high linearity amplifier; Dolby NR with MPX filter; fluorescent electronic bar graph peak meters; three-position tape selector; fine bias adjustment; electronic full

auto-stop; record muting and MIC/line input selector; memory rewind; facilities for timer activated recording. Price: \$650.

Static Reduction System

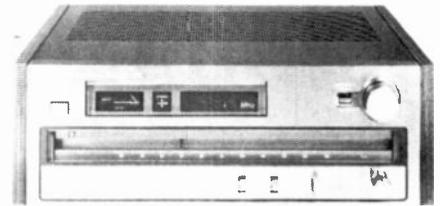
Bib Hi-Fi Accessories claims significant improvements in the design of record static reduction systems. The new Electronic Groovstat 3000 features a "feather touch" push button that releases a 14,000-volt emission of positive and negative ions. This is considered an improvement over older versions that had to be "manually pushed



Circle No. 109 On Reader Service Card

or pulled." A high pitch signal and a neon visual display indicate when "a force" is being emitted. The unit, slightly larger than a pack of cigarettes, is powered by a small 1½ volt cell. A static tester is supplied free of charge with each Groovstat 3000 selling for \$39.50.

Quartz-Lock Frequency Synthesized Tuner



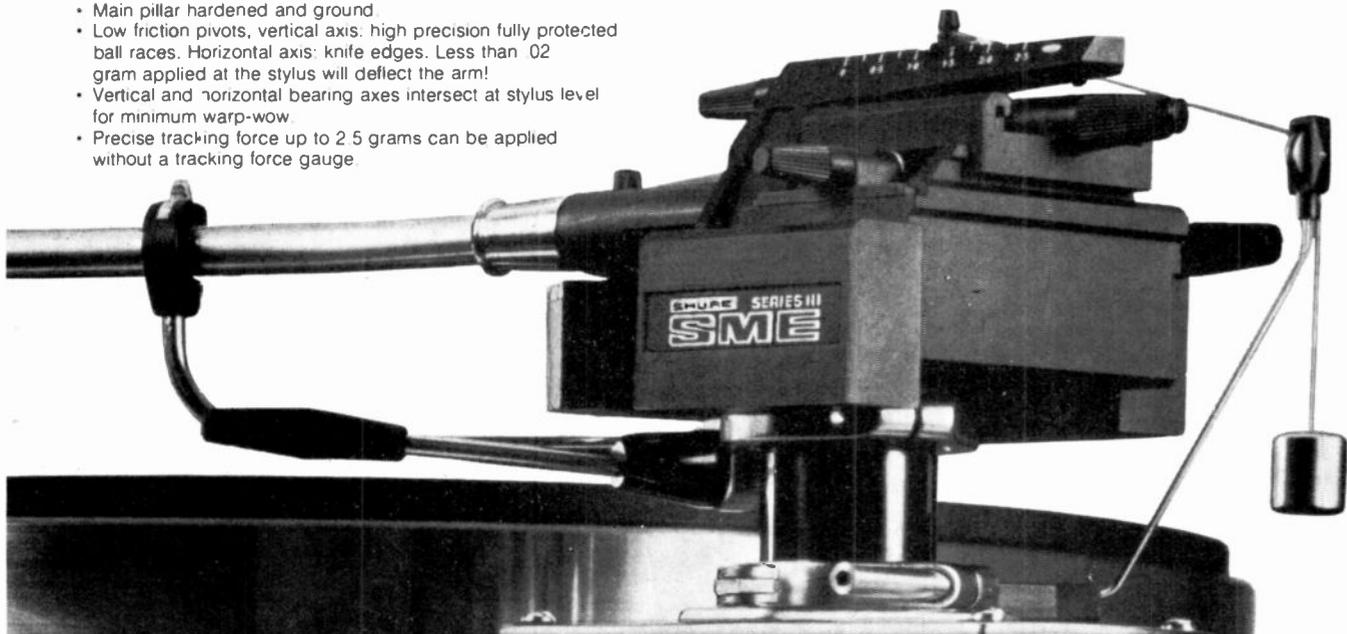
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Sony's quartz-lock, frequency synthesized ST-A7B FM tuner has digital frequency display *plus* the "comforting orientation" of a more conventional linear dial scale. To reject interference and ensure low distortion and noise, the unit uses balanced differential circuitry, including a dual-gate MOS FET radio-frequency amplifier. The IF stage includes high-gain ICs and newly-developed uniphase filters. The IF bandwidth is switchable between "Normal" and "Narrow," to optimize tuner performance under both normal and crowded-station signal conditions. Adjacent channel selectivity is put at 20 dB in Normal position and 70 dB in the Narrow mode. In both modes, alternate-channel interference is "completely eliminated." The ST-A7B's muting threshold is user-adjustable. The output level is also adjustable, for level

...other features of the unique SHURE/SME Series III precision pickup arm:

- Unique balance system enables cartridges weighing 0 to 12 grams to be operated under conditions of minimum inertia
- Interchangeable integral carrying arm replaces conventional tone arm and shell.
- Positive rack and pinion overhang adjustment
- Main pillar hardened and ground
- Low friction pivots, vertical axis: high precision fully protected ball races. Horizontal axis: knife edges. Less than .02 gram applied at the stylus will deflect the arm!
- Vertical and horizontal bearing axes intersect at stylus level for minimum warp-wow.
- Precise tracking force up to 2.5 grams can be applied without a tracking force gauge.

- Bias (antiskating) with fine adjustment.
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matching with associated program sources. Suggested list price: \$900.

Condenser Microphones

Beyer Dynamic (Hammond Industries) offers this 48V Phantom Powered Condenser Series. The microphone system provides "maximum versatility" by virtue of its one preamp/shaft



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(HV710) and four interchangeable head capsules (CK711-714). The capsules include two omnidirectional and two cardioid patterns, one of each pattern incorporating a windscreen. If you don't have access to a 48V line, Beyer will provide external power supplies for both balanced and unbalanced operation. Also available is a lapel clip-on condenser (MC-715, \$380) and its associated 18V power supply (MSB18, \$190). Price on the microphone system, less the external power and lapel-condenser option; \$990.

Needle-point Tonearm

The unique arm support system of this AC-300MKII tonearm by Audio Craft (Osawa) is designed to eliminate the resonance effects associated with conventional arms that use gimbal, knife-edge or ball-bearing mountings. A single vertical needle-point pivot supports the arm assembly. Perpendicular

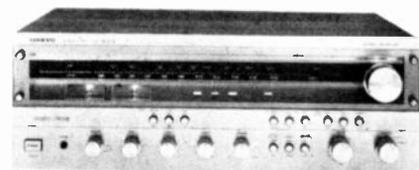
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to the axis of this pivot is a semi-spherical cup containing a precisely measured amount of a special silicon oil. Mating with the cup is a semi-spherical ball assembly attached to the arm. A convenient knob atop the arm permits you to adjust this ball-and-socket damping system to flatten out the low-frequency resonant peak created by the stylus/tonerarm combination in which there is interaction of such varied factors as stylus tip mass, compliance, tracking force, effective arm length and mass. Also eliminated is the customary plug-in headshell; instead, the entire front section of the arm can be replaced. This design concentrates the mass of the connector at the base of the arm rather than at its far end, thus reducing effective arm mass. Suggested retail price of the AC-300MKII is \$325, including straight tubular arm. Additional arms, including S-shapes, are approximately \$60 each.

Quartz-locked Stereo Receiver

Onkyo says this TX-6500 MKII quartz-locked stereo receiver "is an ideal receiver for the audiophile seeking uncompromising performance at a comparatively reasonable price;" in this case \$649.95. The receiver delivers



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a "hefty" 100 watts per channel, minimum RMS at 8 ohms, both channels driven, from 20 to 20,000 Hz, with no more than 0.05% total harmonic distortion. A quartz crystal oscillator is used to maintain a fixed frequency, and its associated circuitry compares the tuner's IF frequency with the frequency generated in the quartz-locked oscillator, to continually compensate for frequency differences that would normally cause distortion or poor reception; additionally it also compensates the FM tuning meter simultaneously. The tuner is then further locked and unlocked by a precise, touch-sensitive control circuit. The front end uses a dual gate MOS FET design, and a four-gang linear variable capacitor. The unit is equipped with three-stage, six-element phase linear ceramic filters for FM IF. Other features: deemphasis switch for Dolby NR broadcast reception, multiple speaker systems, two-way tape dubbing, smooth FM muting and a variety of tone controls.

HI-FI/STEREO BUYERS' GUIDE

"Indasher" Digital Cassette Car Stereo

Audiovox's "Indasher" Cassette Car Stereo Model DGC-10 is ultra-compact sized for installation in virtually all



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American, European and Japanese cars. It contains a built-in AM/FM/MPX "super sensitive" radio. Some outstanding features claimed by the manufacturer include: elimination of dial pointers and station bands in favor of a brilliantly illuminated LED frequency display for both AM and FM stations; pushbutton timer switch to control LED display brightness; full-time (hour-minute) quartz precision clock with date (day-month); elapsed timer for logging trips and other uses; full feature AM/FM stereo radio; front loading "Starr type" cassette mechanism; four-way stereo balance controls; manual and automatic cassette eject. Easily installed by do-it-yourself car owners, according to Audiovox. Suggested retail price: \$299.95.

Touch-Control Receiver

This Model 730 receiver, says manufacturer Nakamichi, "stands out in a market already filled with fine receivers, if for no other reason than its conspicuous lack of conventional lever switches, pushbuttons and knobs." Instead, all functions are controlled by fingertip sensors that respond to the briefest touch. Status indicator lamps display the selected functions. A linear



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bar-graph indicator displays the relative position of the two-speed motor-governed volume control for easily repeatable listening levels. Preset sensors provide instant access to favorite FM stations. Specifications: power output, 105 watts per channel, minimum continuous sine wave at 8 ohms, 5 to 20,000 Hz, with less than 0.02% THD; total harmonic distortion, less than 0.004% up to 1 kHz and less than 0.02% up to 20 kHz; IM distortion, less than 0.004% at 8 ohms, 105 watts output; input sensitivity, 2 millivolts/100 k ohms for phono; signal-to-noise

(Continued on page 20)

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Introducing our new frequency synthesizing tuner. With new capabilities, new features, new design.

With THD in stereo at barely 0.08% at 1kHz. Conservative, at that. With switched selectivity for uncompromising reception. With digital read-out. With LED's to determine signal strength and precise tuning. With an uncanny ability to zero in on the quietest signal.

And along with unique electronic engineering, Mitsubishi offers unique mechanical engineering.

Like The Docking System.

It means preamplifier can be linked with amplifier neatly and compactly. Without a myriad of crossed wires.

But no matter what we tell you, the truth is, nothing will

tell you more about our audio equipment than your own audio equipment.

So, use your ears, and by all means compare.

Compare the difference The DM Factor makes. Compare the convenience The Docking System makes. Compare the capabilities of our new tuner.

And you'll know why Mitsubishi made them part of The System.

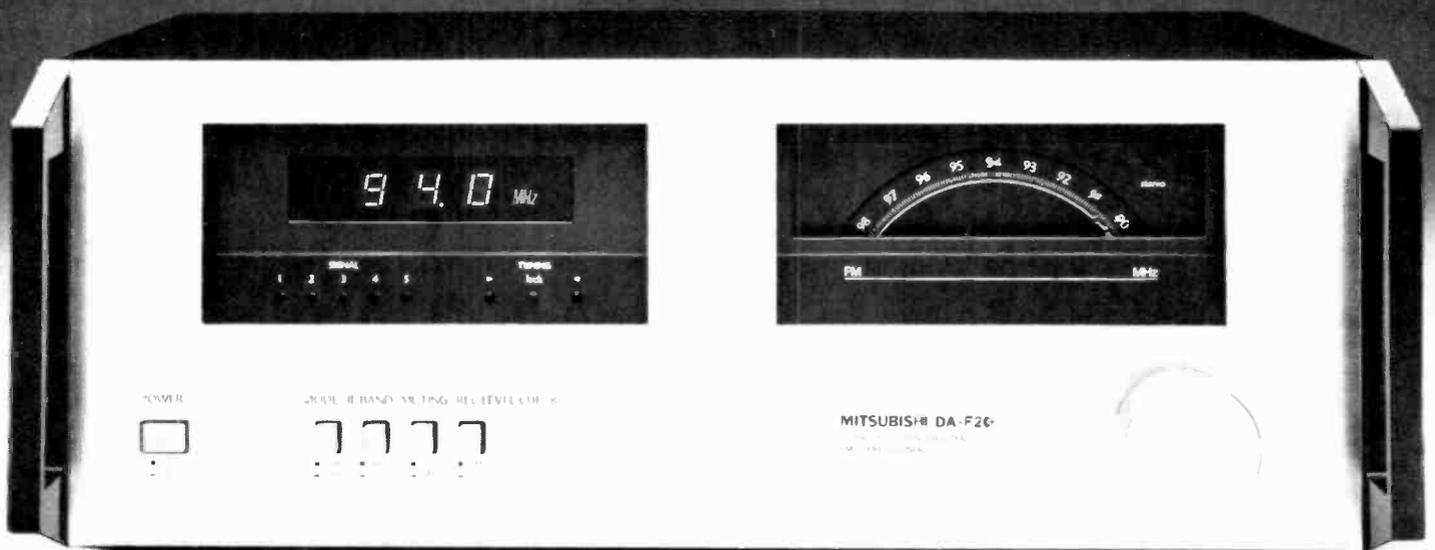
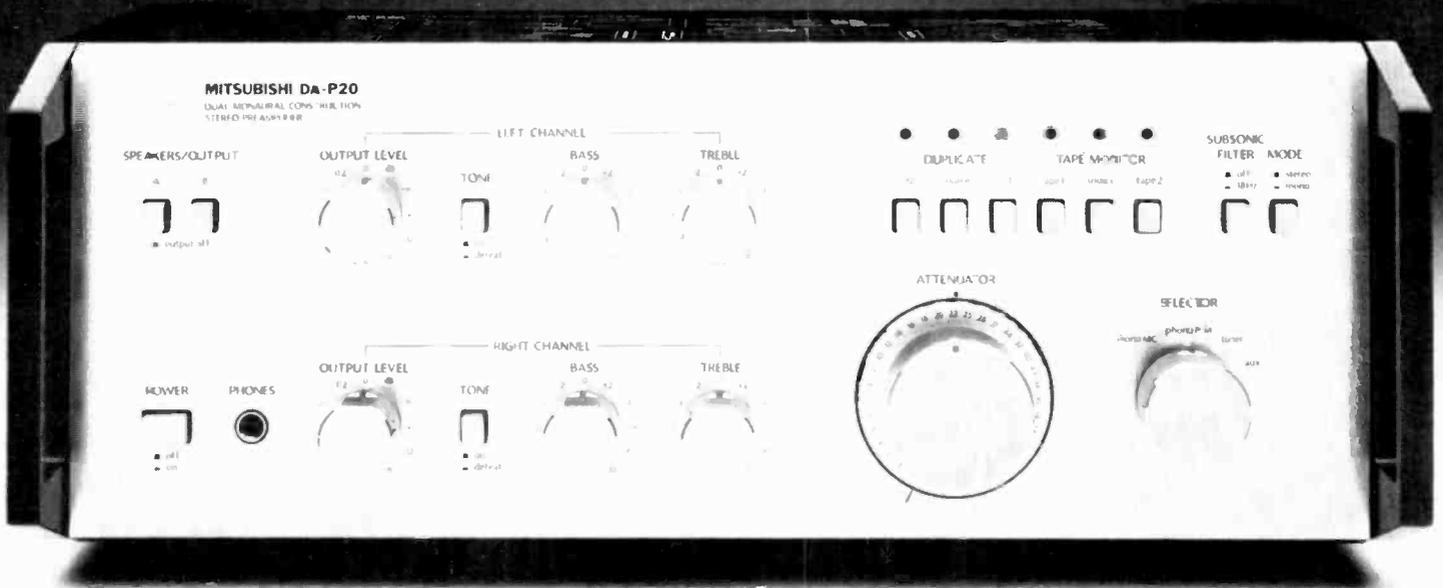
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Because reality is what it's all about.



For more information write Melco Sales, Inc., Dept. SBG, 3030 East Victoria Street, Compton, California 90221.

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AUDIO SHOWCASE

(Continued from page 17)

ratio, better than 83 dB for phono, better than 115 dB for main amp. Price: \$1200.

Interference Filters

Electronic Specialists offers two new interference filters. A Stereo Phono-Input Interference Filter (\$7.95 per

pair) is designed to filter out CB and amateur radio broadcast signals that may enter a stereo or hi-fi system through phono or cassette input cables.

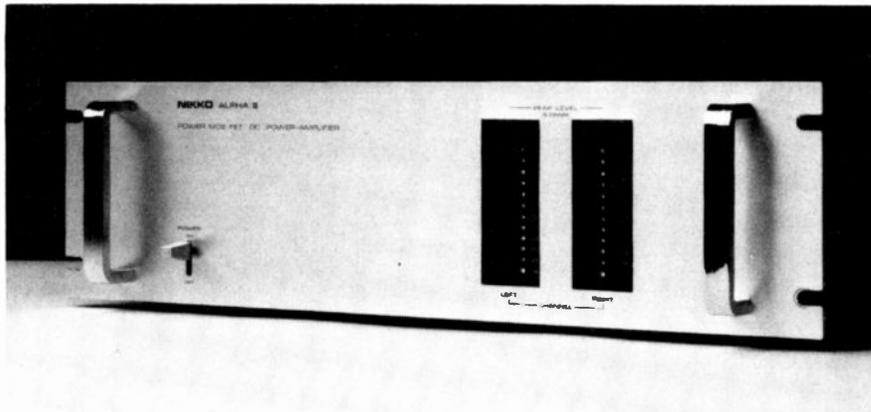


Circle No. 115
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The filter plugs directly into the amplifier input jack. An FM Interference Filter (\$8.50) is designed to filter out CB and amateur radio broadcast signals that interfere with clean FM reception. It also helps cope with interference caused by hobby computers, according to the manufacturer.

Graphic Equalizer Booster for Car Systems

Sparkomatic's GE-500 AcoustaTrac Graphic Equalizer Booster produces a visual curve on an illuminated screen to graphically reveal how a connected car amplifier performs to create the most acceptable sound for individual listening tastes. As the controls of the GE-500 are moved to adjust for tone, an illuminated flexible rod changes shape in conformance with the control movement. The company claims that the GE-500 "is unparalleled at boosting audio output power, and that it contains integrated circuitry for maximum reliability, wide frequency response, and 40 watts of undistorted RMS stereo power." Other features include: slide controls that infinitely adjust five separate frequency bands; a



Unexcelled!

What do you call a stereo power amp with DC power MOS-FET's producing 80 watts RMS per channel, both channels driven into 8 ohms, 20Hz to 20kHz, with THD at 0.006%?

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front-to-rear fader control; a power indicator light; and an audio by-pass switch. The unit, it's said, can be used with all tape decks and radios, and with all speakers having power handling capacities of 15 watts or greater. Price: \$89.

Portable Tape Recorder/Player

Uher's 4000 Report IC is a two-track monaural hi-fi open-reel portable recorder/player designed for "serious amateurs and professional" users. It is expected to be of special value to reporters, scientists and broadcasters who work under difficult field conditions. The unit can be powered by an AC line, battery pack, or auto battery. There are four tape speeds: 7½, 3¾, 1½ and 15/16 ips. Controls include a recording level indicator, three-digit index tape counter with reset button, piano-key type transport controls for start, pause, stop, record and fast forward. The unit accepts many different inputs, and direct tape monitoring with headphones or speaker is possible. Specifications: frequency response, 35 to 20,000 Hz at highest tape speed; 35

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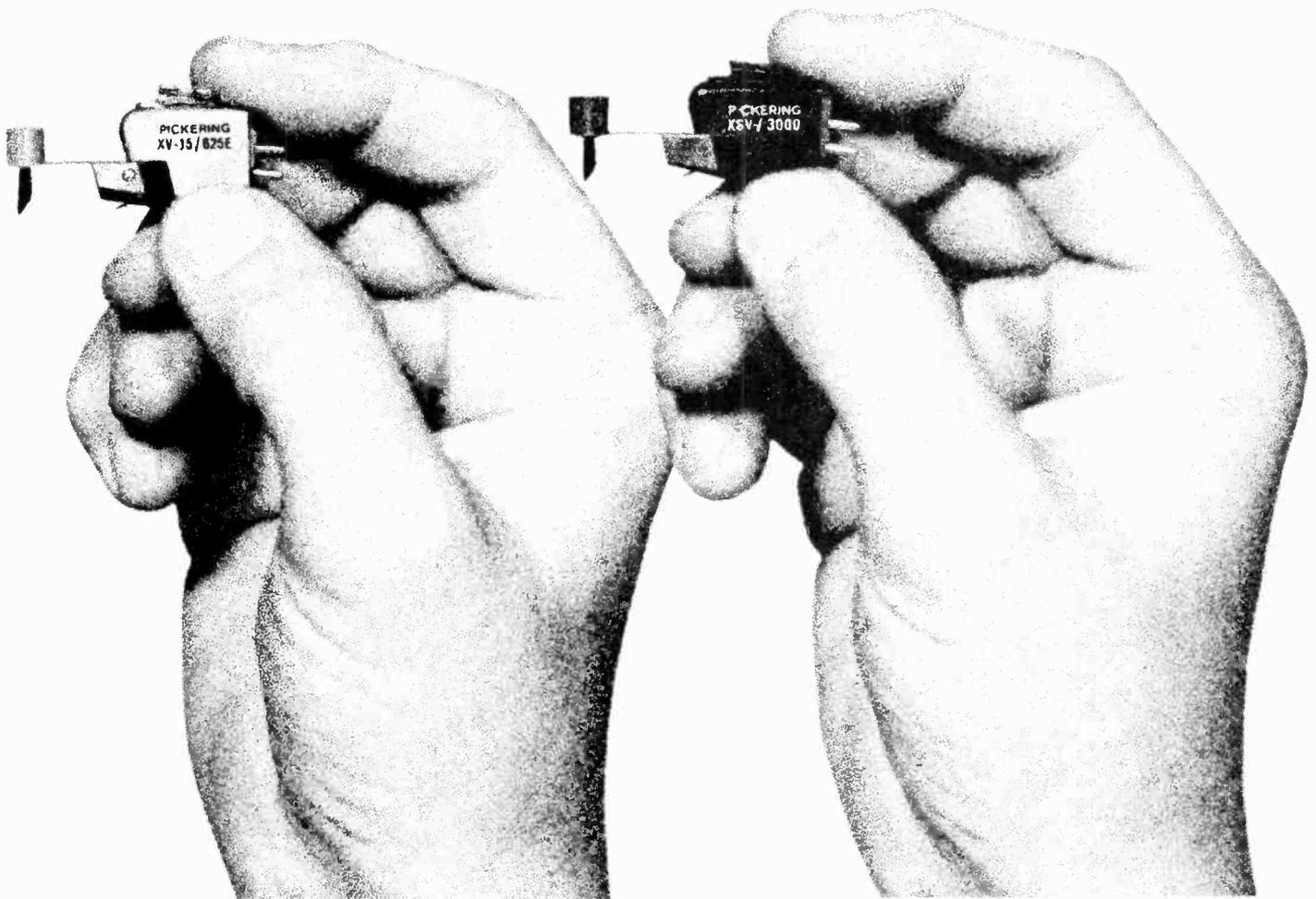
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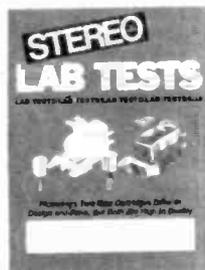
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to 8,000 Hz at the slowest tape speed; maximum wow and flutter, 0.20% for 7½ ips, 0.25% for 3¼ ips, and 0.35% for 1½ ips; the weighted (DIN) signal-to-noise ratio is 57 dB or better for 7½ ips and 53 dB for 1½ ips. Erasure capability is 70 dB or higher. The recorder is equipped with an electronic remote control for start and stop with a remote switch useable as a foot control. Suggested retail price, less case and options, is \$600.

Passive Radiator Speaker System

The newest addition to Radio Shack's speaker line is this Optimus-10 speaker system which employs an 8-inch woofer, 10-inch passive radiator (dronecone) and a 3¼-inch power tweeter. The woofer has a one-pound magnet with a four-layer, high-power handling voice coil. The custom-designed tweeter features one-inch high-temperature voice coil made of lightweight aluminum for "superior" high-frequency dispersion and transient response. The active woofer and passive radiator are acoustically coupled for an effective cone radiating area of 72 square inches which, it's claimed, provides the equi-



Circle No. 32
On Reader Service Card

valent of a much larger woofer, but with greater efficiency and more linear bass response. Specifications: frequency response, 42 to 20,000 Hz ±3 dB; power capacity; 75 watts continuous program power; impedance, 8 ohms.

Has continuously variable brilliance control and both phono jack and screw terminal inputs. Price: \$139.95.

Sub-Harmonic Synthesizer

"Boom Box" Model 100 sub-harmonic synthesizer is described by the manufacturer, dbx Inc., as a "signal enhancement processor" that generates low frequency bass which is often deliberately removed from recorded music. The claimed result is a "heightened accuracy" in the bass reproduction of any hi-fi system with a tape monitor loop. Moreover, the Boom Box permits the larger system listener to "physically experience the air motion created by the increased bass." Thus there is a "tactile" as well as aural sensation of being present at a live concert. The Boom Box is said to correct bass deficiencies by using program in the region above 60 Hz to synthesize signals one octave lower. It then mixes them back into the program via the tape monitor loop. The device is said to work better than an equalizer which can also increase turn-

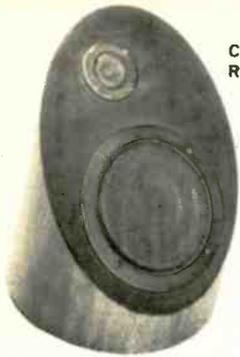


Circle No. 125
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table rumble, acoustic feedback and side effects of warped discs. There are two controls: a sub-harmonic level control which regulates the amount of synthesized signal added to the program; also a low frequency boost knob which is a tone control specially contoured to produce a smooth blend of the synthesized notes into the music. There's also a bypass switch, and a red LED which indicates when the unit is synthesizing. Nationally advertised value: \$199.

Tunable Bookshelf Speaker

You can literally convert your stereo listening room into a "sound chamber" according to Utah American, maker of this tunable bookshelf stereo speaker dubbed "The Principle." The speaker does not emit sound directly toward the listener, as do conventional speakers, but beams it so as to rebound off walls and ceilings. The face of the speaker is oriented at a "scientifically" determined angle of radiation. By rotating the speaker, maximum acoustic characteristics of the room can be utilized, says Utah. It's further claimed that while



Circle No. 126 On Reader Service Card

other speakers oriented in this manner would misdirect or trap and muffle sound, "The Principle" floods the room with sound from "all directions." Price: \$89.95.

Upgraded Mixer From TEAC

TEAC offers a new version of the company's Model 2 mixer. Called Model 2A, the upgraded version is said to have tougher, more reliable modular construction and new treble and bass controls. The new version has the same nationally advertised value of \$400. It works with a combination of several different selectable inputs, and presents the inputs in altered or unaltered condition at a variety of selectable outputs; thus the recordist has virtually total control over what goes on in the recording process. Model 2A fits in two places within the system chain: just ahead of the tape recorder so that the recordist can make decisions about what will be originally recorded, overdubbed



Circle No. 10 On Reader Service Card

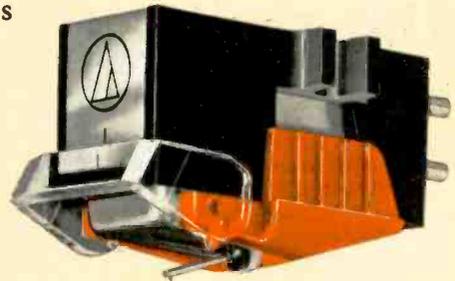
and then stored; or it can be placed into the output of the multi-channel tape recorder to control what will be retrieved and mixed down. Features include cue out, buss in and accessory send/receive patch points. Channel assignment buttons, of the push/push type, are color-coded to correspond to the output busses. There's an accurate, straight line fader as the level control for the input channel. The master fader is the overall level control for the output of the mixer. The mic-in accepts a quarter-inch phone plug and the line-in accepts a standard phono plug. The line-out serves as the program buss out, and the aux-out serves as an additional line output in parallel with the main line output. ▲

SEPTEMBER/OCTOBER 1978

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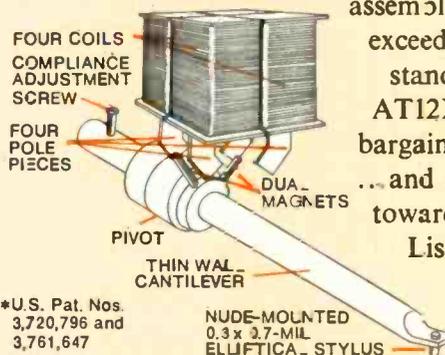
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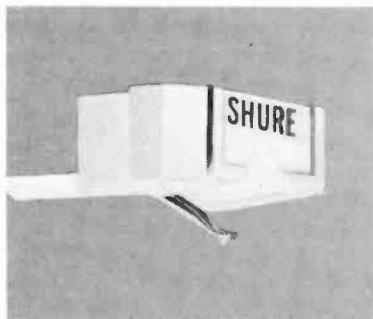
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Needle in the hi-fi haystack

Even we were astounded at how difficult it is to find an adequate other-brand replacement stylus for a Shure cartridge. We recently purchased 241 random styli that were not manufactured by Shure, but were being sold as replacements for our cartridges. Only ONE of these 241 styli could pass the same basic production line performance tests that ALL genuine Shure styli must pass. But don't simply accept what we say here. Send for the documented test results we've compiled for you in data booklet # AL548. Insist on a genuine Shure stylus so that your cartridge will retain its original performance capability—and at the same time protect your records.

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24



ART TATUM/by J. R. TAYLOR

□ In 1926, the reigning jazz orchestra of Fletcher Henderson passed through Toledo, Ohio. Their evening's work completed, several of Henderson's principals went to a local club to hear a young pianist with an imposing local reputation. As trumpeter Rex Stewart relates in his *Jazz Masters of the Thirties*, they were prepared to dismiss this hometown boy—a blind teenager, after all—for they had heard the best pianists New York could offer. Instead, they were all but dumbstruck. "To a man, we were astonished, gassed and just couldn't believe our eyes and ears... the experience was almost traumatic for me... I toyed with the idea of giving up my horn... Coleman Hawkins was so taken... that he immediately started creating another style for himself, based on what he'd heard... that night."

The object of this astonishment was Arthur Tatum, born in Toledo, in October 1910. From birth, cataracts entirely blinded his left eye, and only after many operations did he gain a little vision in his right; yet by his early teens he could read Braille music and play violin, guitar and piano. At sixteen, after two years at the Toledo School of Music, he became a professional pianist; and until 1932, he shuttled from Toledo to Cleveland—sometimes with his own band or someone else's, but usually as a soloist.

The piano style that turned Henderson's men around during this period was based on the "stride" piano of James P. Johnson, Willie "the Lion" Smith and Thomas "Fats" Waller—Tatum's personal favorite. With these forebearers, Tatum shared a reliance on a wide-ranged oom-pah bass accompaniment; a tendency to embellish existing melodies, rather than working out basically new tunes on existing chord sequences; and a serious involvement with European concert (i.e., "classical") piano literature.

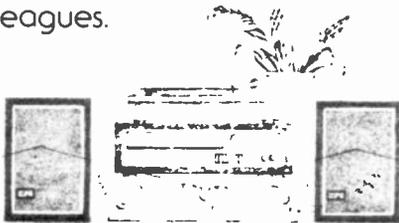
But Tatum went beyond the stride players' mastery of the early Romantics to mine the music of Liszt, Brahms, Debussy and Ravel for harmonic and pianistic usage. He separated the function of the left and right hands, even to a greater extent than Earl Hines had done, and so created an orchestral variety of texture. He was a master of all tempos and all keys; an impeccable timekeeper, with equally developed gifts for *rubato* and strict swing; a spontaneous composer who could reharmonize
(Continued on page 76)

J. R. Taylor is the coordinator of the National Endowment for the Arts' Jazz Oral History Project at the Smithsonian Institution. He was formerly curator of the Institute of Jazz Studies at Rutgers University. His writing on jazz has appeared in the *Washington Post* and the *Village Voice*.

THE LS70 CAR SPEAKER SOUNDS LIKE A HOME SPEAKER BECAUSE IT'S MODELED AFTER ONE OF THE BEST.

	LS70	EPI70
Frequency Response	70-20 KHz	60-20 KHz
Crossover	1800 Hz	1800 Hz
Dispersion	Nearly hemispherical in musical range	Nearly hemispherical in musical range
Tweeter	1" air spring	1" air spring
Woofer	6" long traverse	6" long traverse
Impedance	8 Ohms nominal 4 Ohms D.C.	8 Ohms nominal 4 Ohms D.C.
Grille	Acoustically transparent perforated metal	Acoustically transparent matte-black foam

Up until now there have been car speakers and there have been home speakers, but quite frankly, they've been in two different leagues.



We patterned the LS70 after the much acclaimed EPI 70.

We decided to change that. We designed the LS70, a high performance, 2-way system that fits into a standard 6" x 9" cutout, to meet the same high standards we set for our much acclaimed EPI 70 loudspeaker.

The result is a car speaker that performs like no car speaker ever performed. You get remarkably clear, accurate, "Linear Sound." The term is derived from the way a frequency response

graph looks when it records perfectly accurate sound reproduction; a straight line runs all the way from the deep bass end to the high treble end.

To achieve this, we add no artificial boosting to the bass. Our treble delivers all the subtle overtones that just fade away on most speakers.

Next, you get dispersion that other speaker manufacturers can only dream about — it fills your car with a complete range of natural, uncolored sound.

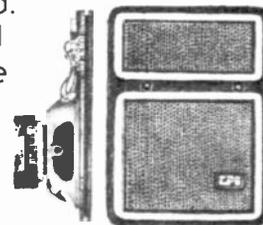
Plus, LS70's can handle over 60 watts per channel.

Most other speakers blow up at considerably less than this.

Granted, the LS70's cost somewhat more than most car speakers, but in return you're getting a system that is every bit as good as exotic separate-component systems.

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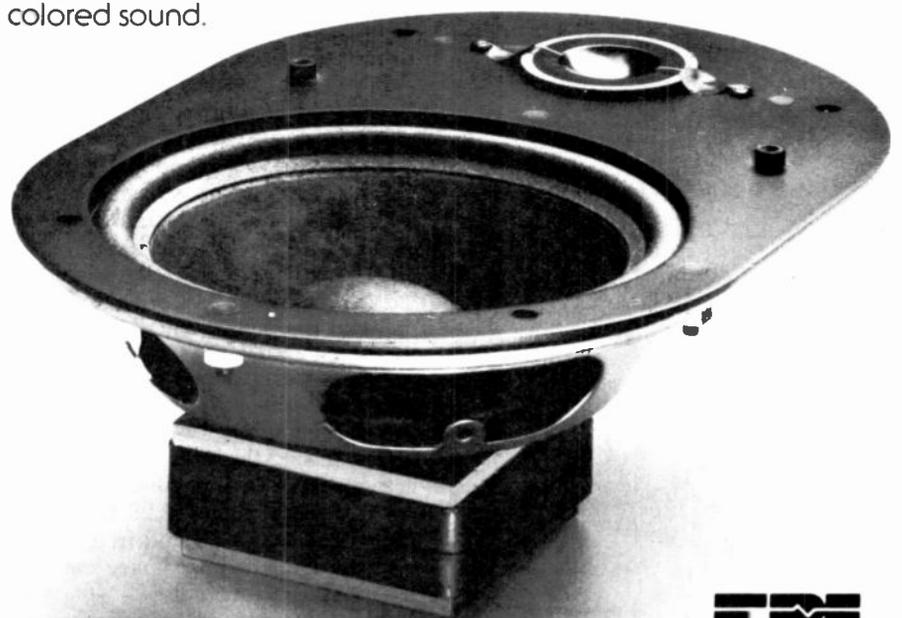
LS70's for yourself. See if it's not a system that you can feel right at home with.



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SOUND PROBE SOUND PROBE SOUND PROBE

Ears are widely considered as the best instruments for speaker testing. But, since subjective judgements without a frame of reference are meaningless, those ears have to be calibrated. The best way to do this is by listening to live music—by getting to know the true sound of musical instruments, singly and in orchestral combina-

tion, and then using this true sound as the ultimate reference standard.

In the speaker evaluations which follow, we are not citing laboratory data. Such data are important in confirming the judgement of the ear, but in themselves they cannot tell you what a speaker really sounds like. That's why we feel that reporting our listening impressions, based on long familiarity with live music, will be more informative and will better convey to you something about the character of these particular speakers and also about the kinds of questions you should ask yourself when auditioning any pair of speakers. Read on—and then happy listening!

by CHRISTOPHER GREENLEAF and HANS FANTEL

Koss CM-1010



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Description

The cabinetry of this solidly built, floor-standing speaker conveys an aura of sturdy elegance which is in no way lessened when you take off the grille. Even the panel on which the speakers are mounted is richly grained walnut veneer and beautifully finished, giving a handsome setting for a massive-looking 8-inch woofer and the 10-inch passive radiator. A 1-inch tweeter is recessed behind an acoustic loading device, and the 3-position tweeter level control (-3db, 0, +3db) is also conveniently located in front.

Effective frequency response ranges from 32 to 18,500 Hz, being 6 dB down at those end points, but remaining within 3 dB between 35 and 17,500 Hz. Koss commendably lists distortion figures for its speakers, with test conditions clearly spelled out. In this case,

intermodulation distortion is less than two percent. The speaker is fused for overload protection, weighs 44 lbs. and measures 28 inches high, 15½ inches wide, and 11 inches deep. Nominal impedance is 7 ohms. The price is \$185.

Performance:

The best thing we can say about this unusually handsome speaker is that, if you aren't looking at it, you don't notice it much. And that is excellence indeed! A lot has been said about "transparent" speakers—speakers so unobtrusive that you forget all about them and just listen to the music. There probably aren't all that many, but the Koss CM-1010 is definitely one of them.

You don't have to reach for words to describe the sound. They come easily.

(Continued on page 28)

Epicure 14



Circle No. 68 On Reader Service Card

Description:

Billed as a bookshelf speaker, the Epicure 14, measuring 24 x 13½ x 10 inches, may just fit on an ample shelf. But since these hefty robust speakers weigh 40 lbs. apiece, you had better make sure your shelves are firmly anchored to the wall. Of course, it's the extra poundage that partly accounts for the rock-solid bass, all the way down to the bottom lows. But more of that later.

The working parts of this rather unorthodox speaker include a 1-inch concave air-spring tweeter, matched to a 6-inch long-throw woofer which activates an 8-inch passive radiator. The specs claim a range of 28 to 20,000 Hz within 2 or 3 dB and from what we heard this extraordinary claim seems altogether credible.

The manufacturer recommends a

minimum input of 15 watts, and the speaker will handle as much as 80 watts continuous signal. The cabinet is finished in walnut veneer with black grille cloth, there are no protruding edges or ridges to cause problems by unnatural sound diffraction. The nominal impedance is 8 ohms, and the price \$195 each.

Performance:

Every so often we come across something we'd like to take home and live with for a while. The Epicure 14 is definitely one of those things. We liked it all the way from top to bottom, and with its unusually extended frequency range, that's quite a stretch.

What really floored us were those lows going down below 30. You get an uncanny sensation of true bottom bass that most bookshelf models (and

(Continued on page 28)

THE DREAM COMPONENTS



A tape deck that thinks, a turntable steady as a rock, a receiver that protects itself, and more.

In your dream you hear beautiful music coming from a high fidelity system. All the components have the same name on them.

Impossible? Only if you believe there's one "best" maker for each type of component. Once, perhaps. But today no one has a monopoly on technological excellence. You'll find the Optonica® name on entire systems of the world's most advanced components, with innovations—our own

new circuits and features—you might expect to find only in a dream.

In a dream you might own the amazing Optonica cassette deck that contains a small computer. You can program it to control endless recording and playback functions. It would be a fantastic deck even without its own computer.

In the same dream you could have the Optonica turntable with a beautiful base that looks and feels

just like granite. It is, in fact, mikage granite, which will transmit exactly the correct amount of vibration to the tone arm: *none*.

You might furnish your dream with a new Optonica receiver or separates, the only ones in the world built with aircheck calibration, Opto-lock tuning, triple power supply designs, and three protection circuits.

Now the same source also produces some of the most accurate speaker systems in

history. Optonica CP-5151's incorporate a unique new tweeter. It weighs just about 1/50th as much as a comparable "dome"-type tweeter, and its sound is incomparable.

Listen to a system with one name: a dream system, only at an Optonica dealer.

OPTONICA

THE OPTIMUM

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SOUND PROBE SOUND PROBE SOUND PROBE

(Continued from page 26)

Koss CM-1010



Circle No. 76 On Reader Service Card

open, natural, and clear. Unspectacular, thank God.

When Koss, a company long renowned for its stereo headphones, decided to manufacture speakers a couple of years ago, they knew better than to enter an already crowded arena with a "me-too" product. They picked a design approach which—though by no means unique—is still fairly new: the use of a passive radiator or "drone cone" as it is sometimes called. The explanation of this in a special booklet that comes with the speaker sounds rather high-flown. So we'll try to translate it into more or less plain language.

Only half the sound energy produced by a speaker driver radiates from the front of the cone. The other half comes from the rear. If you put a speaker in a conventional sealed enclosure (the "acoustic suspension" principle) all the rear radiation is trapped in the box. It never reaches the ears but gets converted into frictional heat. Since this happens mostly at the low frequencies, a lot of bass is lost.

To free the "lost" bass energy from the box and make it audible, speaker designers came up with the idea of the drone cone. It's a regular woofer cone stretched over an opening in the en-

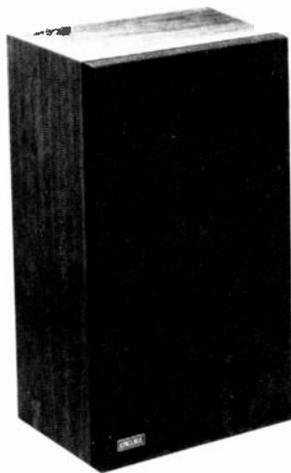
closure, but without a magnet and coil to drive it. Instead, it moves back and forth in rhythm with the main woofer, being propelled by the dammed-up back pressure in the box. Its own carefully calculated resonance restricts its motion to the desired frequency range—in the case of this particular Koss system the two bottom octaves. The two cones (woofer and drone) moving in tandem make up a much bigger sound-radiating surface than the woofer alone, thereby augmenting bass projection.

This isn't as simple as it sounds. False resonances must be eliminated to avoid boom, and only recently have the necessary design formulas been developed (by a couple of Australian engineers) to analyze interaction between cone resonances, enclosure volume, and other pertinent factors.

The Koss CM-1010, among several others, offers persuasive evidence that these computer-aided calculations really pay off. The CM-1010 uses a 10-inch drone cone to supplement its 8-inch woofer, which accounts for its splendid bass projection all the way down to the very deepest musical sounds. What's more, the characteristics of the drone can be varied by

(Continued on page 74)

Epicure 14



Circle No. 68 On Reader Service Card

quite a few floor-standing biggies) just won't give you. Granted, there isn't a lot in music that reaches that far down. But when you play a well-recorded organ disk that doesn't flinch at those low pedal notes—or when the bass drum booms out in the orchestra—this speaker puts out vibes that you can feel through your skin as well as hear with your ears.

Oddly enough, this kind of bass isn't "gutsy," and it doesn't hit you right away. You notice it only if a really low note comes along. That's because it is without the false resonance and frequency doubling by which many "disco"-type speakers often fool you into thinking you are getting bottom lows when you really don't. There is no trace of boom in the Epicure 14. In fact, that astounding bass is rather subtle. You have to listen for it—and it's just that which makes it both startling and delightful.

How, you'll ask, can they get that kind of bass from a woofer just six inches across? Part of the answer lies in the passive radiator, as explained in our review of the Koss speaker. Combined with such a "drone cone," a small woofer can actually be more effective than a big one. If designed for

proper interaction with enclosure volume and the passive radiator, a small woofer can actually produce lower bass than a big one because its movement creates less back pressure in the box. But since nature never gives you something for nothing, you pay for this in terms of efficiency. The smaller woofer may give you lower bass, but it gives you less of it. That's why the Epicure 14 needs a fair amount of power to pump out those spectacular lows.

Anyway, Epicure's engineers have juggled all these complex factors into a highly satisfactory overall design. They were able to do this partly because Epicure—unlike many other speaker manufacturers—makes its own drivers and optimize every detail.

The high end, too, ranks with the best we've heard. The top is razor-sharp, but so smooth that those highs never hit you in the ear. They're available, but they don't jump at you. As a result, individual instruments come in distinctly, yet overall blend and balance remain realistic.

One of the most stringent tests for treble response is to play a good recording of a solo violin. If the

(Continued on page 74)

Equipment used in our listening sessions:
Sony STR-5800 stereo receiver,
Philips 212 turntable,
Pickering XSV 3000 phono pickup.

HIGH BIAS.

**These cassette deck
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There's been a quiet revolution going on in the cassette world. □ Leading makers of quality cassette decks have adopted TDK SA as their reference standard tape for high (CrO₂) bias and equalization settings. Why TDK SA? Because TDK SA's advanced tape formulation and super precision cassette mechanism let them (and you) take full advantage of today's advanced cassette deck technology. □ In addition, a growing number of other companies are recommending SA for use with their machines. □ So for the ultimate in cassette sound and performance, load your deck with SA and switch to the "High" or "CrO₂" bias/EQ settings. You'll consistently get less noise, highest saturation and output levels, lowest distortion and the widest dynamic range to let you get the best performance from any quality machine. □ But you needn't believe all this just because we say so. All you have to do is check our references.

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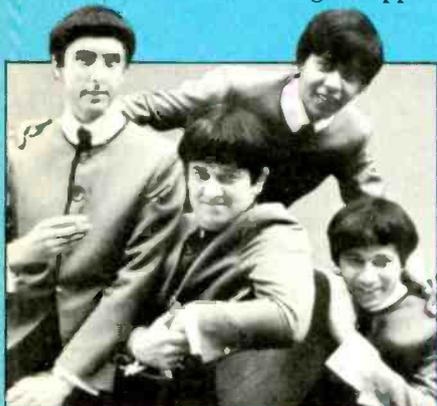
pop discs

A review of the latest popular music releases

by KEN IRSAV

The Rutles: "The Rutles" Warner Bros. HS-3151. \$8.98.

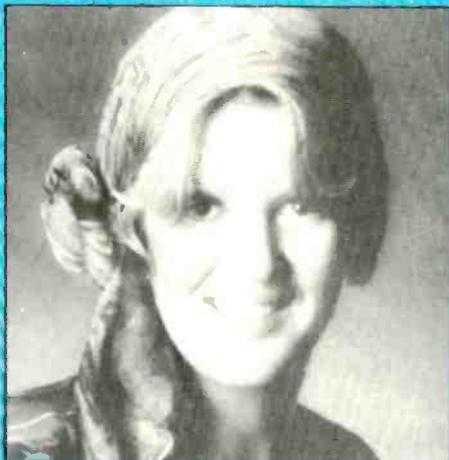
Opinion has pretty much polarized on this musical satire on the career of the Beatles. Those who hold the "Fab Four" as deities consider the album sacrilege. Others praise its humor and creativity. I fall in between, but closer to the latter. Each of the 14 songs is an original composition by Neil Innes, who also sings and plays guitar and keyboards. But because they are deliberately meant to satirize the songs of the Beatles, the tunes sound very much like specific Beatles songs. The album follows the career of the legendary "Rutles" from 1962 ("Hold My Hand") to 1970 ("Let's Be Natural"). As the songs of the Beatles changed musically and philosophically over that span, so do the Rutles' compositions. From a purely technical standpoint, this album is superior to every disc the Beatles recorded before Sgt. Pepper.



Those early LPs left a large, empty gap in the area between left and right speakers. No use was made of the so-called "center channel." All vocals were on one side; all instrumentals on the other. You could swing your balance control to one side or the other and hear only music or only voices. The mix on this album is first rate. "The Rutles" comes with an elaborate booklet documenting the group in words and photos.

Bonnie Bramlett: "Memories" Capricorn CPN-0199. \$7.98.

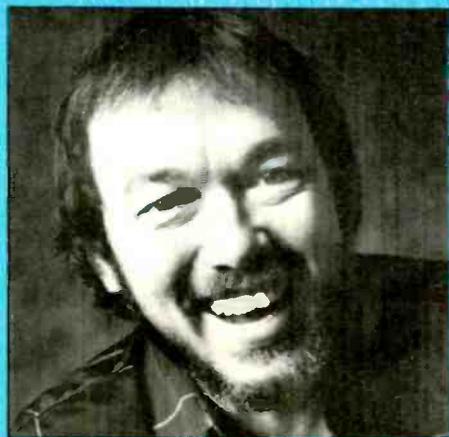
Choosing material for an album can be as important as performing it.



Bonnie Bramlett's fourth solo venture features the compositions of Dolly Parton, Deke Richards, Lennon-McCartney and Steve Winwood, among others. She does them all proud. Bonnie's a belter and balladeer. The full range of her vocal talents is evident throughout. Super sidemen and background singers provide a good "thick" sound.

Billy Swan: "You're OK—I'm OK" A&M SP-4686. \$7.98.

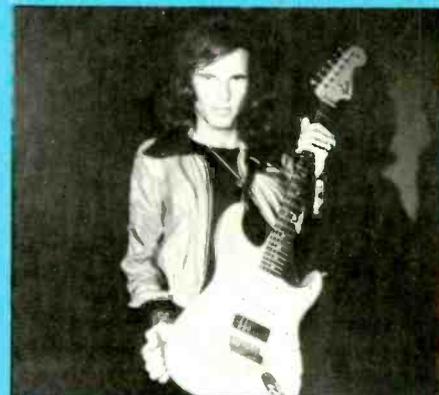
Little did I know when I first listened to Billy Swan's "Four" that it was his last Columbia album and that his first for A&M would be released so soon after "Four" appeared. In this album, Swan continues his love affair with the tempos and arrangements of the country-rock of the 50s, only more so. If there is any doubt about his



musical idols, Swan clarifies the matter by featuring Otis Blackwell, Scotty Moore and the Jordanaires in this collection. "No Way Around It (It's Love)" will send shivers up your spine if you worship the sound of Elvis' first few RCA records (circa "All Shook Up"). Scotty on guitar and the Jordanaires singing back-up recreate the sound to a tee. This album brings back the fun rock and roll of an earlier (simpler?) era. The recording is exceptionally crisp.

Russell DaShiell: "Elevator" Epic JE-35074. \$7.98.

The first words on the album set the tone: "Come on everybody, come on let's rock and roll." DaShiell, a new



name in the rock world, is listed as composer, arranger and player of guitars, keyboards and percussion. That leaves little for other musicians, but the names of two others should ring a bell. Doug Clifford on drums and Stu Cook on bass are former members of the former Creedence Clearwater Revival. In fact the album was recorded at The Factory in Berkeley, where Creedence's albums were done. Opening the set is "Come On," a chunk of hard rock by any standard. It segues into "Electrical Wave of Sound," a clever bit of pop personifying the sound in the very grooves producing it: "Hey girl you've got to keep your cartridge clean; a little dirt hurts my fidelity and blows my scene." No kidding—those are really the lyrics. "Wild Party" sounds a bit

(Continued on page 32)



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pop discs

like "Wild Country," Thunderclap Newman's epic born of Peter Townshend's fertile brain some years ago. "In the Fire" has a slow rock beat with an excellent guitar solo and multi-tracked vocal by DaShiell. A full, rich mix of overdubbed vocals and instrumental textures highlights "Dreamer." With good promotion DaShiell can't help but succeed. He deserves to.

Marshall Tucker Band: "Together Forever" Capricorn CPN-0205. \$7.98.

You can take the band out of Macon, but can you take Macon out of the band? This is the first of the group's seven albums to be recorded outside that citadel of hits. But Miami's Cri-



teria Studios (the Bee Gees, among others, record there) ain't no slouch. The sextet plays seven songs, several with extended instrumental breaks. The punchiest rocker is "Dream Lover" (not Bobby Darin's), featuring a Jethro Tull-like flute solo by Jerry Eubanks. "Everybody Needs Somebody" is a nice cut with warm sentiments, but if I ever hear the lyrics "help me make it through the night" in another song I'll scream. Tommy Caldwell's acoustic guitar is the only instrumentation on "Asking Too Much of You," the plaintive love song that closes the album.

Dusty Springfield: "It Begins Again" United Artists UA-LA791-II. \$6.98.

Dusty Springfield was the most successful female representative of the British Invasion of our shores (musically-speaking) in the early Sixties. "You Don't Have To Say You Love



Me" was her biggest hit. I loved her then and I love her now, but darn it I'm bugged. This album features seven different "arrangers" and it sure is over-arranged. Some of the tracks are downright noisy with bass thumping, shouting female choruses and general raucousness. The disc quiets down a bit on "Love Me By Name," where Dusty does her torchy thing accompanied by strings (mercifully subdued). She gives a good strong vocal delivery on Barry Manilow's "Sandra." It is apparent that Dusty's voice is as good as ever. Perhaps on the next album we'll get to hear it more clearly.

Electric Light Orchestra: "Out of the Blue." Jet JTLA-823-L2. \$11.98.

ELO makes music that's as hearty, meaty and rib-sticking as authentic Hungarian goulash. And if you don't know that experience, you ain't living. This is their first double album. It's made up of 17 new Jeff Lynne compositions. Others have written of ELO's classical influences and superb arrangements. I like their vocal harmonies. Some of it is right out of the Fifties.



Remember the Four Lads, the Four Aces? Just beautiful close harmonizing. I used to listen to those groups from my crib.

Gene Cotton: "Save the Dancer" Ariola SW-50031. \$7.98.

Gene Cotton, a graduate of the David Gates-Don McLean school of smooth, polished vocalizing, serves up a good mix of upbeat rockers and pretty ballads. Production by Steve Gibson is tight and full, but not overdone. Songs like the title cut and "Like A Sunday in Salem" score in the philos-



ophy department as well as being appealing musically. Kim Carnes duets on her composition, "You're A Part of Me."

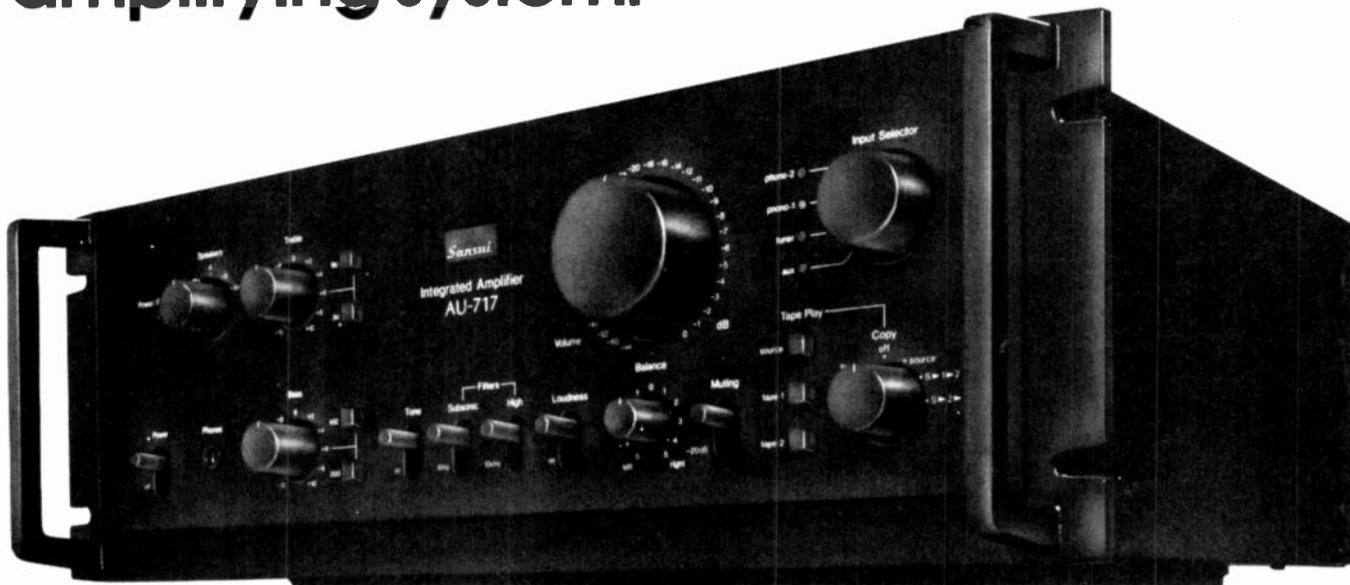
The Babys: "Broken Heart." Chrysalis 1150 \$7.98.

This, the second album by the Babys was produced by Ron Nevison, formerly associated with Led Zeppelin, the Who and Bad Company—all noted hard rockers. But the Babys prove they have a mind of their own by never going completely "hard" on this set, although the influences are certainly evident. Fuzztone guitar and heavy drumming on several cuts will keep your neighbors dancing. But the album also offers downright pretty lead singing by John Waite, as on the opening verse lines of "Isn't It Time." "I'm Falling" features a very pleasing guitar, string and oboe arrangement that borders on—dare I say it—classical! Don't be put off by their punk-sounding name (misspelling and all). The Babys have reached musical maturity.

Brian Eno: "Before and After Science" Island ILPS-9478. \$7.98.

Previously accessible only to aficionados of the esoteric fringes of electronic pop (and sometimes even they couldn't understand him), Brian Eno moves a bit closer to the general public in this outing. "No One Receiving" has a spacey Bo Diddley beat with heavy bass and repetitive hypnotic lyrics. Synthesizer strains are panned between channels. It takes a couple of listenings, but be patient. This album may just grow on you. ▲

“The Sansui AU-717 is a superb amplifier. We like it with no ifs, ands, or buts.” (Julian Hirsch) It offers “as much circuitry sophistication and control flexibility as any two-piece amplifying system.”



Everyone says great things about the new Sansui AU-717, but the experts say it best.

The Sansui AU-717 DC integrated amplifier is "Sansui's finest It incorporates a fully direct-coupled power amplifier section whose frequency response varies less than +0, -3dB from 0Hz (D.C.) to 200 kHz. The amplifier's power rating is 85 watts per channel (min. RMS) from 20 to 20,000Hz into 8-ohm loads, with less than 0.025 per cent total harmonic distortion If any amplifier is free of Transient Intermodulation Distortion (TIM) or any other slew-rate induced distortion, it is this one The slew rate ... was the fastest we have measured on any amplifier, an impressive 60 V/ μ sec.

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"The Sansui AU-717 is a superb amplifier. We like it with no ifs, ands, or buts." (Reprinted, by permission,

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"One clear advantage of DC design is apparent. Even at the low 20Hz extreme, the amplifier delivers a full 92 watts — the same value obtained for mid-frequency power — compared with its 85 watt rating into 8 ohms....

"The equalization characteristic of the preamplifier was one of the most precise we have ever measured, with the deviation from the standard RIAA playback curve never exceeding more than 0.1dB....

"Sansui claims that this unit has reduced transient intermodulation distortion — a direct result of the DC design, and, indeed, the model AU-717 delivered sound as transparent and clean as any we have heard from an integrated amplifier....

"... worth serious consideration — even by those who prefer separate amplifiers and preamplifiers." (Reprinted in part from Len Feldman's test report in **Radio-Electronics**, January, 1978.)

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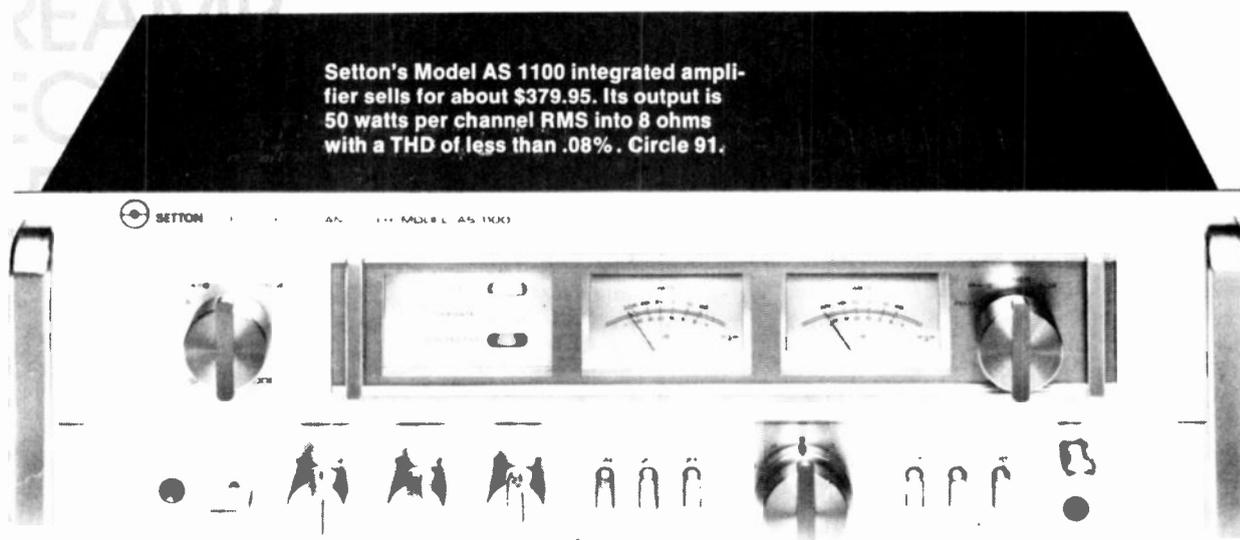


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AMPLIFIER

by William S. Gordon

BUZZWORDS

WHAT THEY REALLY MEAN AND HOW THEY SHOULD AFFECT YOUR CHOICE OF AN AMP

Webster defines buzzword as "an important-sounding usually technical word or phrase often of little meaning used chiefly to impress laymen." Needless to say, high-fidelity literature is liberally dosed with such buzzwords. Your job in selecting an amplifier—or any other component—is to ferret out which of the "buzzwords" have "little meaning" and which indicate differences of substance.

Separates vs Integrated

Take "separates," for example. You are led to believe that separate components are of higher quality than integrated components. Hardly a *universal* truth, but one harboring a grain of substance nonetheless. On the whole, a separate preamp may offer more features—more controls and the like—than are found in the control section of an integrated amp. And separate power amps *tend* to offer a greater output capability. But these generalizations are hardly inviolable rules. There are separate preamps—expensive ones at that

—affording only the rudiments of functions. A selector switch, tape-dubbing switches, volume and balance controls, and little else. Sometimes even tone controls and filters are lacking. These preamps cater to the type of "purist" who believes that the less circuitry in a unit's design, the better.

And, although high-capability separate power amps are the "rule," there are separates affording a mere 35 watts per channel—modest (by today's standards) in anyone's book. On the other side of the coin, there are receivers—the ultimate in high-fidelity integration—that feature output powers (around 300 watts/channel) that rival the most powerful of the separates.

So how should you be guided? I'd suggest the following. If you can't find the assortment of features you desire—including power capability, tone control and filters, switching flexibility and such—in an integrated amp, look to the separates. If you feel that you can afford only one "good" piece of equip-

ment and intend to improve your system piece-meal fashion, the separates offer a greater degree of freedom to do so. But remember, separates tend to cost more for equivalent quality because many of the functions must be duplicated. In a separates system, you are paying for multiple cabinets, multiple power supplies, multiple switches, connectors, etc. where fewer would do the job just as well.

DC Amps

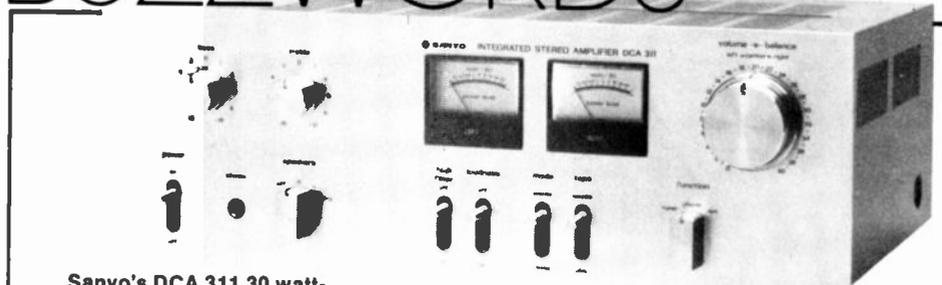
Next buzzword—the DC amplifier. Probably we ought to call this one a double buzzword because it has two meanings. As often as not, they're as confused in the minds of the spec writer as in that of the spec reader. The "DC" in DC amplifier may mean "direct(ly)-coupled" or it may mean a "direct-current" amplifier.

A directly-coupled amplifier *usually* means a power amplifier whose output transistors are wired directly to the speakers *without* the interposition of a coupling capacitor. In this sense, many (if not most) modern solid-state power amps are "DC amplifiers." Whether they say so or not on the carton depends upon the judgment of the particular manufacturer. Such an amplifier incorporates two power-supply voltages, equal in level but opposite in polarity (say +50 volts and -50 volts.) The push-pull output transistors straddle the two power lines and are balanced so that the midpoint (the actual output point) is at DC-ground potential. The speaker can then be connected directly to the output and, under no-signal conditions, no current will flow into the speaker.

Should the output stage become unbalanced (due to some circuit failure) it's possible for a large (and potentially disastrous) current to flow into the woofer. For this reason, such amplifiers usually have some sensing circuit that monitors the DC on the output and quickly disconnects the speaker (usually via a relay) if a malfunction occurs. The same circuit usually keeps the speakers disconnected for a few seconds after the power is turned on in order to give the amplifier a chance to stabilize. Note that as long as no output-coupling capacitor is used, an amplifier can be considered to be *directly-coupled* (or DC for short). Capacitors *may* be used to couple the signal between stages of the amplifier.

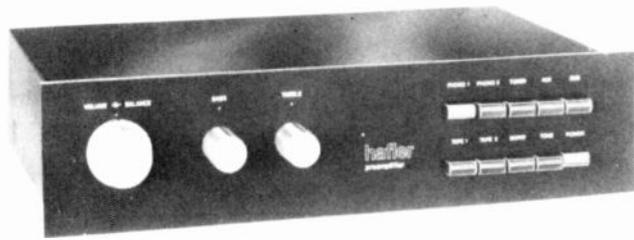
A *direct-current* amplifier forgoes all coupling capacitors and so can amplify uniformly down to DC (0 Hz, if you will). If you were to connect a battery to the input terminals, its voltage would be dutifully amplified and presented at the output terminals as a

BUZZWORDS



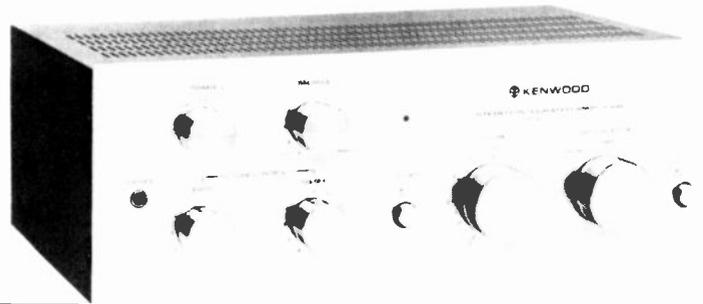
Sanyo's DCA 311 30 watt-per-channel integrated amplifier offers a maximum of .08% THD, plus dual power meters and a 41-click-stop volume control. \$160. Circle No. 138.

Hafner's Model DH-101 pre-amplifier is available in kit form for \$199.95 and pre-assembled for \$299.95. Features include complete tape record, monitor and duplicating facilities. Reader Service No. 139.



Sony's TA-N88 is a Class D power amplifier with an output specification of 160 wpc RMS, with no more than .5% THD. Its price is about \$1000. Circle Reader Service No. 94.

Kenwood's KA-3700 integrated stereo amp put out 20 watts per channel minimum RMS into 8 ohms with no more than .08% THD at any frequency from 20 to 20,000 Hz. \$140. Circle Number 75.



sort of "super battery." If it is also presented to the woofer, you may be out looking for a new speaker.

If a direct-current amplifier is a potential danger to the loudspeaker, why get one? For the simple reason that the danger is a fairly remote possibility, and there are certain theoretical advantages to avoiding capacitors. Music waveforms never contain any true DC component (and you're not supposed to go around connecting batteries to the input!) Music waveforms can, however, contain a quasi-DC component. That is, the instantaneous *peak* signal may be greater in the positive direction than in the negative, even if the *average* signal has no DC component. A DC amplifier is better able to cope with this type of waveform than

is a capacitor-coupled amplifier—especially if the peak signals are so great as to drive the amplifier into clipping. Even so, most direct-current amplifiers have an optional capacitor-coupled input circuit as an added safety measure. **Dual Power Supplies**

Another power-amplifier buzzword, or rather buzzphrase, is "dual power supplies." Some designers tout the virtue of having a separate power supply for each stereo channel. "Really like having two independent amplifiers on a single chassis" is how the copy is phrased. True enough, dual power supplies provide the ultimate in channel separation, but is this really needed?

Considering the higher cost of dual power supplies vs the single (or

of distortion they introduce is mostly of low order (second and third harmonic) rather than the more annoying higher-order types.

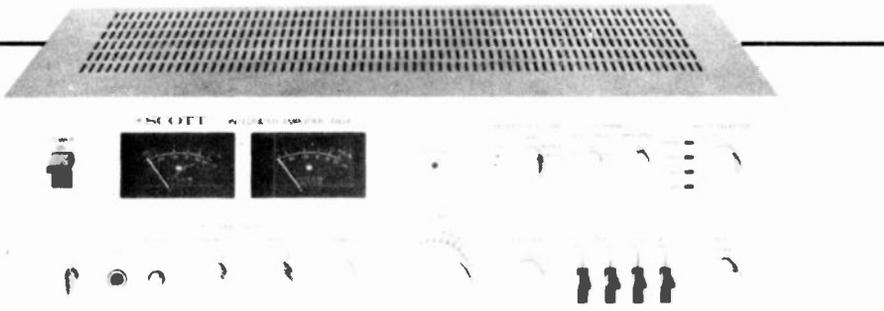
But, and that's an important "but," a transistor amplifier can deliver much more power, much more cheaply. So who should care how the amplifier clips if it has sufficient reserves not to clip at all? Whereas 50 watts per channel is pretty high power for tubes, several hundred watts per channel is relatively commonplace in the transistor world. And with distortion specs of 0.1% or less even at high-power levels, it's pretty hard to work up a real worry whether some of that distortion is of fourth or fifth order.

For those that insist upon worrying, there are VFET (vertical field-effect transistor) amplifiers. These combine the best virtues of both tube and transistor designs. VFETs are transistors and thus afford the benefits or relatively cool operation and extended service life. But like a vacuum tube, the distortion they generate is mostly of low order—that is, until they clip. When they do overload, they act more or less like a conventional transistor amp. One of the major attractions of VFET power amps is their inherent immunity to thermal runaway (and self destruction). They also claim to provide better power bandwidth than comparable bipolar amps. But again, these advantages are of a subtle nature and perfectly good sound can be achieved with conventional techniques. Class A through Z.

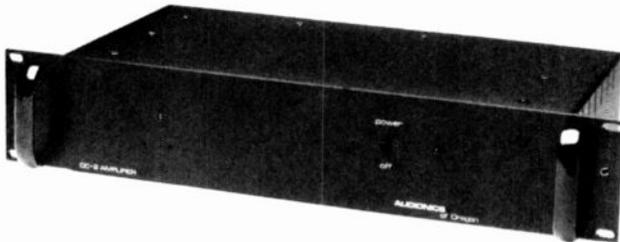
No, we haven't quite gotten to Class Z yet, but the letters of the first quarter of the alphabet have been luzzing around a good bit lately. By this time, I'm sure that you've heard about Class A, B, D, G and H amps, but, to refresh your memory, here's a synopsis.

Theoretically, Class A is the "best" amplifier for sound reproduction. The distortion is lowest; crossover distortion is completely absent. Class A amplification is almost invariably used in low-level (preamplifier) circuitry. Problem is, it's terribly inefficient when it comes to putting out the watts. Under even ideal conditions, a Class A Amplifier internally consumes more power than it can deliver. And the less power it delivers, the more power it consumes.

Essentially, if a Class A amp is designed to deliver 100 watts maximum, it will *constantly* draw upwards of 200 watts from the line. Whatever portion of that 200 watts isn't pumped out to the speaker ends up as heat in the amp. When putting out its maximum rating, the efficiency may approach 50%, but,



Scott's 480A integrated amp offers 85 wpc RMS with no more than .03% THD. It also features phono pickup impedance and capacitance selection. \$400. Circle 90.



Audionics of Oregon's CC2 power amplifier allows stereo or mono mode selection via a rear switch. 70 wpc (stereo RMS), .18% THD or less. \$399. Circle 140.

Spectro Acoustics Model 217 provides seven front-panel controls which tailor the phono pickup load to any of sixteen pickup loading specifications. \$250. Circle 141.



Fisher's CA2110 power amplifier puts out 55 wpc RMS with no more than .2% THD. Also offers monitoring/dubbing for 2 tape decks. \$160. For details, Circle Number 69.

shared) power supply, satisfactory to excellent separation characteristics can be had with the latter design. Only the esoteric audio buff working with high-separation recorded program material on tape format would want (or need) to take on the added expense of dual power supplies.

You're also told that dual power supplies prevent the left channel from pulling down the right channel's supply when delivering high power and so each channel can deliver its full power rating simultaneously. Well, let's take a look at that. Since 1974, the FTC's ruling on the power claims of an amplifier—as it appears on the spec sheet—requires that *both* channels be driven simultaneously when the power is rated. So, if you're buying a new am-

plifier, you can be assured that it will deliver its rated power simultaneously on both channels regardless of whether a single or a dual power supply is used.

Tubes, Transistors and VFETs

There are some audiophiles who swear by tubes. For them, no transistor amplifier can possibly match the clarity of "tube sound." Perhaps that's because the signal gets conducted through a clean vacuum (pun intentional) rather than muddling through an impure solid. All joking aside, there are subtle differences between tube and transistor amplifiers. Tube amplifiers overload more gracefully than do transistor breeds. They clip gradually and softly rather than going suddenly into gross non-linearity. And the type

since the *average* power delivered to the speaker is probably 10 watts or less (even though, on peaks the full 100 watts may be pumped out), the *practical* efficiency is perhaps 5%. The amplifier sits there toasting.

True, Class A amps may be theoretically ideal, but they're large, heavy, generally of rather modest power capability and terribly expensive. They also make your power company happy. Variations on this theme, that combine Class A distortion characteristics with a bit more efficiency, have been introduced by Technics. While this design may be the glimmer of the future, today it is still a very expensive, limited-production item.

By far and away, the most common Class is B, or, more properly, Class AB. Distinct from a Class A amp, a Class B design draws little power when idling. It gobbles up more only when it's needed to drive the load. When delivering its maximum rated power, the efficiency can be 70%. In fact, its "worst case" power dissipation occurs when it's called upon to deliver 40% of its design-power capability. At that point, it's operating at 50% efficiency. Put another way, a Class B amp, designed to deliver 250 watts per channel, will dissipate no more heat (worst case) than a Class A amp of a 100-watt rating. And, under normal conditions, it will develop much *less* heat. That means less heat sinking and lower cost per watt.

Farther on in the alphabet, we come to Class D—the switching amplifier—and to Class G and Class H designs. The goal of all three is to increase the efficiency beyond that available with conventional AB amps. The Class G and Class H configurations are similar to a Class AB amp but with design novelties that reduce the worst-case dissipation. To date, each has only one adherent, to wit, their respective inventors—Hitachi for Class G and Soundcraftsmen for Class H. The Class D switching amp has a theoretical efficiency of 100%. It uses digital pulses to represent the analog signal. Infinity and Sony have shown Class D amps.

When Buying An Amplifier

The best advice we can offer when buying an amplifier is to first make a list of the features you desire. Gather manufacturers data sheets. Study the independent laboratory test reports in *HI-FI/STEREO BUYERS' GUIDE*. Analyze what features are important to you. Do you need provision for two phono inputs? Two-way tape dubbing? Some audiophiles never use their tone controls or loudness equalization. Others find them indispensable. Where do you

BUZZWORDS



The SM-3201 integrated amp from Optonica puts out 40 watts per channel RMS with no more than .19% THD. \$250. Dual power output meters are also included. Circle No. 81.



Crown's D-75 dual channel power amplifier has an output of 35 watts per channel RMS with no more than .05% THD. Rear switch allows selection of mono mode. \$349. Circle 102.



Ace's 3100 "Pancake" preamplifier, wired with an external power supply costs \$325. Rated output is 10 V. Circle 142.



ReVox's B750 integrated amplifier has a rated output of 40 wpc RMS into 8 ohms with less than .2% THD. Circle Reader Service Number 86.



stand? How many sets of speakers will you use? Is there switching for them? What are their impedances? If you plan to use more than two sets of speakers simultaneously, will the power amp drive such a load?

Make two lists; one of "absolute musts," the other of "desirable but can do withouts." Then decide on the power capability you need. A knotty little problem, that! The amount of power you need depends so much on the speaker efficiency, the size and furnishings of your listening room and your personal tastes regarding listening level, that one is at first tempted to say, go for as much power as you can afford. But first try to solicit the advice of the manufacturer of your speaker. Write the company a letter describing your listening room and your musical preferences. Give the model number of the speaker you have or intend to buy and ask for the range of power levels recommended for your setup. If you can afford it, go for an amp at the high end of the range.

You now have the information you need to make an intelligent choice.

Start going through spec sheets and reviews and eliminate all products (or combinations of products) that fail to meet your minimum-acceptable-features-and-power criteria. Next, arrange the survivors in order of increasing desirability—whether based upon features, power, distortion, etc. Then put prices on the sheets. Eliminate all candidates of lower desirability whose prices are higher than the more desirable candidates. At this point you should have narrowed the field down to a manageable assortment. The final decision—weighing features and specs with dollars—is yours alone to make.

And, remember, do not be impressed by buzzwords and don't be intimidated by salesmen. Go to the spec sheet. If the buzzwords have technical validity, the "improvements" afforded by the marvelous, new, proprietary technique available only in the Powerlith Mach 1 by Lithos, Inc. will show up on the technical claims. If the performance per buck ain't any better, chalk up that "technique" as a buzzword "of little meaning used chiefly to impress laymen." ▲

AMPLIFIER SPECS

WHAT YOU CAN EXPECT FROM SPECIFICATION SHEETS KEY QUESTIONS YOU SHOULD ASK ABOUT THEM

History does repeat itself in some ways, and though amplifier performance has come a long way since 1970, there are a number of questions you should be aware of when you're looking over current spec sheets and test reports and making a decision on which amplifier to buy.

The measurement standards for evaluating amplifier performance depend on different influences. Different manufacturers add or subtract criteria on their specification sheets depending on their current design theories or simply depending on current industry trends. Industry organization recommend different testing standards at different points in time.

It can become very confusing, particularly for the person who is about to put hard-earned cash on the line for a new amplifier. In the paragraphs which follow, we'd like to compare the prevailing measurements of 1970 (using test reports from that era as points of reference) with current standards.

In 1970, the FTC had not yet established the requirements that amplifier power be specified in terms of watts per channel RMS into a specified load, 20 to 20,000 Hz with the maximum total harmonic distortion for that output also included. Nevertheless, *HI-FI/STEREO BUYERS' GUIDE* was reporting amplifier power by that method *even that far back* because the method makes it almost impossible to make an amplifier appear to be more powerful than it actually is. Most other amplifier tests and spec sheets of that era were designed to make an amplifier seem as powerful as possible.

For example, one of the best known amplifiers, manufactured by one of the most respected audio firms, carried an IHF rating of 36 watts total output into an 8-ohm load. Its actual power, measured in our lab by FTC standards, was 5 watts RMS per channel (into 8 ohms, 20 to 20,000 Hz)—which was as hard as we could push the amplifier before distortion exceeded 1% THD.

Looking back over those early test reports appearing in stereophile publications, we find amplifier power outputs rated for only one frequency (generally 1 kHz), or for the load that delivered the most power output (one manufacturer used a 2-ohm load for arriving at a "rated output power"). Other sources discussed the power outputs that would occur in the existing power supply was replaced by a constant voltage laboratory power supply (which was also the basis of the so-called *dynamic* or *music power* measurement). The theoretical purpose of the laboratory power supply was to simulate the actual performance required by *transient* waveforms, since they supposedly simulated true music or program waveforms

more closely than the sine waveforms used for the RMS power test.

As for frequency response measurements, those early solid state amplifiers appear to have been phenomenal. It was not unusual to find "measurements" within ± 3 dB from 15 to 40,000 Hz, or even 1 to 50,000 Hz. Trouble was, these frequency measurements were made at 1 watt output. When frequency response tests were made at what is now the FTC rating level the response was more likely to be within ± 3 dB 20 to 20,000 Hz at a power output well below the manufacturer's IHF or "music power" specification. One very famous manufacturer had an amplifier spec'd at 100 Watts Peak Music Power that could produce no more than 12 watts per channel (20 to 20,000 Hz, at the clipping level when working into 8 ohms).

In the area of distortion anything under 1% THD was generally considered hi-fi, with the very best of amplifiers running between 0.15% and 0.5% THD.

Today, we find hi-fi amplifiers from the low power *dormitory specials* of 20 watts per channel to the brute force 200-300 watt amplifiers have distortion values approaching 0.01%-0.05% THD.

While on the subject of distortion, it's interesting to note that *intermodulation distortion*—also known as *intermod* or I.M.—is rarely seen in modern amplifier specifications, though ten years ago I.M. was part and parcel of every spec and test report, and many audiophile magazines devoted seemingly endless pages to articles on IM: what it was, how it affected sound reproduction, and how it was avoided.

Back in the mid-1930's, exhaustive tests by the motion picture industry (SMPTE), from which many developments in true sound reproduction sprang, established that less than 7% intermodulation distortion could not be discerned by the typical listener, and that less than 6% IM wouldn't be discerned by anyone without a good imagination. Even C. J. LeBel, designer of the modern intermodulation distortion test instruments which serve as the reference for most current IM test equipment, agreed with the SMPTE findings of a 6-7% audibility threshold.

Now when you consider that hi-fi amps of 1970 with total harmonic distortion readings of under 1% also had IM distortion of less than 1% and that research showed that less than 6% IM distortion cannot be detected by human ears, you can see why *HI-FI/STEREO BUYERS' GUIDE* was not impressed by the importance of IM.

At this point we might as well spend a few moments on another question—that of Transient Inter-
(Continued on page 75)

■ Your amplifier is the element in your hi-fi system which links the rest of your components to the sound-deliverers: the speakers. Its go-between position in the system is important to remember when choosing one for yourself. In order to attain compatibility with the rest of your system, you must do some thinking about the interaction between the speaker and the amplifier. How much power (minimum and maximum) do your speakers require to deliver the sound level you want? The answer to this question can guide you in how much power you'll need.

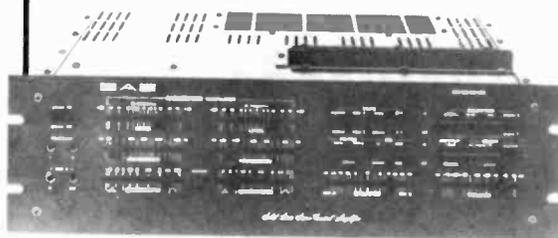
What is the nominal impedance of the speaker and how much variation in that figure can you expect? How often will you be driving the amplifier at full power? The lower the impedance, the more often you expect to be using a lot of power, and the more money you intend to invest, the more costly a short circuit in the speaker wiring or another mishap is likely to become. If these factors figure into the use you expect to get out of your amplifier, pay particular attention to amplifier protection circuitry and thermal safety features when choosing an amp.

INTEGRATED AMPS

Rotel's RA 1412 integrated amp provides selection of phono input impedance and sensitivity by way of back panel switches. Its rated output is 110 watts per channel RMS into 8 ohms with .05% THD. \$800. Circle Reader Number 87.



SAE's 2922 "pre-amp/amp" sells for \$850. Specs: 100 wpc into 8 ohms with .05% THD. Pre-amplifier and power amplifier sections are completely isolated from each other. Circle No. 88.



AMPLIFIER MARKET



Dynaco's model 2521 power amplifier puts out 100 watts per channel with less than .05% THD, 20 to 20,000 Hz. Included are an LED power readout, accessible speaker fuses. Circle Reader Number 37.

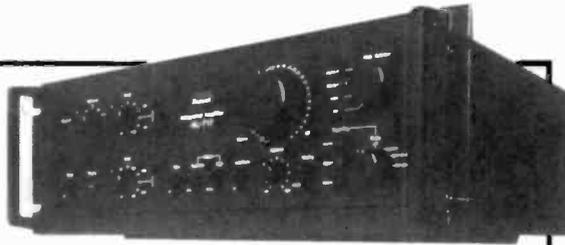
Mitsubishi's DA-A15DC is a 150-watts-per-channel power amplifier which sells for about \$630. It may be docked with either of two preamps or with the tuner/preamp in Mitsubishi's line. Circle 78.



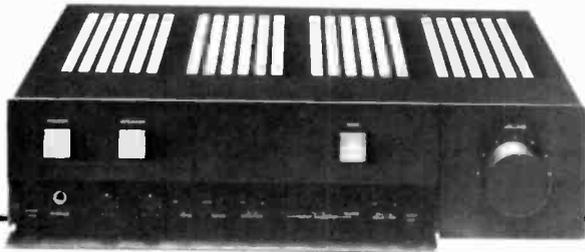
POWER AMPS

PREAMPS

Sansui's AU717 integrated amp is rated at 85 watts per channel into 8 ohms with no more than .025% total harmonic distortion. Features include full monitoring/dubbing facilities for two tape decks. \$550. Circle No. 89.



The Holman preamplifier from Apt Corporation has a rated output of 2 VRMS. The phono 1 input impedance is switchable between 47k ohms and 100k ohms in parallel with 50, 100, 200, 300, 400 pF. \$447. Circle Number 150.



Yamaha's A-1 integrated amp has a DISC switch which is able to electrically direct-couple the phono pickup to the output power amplifier. Direct-current equalizer improves transient response. \$595. Circle Number 101.

Phase Linear's 4000 Series Two preamp includes independent tape monitor and dubbing circuits and independent RIAA phono stages to reduce hum and CB interference to a minimum. \$650. Circle 147.



R A SELECTED SAMPLE OF THE WIDE VARIETY OF CHOICES YOU CAN MAKE PLACE

Osawa offers the A & E SCA-2000 preamp at a price of \$900. The two phono inputs have switch-selectable impedances of 100k, 68k, 47k, 33k, 1k, and 100 ohms. Circle Reader Service No. 114.



Threshold's Stasis 1 is a "feed-forward, error-nulling" power amp with a power output spec of 175 wpc (8 ohm load, 20 to 20k Hz) at no more than .002% THD. \$2500. Circle Reader Service No 149.



Dunlap-Clarke's Dreadnaught 1000 power amplifier has a rated stereo output of 250 wpc into an 8-ohm load. It's designed to perform well at high sound pressure levels, with special attention given to protection circuitry and thermal design. \$1500. Circle Number 148.



Hitachi's HCA-8300 preamplifier includes an adjustable Phono 1 input level control, two-stage turnover and tone defeat switches. \$350. Circle Reader Number 72.



PREAMPS

SPOTLIGHT ON...

TDK HD-01 CASSETTE HEAD DEMAGNETIZER



Circle No. 107
On Reader Service Card

IT'S THE VERY LATEST IN STATE-OF-THE-ART CASSETTE HEAD DEMAGNETIZERS

□ The manuals and instructions supplied with cassette tape recorders always make head demagnetization look easy. As a general rule, a line drawing shows a hand holding a demagnetizer against the record/play (R/P) head—and that's all there is to it.

Real life, however, isn't as easy as an artist can make it appear. With particular reference to the many different types of front loaders, it can be next to impossible to get a demagnetizing tool up against the R/P head; or, the job might call for a tool with a special offset configuration. Many stereophiles and tape fans simply avoid the whole hassle and flirt with noise (hiss) build-up and partial self-erasure of the recorded upper highs caused by magnetized heads.

But now you can demagnetize cassette heads with no more effort than it takes to install a cassette, because the very latest in state-of-the-art cassette head demagnetizers is a totally self-contained demagnetizing cassette by TDK known as the model HD-01 head demagnetizer.

Simply snap the HD-01 into your machine, press the recorder's *Start* or *Play* button for one second, and remove the cassette. That's the whole bit; the head(s) is demagnetized. For those who need a positive indication de-

magnetization has occurred, a small red LED lamp in the center of the cassette turns on when the recorder's PLAY button is pressed, indicating demagnetization has taken place.

In actual fact, what takes place electronically is not as simple as it appears. As shown in the photograph, the cassette is literally jam-packed with electronic hardware powered by a self-contained miniature battery such as you might find in an automatic 35 mm camera. The demagnetizing coil is "floated" in such a manner that when the recorder's R/P head moves forward and pushes against the coil (when the *Play* button is pressed) the coil moves backwards against a microswitch; the microswitch closes and applies power to the circuit. When the *Play* button is released, a spring pushes the demagnetizing coil forward, thereby releasing the microswitch. The LED lamp, which is observed through the recorder's "door", shows when the switch has applied power to the demagnetizing circuit.

Demagnetization takes place almost instantly—in less than 50 milliseconds.

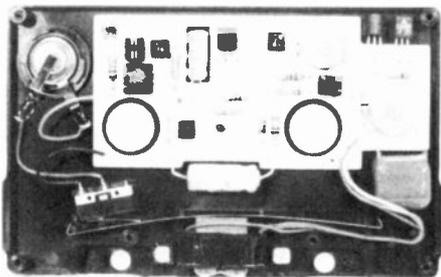


• To demagnetize, simply place the HD-01 in the recorder and hold down the play or start button for about one second. When the LED in the center of the cassette lights, demagnetization has been completed. Circle Reader Service Number 107.

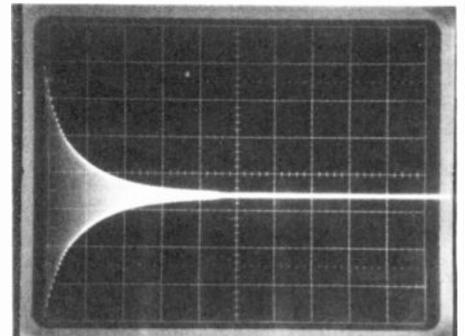
Holding the *Play* button down for "extra demagnetization" does absolutely nothing other than use up the battery at a faster rate. (In normal use the battery should last from six months to over a year.)

Figure 1 helps show how the HD-01 works. (The oscilloscope trace was made in our lab.) At the instant that power is applied, the HD-01 generates a surge of high frequency energy that rapidly decays to almost zero in about 50 milliseconds. Just this single surge is all that's needed for demagnetization. Holding the *Play* button down does not produce additional surges, while cycling additional surges by repeated activation of the *Play* button does not produce additional demagnetization, for you cannot demagnetize a force that ceased to exist on the first surge.

For the technically-minded we'll explain the reason for the rapid decay of the demagnetizing field. Demagnetization takes place only when a *decaying* AC field is applied. If you were to apply a steady alternating (AC) field and suddenly turn off the field you would be likely to magnetize the device. You can demonstrate this for yourself: place a screwdriver on a bulk
(Continued on page 74)



• Inside the head demagnetizer is a printed circuit board with a rather complex and sophisticated electronic circuit. Battery is in the upper left-hand corner of this photograph.



• When in use, the HD-01 applies this rapidly decaying alternating field to the recorder's R/P head. It is the decay of the field which is responsible for demagnetization taking place.

FALL FORECAST

by FRED PETRAS

WATCH FOR THESE NEW TRENDS
IN HIGH FIDELITY PRODUCTS

Hi-fi equipment buyers who shop this fall will find the cornucopia of new offerings bigger than ever, and containing further evidence that the audio industry never sleeps. Some of the new equipment is unlike anything available before, marking new technological achievements which, in turn, will push the industry into realms of audio never before dreamed of.

- Amplifiers, tuners, preamps, receivers and turntables are getting ever better spec-wise, and, therefore, sound-wise. And, despite a rash of price increases related to the value of the U.S. dollar vis à vis some foreign currencies, you'll be getting more for your money than ever before for comparable sound and specs. Some of the new electronic products are so close to theoretical perfection that certain of their specs are beyond the scope of current testing instruments used to rate them!

- The so-called audio "power race" has not ended. Recently the world's highest powered stereo receiver was introduced. Technics' Model SA-1000, with 330 watts per channel output, a mind-boggling figure five years ago, but one that today is more likely to raise the question, "When will *that* be topped?" (Rumors are that it will be before the year ends.)

- Speaker systems are getting bigger on the one hand, with some models towering in the six-foot high area, and getting smaller on the other, with some units' front panels measuring no larger than a paperback book. You'll find more and more three-unit and four-unit speaker system ensembles, offering the kind of reproduction that will surely fulfill your dreams of exquisite sound. You'll find an abundance of sub-woofers intended for use with existing speaker systems, to give

them an extra dose of bass and greater realism. You'll run into new styling concepts when you start shopping, with more speakers in columnar shapes than ever before, and in a variety of other configurations—such as obelisks, truncated as well as full pyramids, a dodecahedron (12-sided sphere), and various panel/screen models that present either flat or bowed faces. You'll learn in your wanderings that today's new speakers are generally more efficient and accurate—most often a result of computer involvement in their design.

- Tape equipment is also getting better, more flexible in terms of bias/equalization selection and operating controls, and also offering more value for your greenbacks in terms of specs and sound recording/playback. Cassette decks are sporting easier-to-load, easier-to-view loading systems that make them even more convenient to use than in the past.

- The new audio products are better looking than ever, in line with their now being regarded as part of a home's basic and necessary "furniture," and better able to be integrated into the decor. Many companies are offering special cabinetry to house audio equipment, to end the clutter that so many people associate with components.

- While prices have generally risen in the audio field, the industry has also come up with new low starting prices in some categories, as witness: a quartz-controlled turntable from JVC at \$169.95 (Model QL-A2); a Dolbyized cassette deck from Toshiba at \$149.95 (Model PC-2460); a stereo receiver from Kenwood at \$189.95 (Model KS-4000R); a digital readout FM stereo tuner from SAE at \$400

(Model 3200); and a 150 wpc receiver with frequency synthesizer and digital display at \$995 from Toshiba (Model SA-7150). Three major speaker manufacturers—JBL, Infinity, Janszen, are now putting their names on units in the low price range, namely \$105 for Infinity Model Qe, and \$150 each for JBL Model L-19 and Janszen Model Z-210A. And ESS, Inc., speaker manufacturer and distributor of the Dyna-vector line, broke the high price barrier of moving coil cartridges with its Model 10X, which requires no special preamp, at a price of \$120.

For openers, in new technology, consider a new microprocessor-controlled programming unit from Technics, Model SH-9038, priced at \$549.95. It provides 32 "steps" of pre-programmable memory that permits you to select a stereo schedule for a full week in advance. The new unit's "stereo computer brain" has a pre-programmable memory for the day of the week, time of day, and on/off for four AC lines. The SH-9038 can tune in a selected broadcast station, at, say, 6:59 on Sunday night, and at the same time turn on a cassette tape deck to record the broadcast starting at 7:00 p.m. It can then turn off that deck, say at 7:30; turn on a second tape machine to record another type of program; and turn it off at the selected time. Programming is easy. You choose the day of the week, time of day, FM station or any of the four components you want switched on or off at selected times. Then you select the "write" mode and program your selections. Switch to the "read" mode and you'll get a readout of the program you've set up. Used in conjunction with Technics' new ST-9038 quartz synthesizer FM stereo tuner, the SH-9038 permits pre-setting the combination for eight different FM stations' programs. The tuner is also priced at \$549.95.

Another example of new technological directions, and the concern of manufacturers with making audio products more convenient to use, comes from Burven Research. Tagged "Remote Variable Field Equalizer," this

new product is actually a remote-controlled equalizer connected to a base power unit by a 20-foot cord. The base unit is connected into a hi-fi system. Measuring less than five inches by seven inches by one and a half inches high, it offers control points of 15, 120, 500, 2,000, 5,000 and 25,000 Hz for each stereo channel. It sells for about \$300.

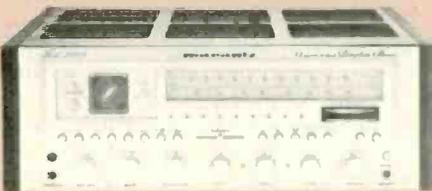
New high realms of technology—and high prices—are to be expected in the amplifier category. Two such models came from Threshold Corp. of Sacramento, California, a year-old company with a noteworthy engineering force. The new units are the Model Stasis 1, tentatively priced at about \$2,500, and Model 4000, priced at about \$1,825. The Stasis 1 is described as a feed-forward, error-nulling power amp embodying a design advance which is claimed to achieve virtually distortionless performance. A company spokesman explained that the unit is "theoretically perfect . . . It eliminates current-induced distortion and, via cascading, voltage-induced distortion. The end result is a distortion spec of 0.002 per cent, comparable to the residual of test equipment."

The Model 4000 cascode/Class A amplifier combines all the advantages of cascode and Class A operation. It was designed for applications demanding immense power output reserves and the utmost signal accuracy, said the spokesman, who went on to explain that it can function as a 200 wpc stereo amplifier or as a 700-watt mono amplifier.

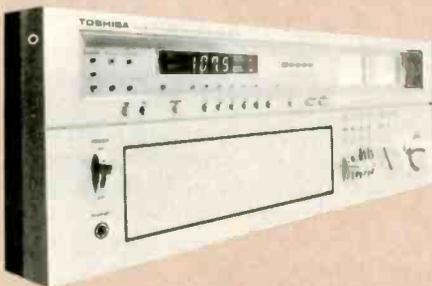
Another new product category to watch carefully since it is bound to turn into a trend before long is television sound via your audio system. U.S. Pioneer Electronics, for example, rounds out its product line with a TV tuner component, the TVX-9500, which allows you to take advantage of the recently improved TV transmission bandwidth of 15 kHz and listen to the audio portion of a television program through your hi-fi system in a manner



Kenwood's KR8010 AM/FM receiver puts out 125 watts per channel RMS with no more than .03% THD. Included are two phono preamps, one handling up to 250 mV, the other handling up to 500 mV. \$675. Circle Number 75.



Marantz offers a new AM/FM receiver, model 2600. Its rated power output is 400 watts per channel into a 4-ohm load (.05% THD), 300 watts per channel into a 8-ohm load (.03% THD). \$1600. Circle No. 77.



Toshiba's SA-7150 AM/FM receiver puts out 150 watts per channel and includes a digital frequency-synthesized tuner section. For details on this unit, which sells for \$995, circle Number 99.

similar to current simulcasts.

Another company, Wintec of America, a recent comer, debuts two stereo receivers with a special TV tuning section to provide UHF and VHF sound reproduced realistically. One is a 120 wpc model priced in the \$700 to \$800 range, the other is a 60 wpc unit to retail in the \$500 to \$600 range. Both also feature five LED readouts per side, in a +2/-15 dB output level range.

The receiver category is enhanced by introduction of a 150 wpc model with digital, quartz-locked, PLL synthesizer tuner section, priced at \$995,



Dynaco offers a new FM tuner, Model 2501. Features include an LED signal strength indicator, built-in quartz digital clock and a touch sensitive tuning knob. Price: \$800.00. Circle R.S. Number 37.



The ST-9038 is a new quartz synthesizer FM tuner by Technics which is designed to be used with a microprocessor-controlled programming unit, the SH-9038. The units are sold separately: \$550 each. For details, circle Reader Service No. 98.



SAE's new FM tuner, Model 3200, has a stereo distortion spec of less than .2%. Also featured are digital readout and LED indicators for signal strength and center tuning. \$400. Circle Reader Service No. 88.

from Toshiba. This is another case of component technology working its way down to the all-in-one receiver, the heart of most audio systems. The unit, Model SA-7150, features memory channels that allow instant tuning of six AM and six FM channels at the touch of a finger. It wholly scans both AM and FM bands through the use of up and down buttons.

The receiver category was further uplifted via a complicated-looking but simple-to-operate 25 wpc receiver from Yorx Electronics Corp. with both cassette and cartridge record/play capabilities and featuring an electronic timer with green fluorescent display. It sells for about \$699.

Cassette Machines

Cassette technology is advanced by Hitachi Sales Corp. in the form of the world's first cassette deck featuring the "Hall-Effect" playback head. This head utilizes a Hall-Effect semi-conductor element instead of the inductance coil required by all conventional playback head designs. The semiconductor eliminates the need for conventional playback equalization and offers increased low frequency sensitivity, with lower phase distortion, while still achieving a signal-to-noise ratio equal to or better than the best coil-wound heads. The new deck, Model D-7500, retails for

about \$700.

Another example of exploration in new realms is the RS-M85 cassette deck from Technics priced at \$650. It is notable for a new approach to recording level readouts. The new set has two horizontal electronic bar graph peak meters segmented into 16 square "dots" for instant comparison of recording levels. JVC has also been exploring new level meter designs, and has come up with a proprietary LED system called "Spectro-Peak Indicator" which shows recording levels from +6 dB to -10 dB on five vertical bars representing 100, 300, 1,000, 3,000 and 10,000 Hz frequency points. The 25-LED Spectro-Peak Indicator is incorporated in the \$500 Model KD-85 cassette deck and \$400 Model KD-65, which both also utilize large-sized VU meters set for easy-view vertical readings.

Pioneer has also been researching new forms of recording level indication, has debuted its Model CT-F900, priced at \$475, featuring highly accurate fluorescent level indicators in place of conventional VU meters. The fluorescent system offers high speed response of peak-indicating LEDs at all recording levels from -20 dB to +7 dB. It also offers "peak hold" to help you determine the maximum signal level present to prevent overload in recordings.

Bias fine tuning is provided by TEAC in its new deluxe Model C-1 three-head, three-motor cassette deck priced at a whopping \$1,300. The fine tuning is in the form of interchangeable modules to match the deck's electronics to a specific brand of tape. Available are optional modules for additional tapes to suit specific recording needs. The C-1 also offers another "first"—optional dbx interface module with switch, to accommodate recordists who want more than the Dolby noise reduction system built into the set.

TEAC also expresses its concern with fine tuning on another level—a new Micro Seiki tonearm. The arm is

available as a separate product, at \$200, or as part of three deluxe Micro Seiki turntables priced at \$350, \$450 and \$500. Designated the Model MA-707, the tonearm is claimed to be the



Ortofon's new moving coil cartridge bears the model number MC10. It may be bought singly (\$125) or packaged with the STM72 transformer (\$185). Circle Number 82.



Nagatronics offers the HV-9100 ribbon cartridge (\$220) with integral head shell. Each pickup is handmade and individually adjusted for optimum performance. The HA-9000 head amplifier (\$275) matches it. Circle No. 146.



ESS distributes the Dynavector 10X moving coil cartridge, which requires no special transformer or preamplifier. Its price: \$120, the lowest priced moving coil design to date. Circle Reader Service No. 145.

"world's first dynamically balanced, low-mass tonearm with a patented variable mass capability." The arm can be varied or "tuned" in such a way as to achieve ideal resonance between the tonearm and any cartridge you might select. An ideal resonance of about 10 Hz is required for the best reproduction, according to TEAC. The arm utilizes a torsion bar system for dynamic balance and achieves the ideal resonance by means of a tiny weight positioned on the tonearm which can change the resonant frequency of the arm/cartridge combination when it is moved back and forth manually. A list is provided to help users attain ideal



TEAC's new line of Micro Seiki turntables includes the DQX-500, a direct-drive, quartz locked manual unit with the MA-707 tonearm. It has a separate power supply and quartz control. \$500, includes tone arm dust cover. Circle Reader Service Number 10 for details.



Audionics of Oregon is offering a new belt-drive turntable, the LK 1. It employs a compliant circular (rather than flat) belt and a dynamically balanced 12-inch aluminum alloy platter. Circle No. 128.

**FALL
FORECAST**

PHONO PICKUPS & TURNTABLES



Philips' new AF 877 belt-driven turntable with "Direct Control" features pitch controls with a 9-LED-bar actual speed indication and direct stylus force readout. \$239.95. Circle Reader Service No. 84.

resonance settings with various cartridges.

Speakers

The speaker area is also rife with new developments. In what could best be called a "far-out" realm, Plasmatronic Inc., Albuquerque, New Mexico, has debuted its "Hill Type 1 Plasma Speaker System," priced at \$6,000 a pair complete with an audio system interface unit. The total system consists of two huge speaker housings measuring 57½ inches high by 24½ inches wide by 18½ inches deep, each containing a section with matched five-inch driver and 12-inch woofer for the lower frequencies, and a tiny "plasma driver," for high frequencies. The plasma driver is like a small gas burner with several mini-jets, fueled with helium. We asked inventor Alan Hill, a laser physicist, for a simple explanation of how the unit works. "There is no simple description. What it is basically, is a thermal dynamic process that has to do with heat flow—which generates sound pressure waves." Each speaker unit also contains independent vacuum-tubed power supplies, plasma control circuits, and power amplifiers, and 100 Hz crossovers, along with tanks of helium providing 300 hours of listening. The tanks must be filled every 300 hours of playing time (by local welding supply companies or other sources). The helium supply cost is 30 to 40 cents per playing hour. Needed to drive the systems is a basic stereo power amp with 100 to 200 wpc RMS output, plus a preamp to which the interface unit connects.

(How does the Plasmatronic unit sound? Great—but not significantly better than several other first-rate systems HFSBG has heard recently. Of concern to potential buyers is the heat the unit generates—not only from the gas-burning tweeter, but also the amplifier and power supply vacuum tubes. A second concern is the helium gas supply source; is there one handy to your home? A third is keeping track of the helium supply, so that you don't,

for example, run out of high frequency sounds in the middle of your favorite symphony, opera or chamber music performance.)

On a less rarified level, Barcus-Berry, of Huntington Beach, California, also has a new speaker system concept. It is called "AudioPlate," a well-chosen tag that tells in part what it is—a plate of glass, energized by a drive mechanism. The new unit, which measures six by six inches and fits into a 3½-inch deep walnut frame surround, was devised to work in the 2,000 Hz to "beyond audibility" range, essentially as an add-on to an existing system deficient at the high end. It sells for \$200 a pair. The firm is hoping to license the concept to other speaker manufacturers who would use the AudioPlate as the tweeter in a full-range speaker system. A brochure on the product says "It works . . . (We Don't know how!)" Robert Johnson, president of Barcus-Berry, described the AudioPlate to us in these terms: "It does not propagate sound waves in the normal manner of a pressure cone system, and is virtually inertialess, not encumbered by the normal problems of distortion and efficiencies and baffling of regular speaker systems, and is totally omni-directional with a very wide dispersion pattern."

(How well does the AudioPlate work? As well as any other top quality tweeter, but with less "beaming"—for truly omni-directional dispersion.)

Among new speaker trends is a noticeable tendency toward three-and four-unit speaker systems, and toward the introduction of many new sub-woofer systems designed for use with existing systems, or for use with small "satellite" speaker systems, such as the new crop of mini-models that is blossoming out in the audio marketplace, to create three-and four-unit ensembles.

One new-four piece system consists of two RTR PS/1 satellite speakers and two RTR DAC/1 subwoofers. The RTR satellites are, essentially, truncat-



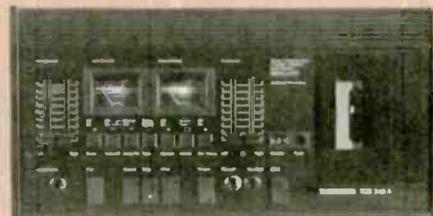
Yamaha has introduced the TC-1000 cassette deck. It is a three-head (sen-dust), two-motor machine with user-adjustable bias fine-tuning. \$595. Circle Number 101.



AIWA has a new cassette deck in its line. It's the AD-6900U, a dual-motor three-head machine (\$850) with a remote control option (\$60). User-adjustable bias & Dolby. Circle 121.



Pioneer's CT-F900 cassette deck is a three-head machine which also features fluorescent level indicators and four electronic memory controls. \$475. Circle Reader Service No. 85.



Tandberg's TCD 340AM cassette deck offers an "Actilinear" recording system and front-panel bias switching to accommodate either Maxell UDXL I or the new metal particle tape. \$1300. Circle Reader Service Number 97.



3M's new metal particle recording tape called Metafine, whose output performance is designed to be 5 to 10 dB greater than that of "typical" chrome tapes. Circle 113.

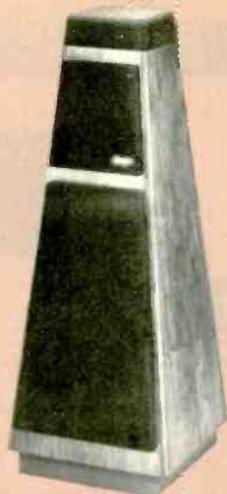
ed pyramids, containing tweeter, mid-range and lower midrange drivers. The subwoofers each contain a down-firing, slot-loaded 12-inch woofer and two side-firing 15-inch passive radiators. The subwoofer design is claimed to be "the first new design in low frequency models, combining the attributes of the vented and acoustic suspension concepts." Price for the RTR ensemble is \$1,550.

Another is a three-unit system from Fried Products, consisting of two Model B/2 mini monitors, and the Model T subwoofer, at \$1,900 for the three pieces. Each B/2 contains a 5-inch midrange and one-inch dome tweeter. The 44-by-25-by-21-inch subwoofer contains two 10-inch woofers, one for each channel.

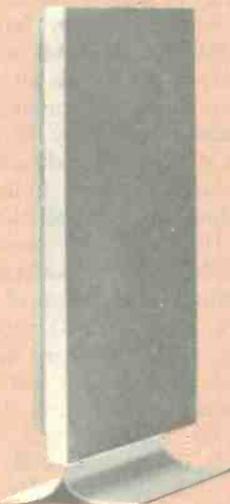
One company, Fulton Musical Industries, has come up with a walnut vinyl-clad woofer, the 49-inch high Model FMI E with special 12-inch driver, priced at \$275 each, for use with its two-way, three-driver Model FMI 80, priced at \$119 each. The company says that a total four-unit ensemble could be bought on a "building-block" basis, by buying the FMI 80s initially and enjoying their first-rate reproduction, and then when the budget permits adding the woofer units for the extra modicum of bass. FMI also has a smaller woofer, the Model B, in walnut finish, at \$279 each, for those who prefer wood veneered cabinetry. The unit has two 8-inch woofers and stands 34½ inches high. Additionally, Fulton has a tweeter unit at \$169 for use with existing speaker systems. It does not require a crossover. A company spokesman notes that the building-block approach enables audiophiles to upgrade to better systems without having to go the trade-in route which is generally a costly matter.

Several companies offer giant speaker systems for those who like big sound and have the space for repro-

(Continued on page 80)



Epicure's Model 3.0 "Trilogy" speaker is a three-way speaker system uses a 10-inch woofer, a 6-inch midrange, and an 1-inch air-spring tweeter. Drivers are housed in a truncated pyramid which is designed to increase power handling ability and reduce distortion. \$575. Circle 68.



Thorens is introducing its first speakers with the HP 360 (pictured here) and the HP 380. Also called "Sound Walls," both have a nominal impedance of 4 ohms. The HP-360 has a rated power handling capacity of 80 watts DIN. Its price: \$700 each. HP-380: \$990 each. Circle Number 95.



Design Acoustics' D-12A is a dodecahedron shaped system including two 8-in. woofers, a 1½-in. dome midrange, two 5-in. cone midranges, 2 1-in. dome tweeters and 3 1½-in. cone tweeters. \$675 ea. Circle 96.



JBL's L220 loudspeaker employs three drivers and a passive radiator to achieve the design goal of aligning the drivers' acoustic centers while retaining a flat baffle panel. \$750. Circle Reader Service Number 73 for details.



\$6000 will buy you a pair of Plasmatronics H11 Type-1 speakers. Its design is based on laser plasma physics. A new helium tank (in the cabinet) is needed every 300 listening hours.

**FALL
FORECAST**

**8
SPEAKERS**

NAKAMICHI P-100 AUDIO ANALYZER



Circle No. 112 On Reader Service Card

AS A TAPE RECORDER TEST SET, IT'S ALL YOU'LL EVER NEED

□ Intended for both the service shop and the serious audiophile the Nakamichi T-100 Audio Analyzer (\$800, complete with carrying case and strap) provides several test and measurement systems for what is generally just the cost of a wow and flutter meter.

Though more or less specifically designed for test and evaluation of tape recorders, the instrument can also be used for meaningful amplifier tests.

Housed in a cabinet measuring 13.5 inches wide by 3 inches high by 9.5 inches deep and weighing slightly in excess of 9 pounds, the T-100 provides several test systems which are normally separate instruments. All measurements are indicated by two *plasma indicators*, which are perhaps better known as "bar graph" meters. Each meter consists of a series of horizontally mounted gas-discharge cells that glow red when excited. The higher the applied voltage the greater the number of cells caused to glow, so the cells form a *bar of light* that spreads from left to right as the applied voltage is increased. The greater the applied voltage the wider the bar of light.

Scales printed on the front panel adjacent to the bar graph meters are calibrated to measure *Speed Drift* ($\pm 3\%$), *Level* (-20 to $+10$ dB), and

THD or *Wow and Flutter* (0.1% to 3%). An accessory *Wattage* scale that can be placed over the normal scales indicates left and right channel *Voltage* (0.1 to 30 volts), and *Watts* (0.1 to 100) for 8 ohm loads.

Front panel controls include a function switch that sets up the T-100 for speed deviation with unweighted wow and flutter, or speed deviation with weighted wow and flutter; left or right THD at 400 Hz; oscillator output, oscillator output 20 dB down; left and right noise level measurements (increases display sensitivity 40 dB); left and right peak level indication (converts "damped" meter indicators to peak reading). A two-position switch provides 1% and 0.1% meter sensitivity, while a three-position switch provides input level range of 10 volts ($+20$ dB), 1 volt (0 dB) and 0.1 volt (-20 dB), while a rotary switch selects a pink noise output test signal or a low distortion sine-wave frequency of 20, 40, 63, 100, 160, 250, 400, 630, 1k, 1.5k, 2k, 3k, 4k, 5k, 6.3k, 8k, 10k, 12k, 15k, 18k and 20k Hz. (When testing for distortion the output signal is automatically 400 Hz.)

Multi-turn controls are provided for the *Speed* meter calibration, left input level, right input level, and oscillator output level.

The 110 volt power cord receptacle

and power switch are located on the right side panel. The left and right input and output jacks, and left and right output connections for an oscilloscope (all of the phono jack type) are located on the left side panel.

When the function switch is set for weighted or unweighted wow and flutter measurements (indicated by the lower bar graph), the speed deviation is automatically indicated by the top bar graph. First, the top bar graph is calibrated for zero-drift (or error) using a built-in test signal selected by the function switch and the *Speed Calibration* control. Then a 3k test tape or record is played on the tape recorder, or from a turntable through an amplifier. The percent speed variation (drift) is indicated by the top bar graph, while the wow and flutter is indicated by the lower bar graph. If you're testing a complete record/play system for wow and flutter you first record the 3k Hz from the T-100's internal oscillator, then you measure the wow and flutter to attain the combined record/play wow and flutter measurement.

To test a recorder for distortion at 400 Hz you first record the T-100's 400 Hz test signal at whatever record level you select or are interested in. On playback the bar graphs indicate prop-

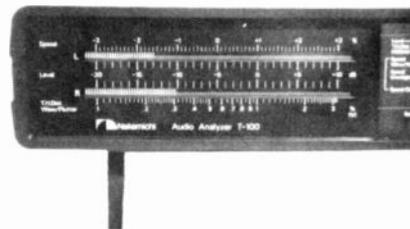
(Continued on page 74)



• All test functions are selected by the function switch, which automatically provides a 400 Hz oscillator output when set for the THD (distortion measurement) mode. Otherwise, the oscillator switch determines the output frequency, or pink noise.



• All connections are made to phono jacks on a side panel. The scope connections permit visual observation of the T-100's test and signal output(s).



• Bar graphs are created when individual plasma cells glow. From a distance the cells appear to merge into a solid light bar. Here the bottom graph indicates -10.5 dB, while the top indicates -14 dB.

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They're sexy looking." "They give a lot of sound for the dollar." You can't beat them for use in tight spaces." "They fit into home decor—rather than stick out from it." "Set 'em up right and they'll sound as good as units five to 10 times their size." They cost more per cubic inch, but they're worth it."

The foregoing are just a few of the many comments made by audio dealers, and hi-fi buffs to *HI-FI/STEREO BUYERS' GUIDE* in recent months on what is turning out to be one of the hottest "new" products in the audio field—mini speakers. While the concept of mini-speakers is not actually new—there's been a sprinkling of them down through the years—the new breed represents substantial technological advances and new application horizons, some a direct consequence of the ever-growing use of computers in the design of speaker systems.

Ironically, the new minis have spurred manufacturers of traditional speaker systems to start reworking their existing compact and near-mini-sized models in the light of these advances and new applications, to develop "spin-offs" in sizes that bridge mini-speakers and traditional-sized units.

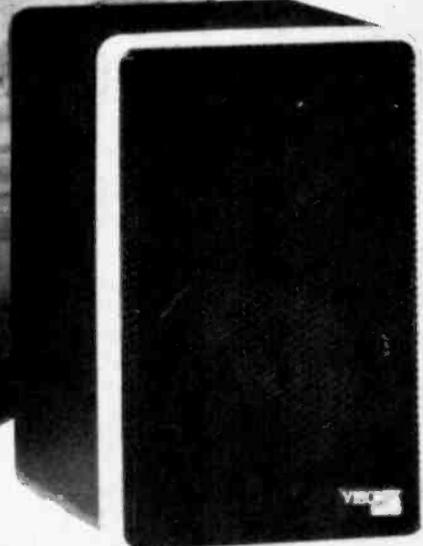
The genesis of the new

mini-speaker is generally attributed to Analog & Digital Systems, Inc. (ADS) which back in April, 1976, debuted a two-way, bi-amplified mini measuring about 7 by 4½ by 1½ inches, called the Model 2002, designed to be used with a deluxe cassette deck made by Nakamichi. (This introduction was additionally significant in that it also launched true hi-fi sound in automobiles.) The Model 2002 uses a four-inch long-excursion woofer and one-inch soft-domed tweeter, and contains a pair of bridged amplifiers to drive the woofer, and one amplifier to drive the tweeter in each system. The Model 2002 spurred a score of "me-too" speakers, most of them minus the expense-adding amplifiers. ADS itself has two such models.

Typically, the minis employ woofers measuring from three to five inches in diameter and one-inch tweeters. They are most often housed in thick, high-impact plastic or metal (frequently aluminum) cabinets with rounded corners and with metal grilles. The two-way models are from six to ten inches wide, and up to five inches deep and high. ADS notes that it uses solid aluminum housings for its line in that "the metal housing



Visonik's David 502 mini-speakers (\$115 each), below, combine with the Sub-1 sub-woofer (\$360) to handle the full audio spectrum. Circle Reader Service Number 100.



MINI

by FRED PETRAS

SPEAKERS

A LOOK AT A NEW SPEAKER TREND

MINI SPEAKERS

allows the smallest possible outside dimensions for a given inside volume. Made of wood, our Model 300 would be 50 per cent larger." Mini models are generally priced in the \$70 to \$150 range, but a few go as low as \$67.50. And some range up to \$285 each.

There are also a few three-way models, a bit larger, with woofers measuring up to eight inches in diameter. These are priced from \$80 to \$300.

Typical frequency response specs are on the order of 60 to 22,000 Hz. Sound pressure levels are on the order of 85 to 90 dB at one watt RMS input at one meter. Power handling ranges from 20 to 100 watts. Recommended minimum amplifier drive power starts at around 10 watts, but most require substantially more for optimum reproduction.

Both two-way and three-way types can produce first-rate sound, if properly driven and positioned in a listening environment. While some of the units can fill a large living room with hefty levels of clean sound, some function best in a small room environment. (Remember, these units were originally designed for mobile use, with home applications actually a spinoff.)

One engineer explained that a key to the solid type of sound produced by the mini models is that they usually incorporate "long-throw" (deep excursion) woofers. Instead of utilizing a wide area of cone that moves perhaps a quarter inch, as in regular systems,

the mini models use smaller woofers whose excursions range up to an inch, to move a surprisingly large amount of air.

While some models are a bit shy in the bass area, proper placement in, and coupling to, the listening area can result in a satisfying bass.

A source at Visonik, manufacturer of the David line, explained that the minis do not "beam" high frequency sounds as much as larger models, in that they have a smaller frontal diffracting area and thus offer better dispersion.

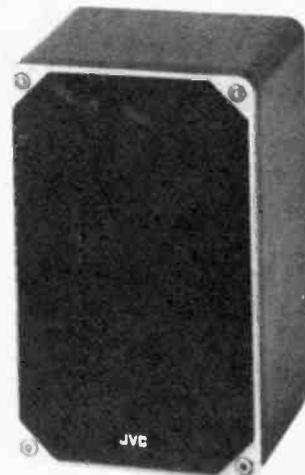
More than 20 companies are selling two-way mini-speaker systems. Most supply only one or two models, but ADS, Braun, Royal Sound, and Visonik market from three to five models each.

The ADS line is comprised of four models. The ADS 200, measuring approximately 7 by 4½ by 4½ inches, uses a one-inch soft-dome tweeter and one four-inch super long excursion woofer. It comes in a satin black or silver solid aluminum cabinet, and sells for \$105 each. The ADS 2001 is the same size and uses similar drivers, but comes with a power module that contains two woofer amplifier sections, each offering 60 wpc output, and two 20-wpc tweeter amp sections. Total cost of a pair of 2001s and the amp module is \$569.95. The ADS 2002 described earlier, also has the same speaker complement as the above, and comes in the same sized cabinet at \$449.95 a pair. The ADS 300, priced at \$140 each, features a 5¼-inch woofer and one-inch dome tweeter in a solid aluminum housing measuring about 8 by 6 by 5¼ inches. All models come with perforated brushed aluminum grills.

The Braun two-way line from Ad-



Lafayette's Pip Speak includes a long-throw woofer and a soft-dome tweeter. Its nominal impedance is 8 ohms. \$49.99. Circle Reader Service No. 129.



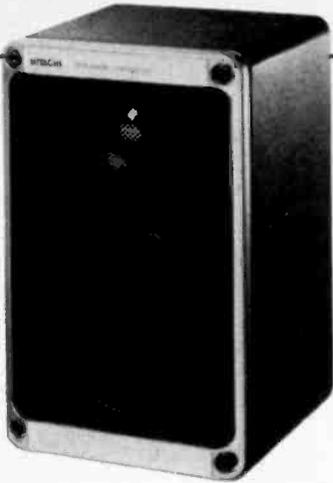
JVC's SM-3 micro-speaker system sells for \$159.90 per pair. It's a two-way acoustic suspension design. For details, circle Reader Service No. 74.



Canton's HC 100 two-way acoustic suspension speakers come in a die-cast aluminum enclosure with perforated metal grille. Nominal impedance: 4-8 ohms. \$190 a pair, slightly higher in West. Circle Reader Service Number 132.



Tamon Audio offers the LB-103D two-way compact speaker with mounting bracket for \$189 per pair. It is also available as the LB-103, without mounting bracket, for \$179 per pair. Get additional details by circling Reader Service Number 134.



Hitachi's HS-1 mini-speakers sell for \$100 each. Nominal Impedance: 8 ohms. Uses 4½" woofer, 1" tweeter. Circle Reader Service Number 72.



Braun's Output C has a nominal impedance of 4 ohms and handles from 10 to 35+ watts of amplifier power comfortably. \$230 per pair. Circle Reader Service Number 135.

com has three models. They are as follows: Output C at \$230 the pair, featuring 2½-inch woofer and one-inch dome tweeter in a 7-by-4-by-4-inch housing; Model LVP-100 at \$260 the pair, using a similar speaker complement and in the same sized cabinet, but with swivel mounting bracket; Model L-200, priced at \$270 the pair, using a five-inch woofer and one-inch dome tweeter, in a cabinet measuring 10 by 6 by 6 inches.

The Royal Sound line consists of three models. They are: S-6050, a two-way three-speaker (two 2½-inch woofers, one piezoelectric tweeter) in a cabinet measuring 6½ by 3½ by 3½ inches, and priced at \$150 each; the S-6060 with four-inch woofer and 1½-inch tweeter in a housing measuring 4½ by 7½ by 4½ inches, priced at \$130 each; and S-6100 with 4-inch woofer and soft dome tweeter, in a cabinet measuring 5½ by 8½ by 5½ inches, priced at \$150 each. All three models come with universal mounting brackets for auto use, or special mounting in the home.

The Visonik David mini line consists of five models in three basic systems. They are: Model D-302 in black cabinet measuring 6½ by 4½ by 4½ inches and using a four-inch woofer and two-inch cone tweeter, and priced at \$80 each; Model D-502 in same type and size cabinet as the 302 but with four-inch woofer and ¾-inch soft dome tweeter, priced at \$115 each; D-602 in choice of black or walnut finished cabinet measuring 9½ by 5½ by 5½ inches, using a five-inch woofer and one-inch soft-dome tweeter, and priced at \$150 in black and \$160 in walnut. The D-302 and D-502 also come in versions meant for mobile use

with special mounting brackets, at an additional \$12 per unit.

Other firms offering two-way mini-speakers are: Adcom (Canton), Audio-analyst, Chartwell, Custom-Craft (Dimension), Electronic Industries (Goliath), Fujitsu Ten, Hitachi, Isophon, JVC, Jandy (Car-Fi, Diamant), Mesa, Metro Sound, Mitsubishi (MGA), Muntz, Tamon, and Ultralinear.

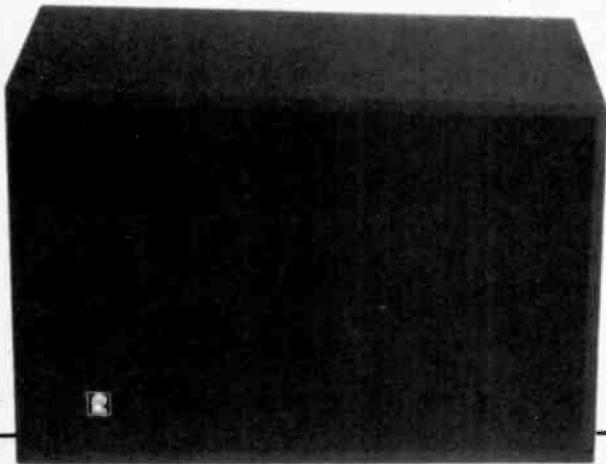
Slightly larger model in three-way configurations are available from Braun, Fujitsu Ten, Jandy, Qysonic, and Setton.

You'll also find two-way mini-speakers in private brands marketed by giant audio dealers, such as Acutex by Atlantis Sound, and Pip Speak by Lafayette Radio, the former priced at \$99, the latter at \$40.

Choosing mini-speakers can be as simple—or complicated—as choosing regular speaker systems. You have only your ears as the true, final guide.

A few caveats are in order. First off, don't expect the minis by themselves to sound like full-sized speakers; some will, some won't. Secondly, the only real way to evaluate them is on an apples-with-apples basis, i.e., mini-speaker vis-à-vis mini-speaker. If you try evaluating minis against regular sized models you will confuse the issue and defeat the evaluation.

As with regular speaker evaluation, listen to as many as you can. Don't expect to find a lot of mini-speakers at your local store(s); they are still too new a category for many dealers. You'll probably have to do your listening at several stores, then narrow down your selection as best you can, hopefully in an outlet that carries the two or three "finalists," one of which will be your ultimate choice.



Royal Sound's S-6100 is a two-way speaker capable of handling 50 watts per channel RMS, with 100-watt peaks. Price: \$300 a pair, including mounting brackets. Cabinet measures 5½ by 8½ by 5½ inches. For details circle R.S. Number 130.



Mini-Mesa 15 speakers measure 3½ inches wide by 6 inches tall by 3 inches deep. They are packaged two per kit, with 30 feet of speaker cable and mounting brackets. They're covered by a 5-year limited warranty. \$119.95 a pair. Circle No. 133.

MINI SPEAKERS

Listen carefully for *balanced* reproduction, with lows, midrange and high frequency sounds reproduced in proper proportion for the most natural sound. Do this at various loudness levels; make sure you check at low listening levels where some models perform better than others. On first listening to some minis, you may feel they don't have enough bass. In many cases you will be listening with an aural image carried over from regular sized speakers, some of which have a bass that is heavy with resonances that reinforce the essential true bass, making it seem deeper. The bass of many minis is actually a truer bass than you get out of larger models, for the reason noted above, but it is less obvious because it is less artificial.

In some stores you may discover that the units are placed in a way that does them a disservice. This may be out of ignorance of the sometimes critical nature of mini-speaker placement, or a deliberate way of downplaying them by the store in order to sell you a larger system. The units may be placed too high on a shelf, too far apart, or in some other way that negatively affects their reproduction. If you sense that the units are capable of better sound than they are giving off, ask the salesman to move them up, down or sideways—whatever seems appropriate—to check out their true potential.

Two other points to watch are the demo room size and the volume level of reproduction. Minis are generally meant for smaller listening rooms, where the usual forces of direct and reflecting sound come into play. If played in too large a room, they may be "lost," and their sound may seem inadequate, thin, or weak because the surroundings are wrong for their operation. (Remember again, many of these systems were designed with an auto or van environment in mind.)

A natural tendency would be to turn up the volume control to fill a large room with a greater level of sound from the minis. This works up to a point, but you can turn up the gain too far. This results in overloading the speaker, causing it to distort. Avoid this, if possible.

If you like the essential sound of the speaker but it seems inadequate in a large demo room, ask if you can hear it in a smaller room or partitioned

area somewhere on the premises. If this is not possible, ask for a home trial transaction, in which you buy the speakers but have a few days to use them in your home to make sure they will fill your needs.

Recent "hands-on" experiments at home, with a pair of Visonik David Model 602 and a pair of ADS Model 300, have convinced us of the merits of mini-speakers. Despite the caveats of generally higher price, greater power requirements, and sometimes critical placement, we are convinced they are a valid hi-fi product for both general as well as specific application.

Based on our experimentation, and reports from several dealers and manufacturers with whom we discussed minis, we'd say that you may actually have far more flexibility in placing the minis as opposed to large bookshelf or floor models.

In our experimenting with the Visonik and ADS systems, we found placement to be a two-sided coin. It consisted of learning that placement is both critical and non-critical, mostly the latter, depending on a variety of factors including room size, type of furnishings, relative "liveness" or "deadness" of a room, etc. In essence, we found that while it took a fair amount of drive power to get our units to operate optimally, we could, on the other hand, place them in a variety of ways for a variety of good sound setups. For instance, we found that the units would produce a certain type of satisfying sound when placed at an angle firing into the intersection of two walls of a large, open and deep equipment cabinet. They could also be placed on their backs, firing upward against a shelf 10 inches above, and reflecting onto an adjacent wall for equally satisfying results. We also found you could aim them straight at a wall or the back of a spacious bookcase/cabinet and get first-class sound. By carefully angling each pair in a moderately "live" 15-by-19-foot living room with one end opening onto a dining area, we were able to balance the sound for a full stereo effect and attain full-room sound on the order of that produced by a pair of floor-standing models 10 times their size.

We also placed them on the floor, firing forward in the traditional manner, and angling them in several directions. Again the stereo image was good, with high frequency sounds abounding no matter what the angle. We also laid them flat on their backs on the floor, firing ceilingward. Again, first-rate sound

(Continued on page 75)

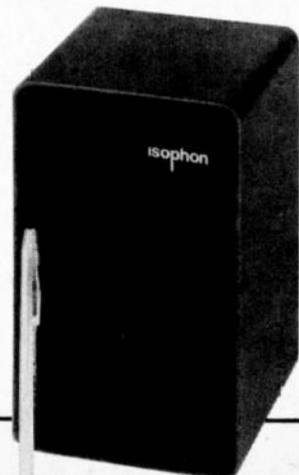


The ADS 200 is a two-way speaker which comes in either satin black or chrome-colored solid aluminum cabinets and sells for \$105 each. Circle Reader Service Number 136.



General Sound the 400 Series two-way speaker in a choice of three finishes: black, white, or walnut veneer. \$120, each. Circle Reader No. 137.

Isophon's DIA-2000 is 7 1/4 inches high, 5 inches wide, 3 1/4 inches deep. Its nominal impedance is 4 ohms, and its price is \$79.95 each. Circle 131.





Buddy Rich is featured on the Great American Gramophone Co.'s release, *Class of '78* (GADD-1030). Included are: Joe Zawinul's *Birdland*, and a trio treatment of Chick Corea's *Fiesta*.

HARRY JAMES...



COMIN' FROM A GOOD PLACE

Sheffield Labs features Harry James on *Comin' From A Good Place*. Nos. include *Two O'Clock Jump*, *Blues For Sale*, *Moten Swing*, *Opus No. One*, *You'll Never Know*.

During the last few years a "new" (and growing) phenomenon has been sweeping the audiophile community—direct cut discs. Why is the word new in quotes? Because, as most of you know, it is not at all new, but rather a rebirth of the recording technique used before the introduction of tape. The convenience, editing capabilities and permanence of taped performances is enough to guarantee that taped recording sessions will never be totally replaced by the direct cut process. For the production of special, costly audiophile recordings, however, the direct-cut process predominates. There is always the possibility (and hope) that someday the taping process will be able to equal direct cut in terms of sound quality. This dream has been demonstrated with some of the new digital (or Pulse Code Modulation) recorders and playback units, but it will be many years until the standard analog record gives way to digital. So, if you are a true blue audiophile, or just a person who appreciates exceptional recorded sound, then for now direct-cut discs are for you—especially if you *really* want to hear what your hi-fi system can put out.

Aside from the high costs (both to the manufacturer and consumer) of direct cut recording, certain inherent limitations make direct cutting highly impractical: once the supply of masters is used up, there just aren't any more. It isn't possible to simply re-run the original tape and cut a new master so a few thousand more discs can be pressed. And, since direct cut discs are truly recordings of live performances, there can be no going back to edit out a blown note, add a little echo, dub in a string section or, in general, use the

DIRECT TO DISC DIRECTORY

by ALFRED W. MYERS

studio electronics to turn a mediocre performance into a gold record.

When making a direct-to-disc recording, the whole "thing" must be done correctly while the master is being cut—equalization, channel balancing and microphone levels—right down to cutting the entire side of a full album at one, non-stop sitting. No coffee breaks or "take five." If a musician makes an error during the last band of a side, then the whole side must be redone. Because of all this, certain sounds we have become accustomed to on conventional recordings are impossible with direct cut—no Tomita or Walter Carlos synthesizer albums with their countless

overdubs, no Carly Simon singing counter-melody with herself and no Ronnie Aldrich and his twin pianos.

Yet, with all these limitations, direct-cut recordings are the sweethearts of hi-fi enthusiasts, in spite of the fact that their average price is fifteen dollars for a single record—and some of those are 12-inch 45s. The wide-open dynamic range, clean and sharp transients and overall "alive" sound make direct-cut discs superior to run-of-the-mill albums. Usually, but not always, the consumer is sure of getting a record that is as quiet and free of surface noise as modern pressing technology will allow. If nothing else, these discs show us what

DIRECT TO DISC

is so sorely lacking in regular records.

The purpose of this article is to act as a "guide" if you are about to purchase some D/C discs. An unfortunate practice with some of these albums is that no indication is given on the record jacket as to what the actual contents are. Simply calling a disc "big band jazz" is not much help without at least knowing what songs are played. And, just try to return a fifteen dollar album minus the loose shrink-wrap, just because you did not like it.

Sheffield Records are the pioneers of the direct-cut revolution now going on. They began releasing this type of disc back in the late sixties, and today, their first two albums are collectors items commanding prices over \$100.00 each. Their third release, Lincoln Mayorga & Distinguished Colleagues III, is still available and an excellent way to introduce yourself to the sonic splendors of direct-to-disc recordings. Although it might be musically described as "middle of the road" it is certainly not easy listening. The arrangements and sounds packed into this vinyl will *grab* you. Two particular cuts, "America" from *West Side Story* and "From Menaggio To Bellagio" are guaranteed to explain the term dynamic range to anyone who still isn't sure what it means. On the latter song too, there is a bass drum like has never been on a disc before. Other selections include "King Porter Stomp," "You Are The Sunshine Of My Life" and a Michel LeGrand medley. In all there are eight bands. This is one of those discs with no table of contents outside, giving no indication that it is all instrumental.

If you like some more "punch" to your music, try Sheffield's recording of Thelma Houston & Pressure Cooker. Not all eight selections are vocals by Ms. Houston, just four and a brief reprise of the title song, "I've Got The Music In Me." A quick listening comparison between the vocals on this and her "conventional" recordings will open the eyes of the uninitiated. If you've seen this album in a store and have been toying with the idea of buying it, you'd better hurry. It has been available since 1975 and already the price is starting to climb as supplies become depleted. The vocal and accompaniment on the ballad "Don't Misunderstand" is perfectly balanced and ultra-clear, as is the whole

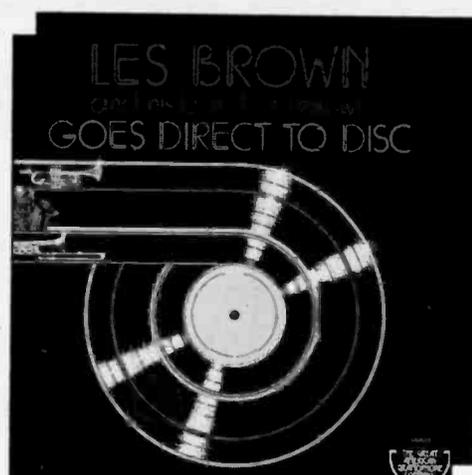


Nexus is a six-member percussion ensemble whose ragtime numbers on this Umbrella disc are scored for xylophone, marimbas, a toy piano, and various other percussion instruments. UMB-DD2.

disc, while the rocking title song seems to jump out of the speakers and onto the living room floor. "Step In Time," an instrumental is outstanding for the drums and synthesizer while "Dish Rag," another instrumental is notable for its rinky-tink piano and brass. The disc surface is velvety smooth and dead quiet. Narry a click or pop.

"Discovered Again" by Dave Grusin (also on Sheffield) might be termed a quiet alternative to the rock and bounce of the Houston album. Grusin is a pop-jazz pianist/composer whose mastery of the piano and note-perfect arrangements are a pleasure to hear. The music ranges from slow to bouncy and although there are no sonic block-busters, the sound is so clean and natural that the disc is well worth the price. Grusin is known for (among other things) writing the popular theme for the TV series *Baretta*. "Keep Your Eye On The Sparrow," which is played here along with "Sun Song," "Captain Bicardi," and a long medley of cowboy songs. There are only four musicians playing with Mr. Grusin (drums, bass, guitar and percussion) which leads to the quiet "intimacy" of this well-recorded album.

Recently several direct-cut companies have issued recordings of "big band jazz"—both contemporary and swing. The two Sheffield offerings in this genre are by Harry James and his band, and both albums reflect Sheffield's consistent high quality. The two James discs offer big band arrangements of "forties-type" standards as well as more recent compositions. The first release, "The King James Version" includes "Cherokee," "Sweet Georgia Brown," "Traces," and "Lara's Theme" from the film, *Dr. Zhivago*. His second album, entitled "Comin From A Good Place" includes



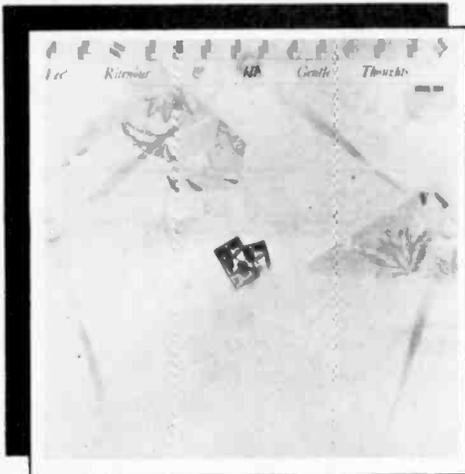
Les Brown Goes Direct-to-Disc is a Great American Gramophone Co. recording (GADD-1010). Nos. include Tickle Toe, Alone Again (Naturally), Satin Doll, Laura, On Green Dolphin Street and Sir Duke.



At Seventeen, Swing 39, It's All Clear To Me Now, and Old Hymn are all included on Crystal Clear's disc, Charlie Byrd. The disc was recorded and must be played at a 45 rpm speed. CCS 8002.



Big Band Jazz features Rob McConnell & the Boss Brass, on the Umbrella label (UMB-DD4). It's a two-record set which includes Gershwin's *Porgy and Bess Suite*, *Keep Me In Your Heart*, *Runaway Hormones*.



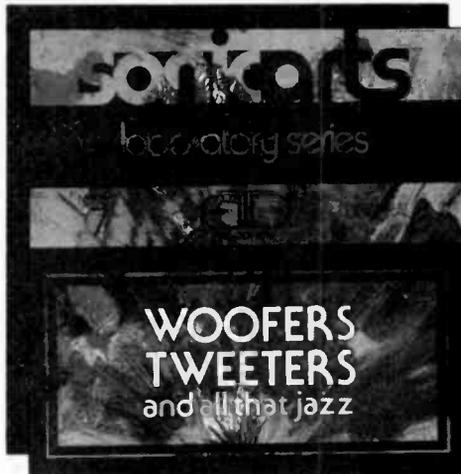
Nautilus Recordings distributes this direct-to-disc JVC recording. Entitled *Gentle Thoughts*, the album features pop guitarist Lee Ritenour. Selections are a collection of jazz/soft rock instrumentals.



Laurindo Almeida performs on a Crystal Clear release called "Virtuoso Guitar." It's a blend of jazz and classical selections, including a *Sonata for Guitar and Cello* by Radames Gnattali. (CCS 8001)



San Francisco Ltd. (Crystal Clear CCS 5004) is a direct-to-disc recorded at 45 rpm. It includes Bob Dylan's *I'll Be Your Baby Tonight*, a cut called *Cannonball*, & *Just A Closer Walk With Thee* (traditional).



Woofers, Tweeters, and All That Jazz is a binaural direct-to-disc recording which includes *Sometimes Plums*, *Sometimes Turnips* and *Keith's Blues* among other numbers. (Sonic Arts Lab Series 7).

"Two O'clock Jump," "Tuxedo Junction," and "Make The World Go Away." There are nine songs on each album.

Great American Gramophone Company, whose three releases thus far are all of the big band type, is a relative newcomer to the list of direct-cut companies. Their first features the Glenn Miller orchestra under the direction of Jimmy Henderson. While it is sonically an obvious direct-cut disc, the drums seem just a bit weak (muffled)—especially on the upbeat numbers. However, this does not detract from the overall high quality of the disc and, after hearing so many imitations of the Miller "sound" it is a pleasure to hear the real thing. The contents are all standard Miller fare including "String Of Pearls," "Moonlight Serenade," "Tuxedo Junction," and one of the fastest versions I've ever heard of "American Patrol." In all there are ten selections. A very quiet disc surface.

G.A.G.'s second venture into direct recording features Les Brown and his Band of Renown. G.A.G. can not be faulted for either muffled drums or weak bass on this disc. This represents yet another excellent way to introduce yourself to the sound on D/C recordings. The instrumental selections (nine total) include such "oldies" as "Poor Butterfly" and "Laura" while more modern works such as Stevie Wonder's "Sir Duke" and the theme from the film *Rocky*, "Gonna Fly Now" are also given the Les Brown treatment.

Quadraphiles Note: Although this disc was not specifically SQ encoded (it would be possible) it provides outstanding four channel effects when played through a high quality matrix decoder.

Recently several writers have made mention of the fact that simply using the direct-to-disc process does not absolutely guarantee a super album. This is proven out with "Peter Appleyard Presents" on the Canadian label, Salisbury. Musically it is a nice disc with interesting instrumental arrangements (soft rock and very mild jazz) of pieces in the vein of "Swinging Shepard Blues" and "Mambo #5." The disc is pressed on white Quadradisc vinyl which, according to the liner notes, is supposed to reduce surface noise. These people need all the help they can get in this area. As we are all sadly aware, in the world of records there are clicks, pops, and scratches. This disc has them all, including one pothole that my stylus and tonearm would not cross. The only practical use for this album would be with some electronics engineer who is trying to perfect a click/pop impulse noise reducer.

Umbrella, on the other hand, is a North-of-the-border direct-cut label about which only good things can be said. While the musical content of some of their albums might not be to everyone's liking, the sonics and technical aspects of their releases are first rate. "Rough Trade Live" is the first hard rock disc to be done direct, and in terms of transients and clarity, it is a hair-raiser. It has an absolutely thunderous bass line so you bass freaks beware: if you already have the bass tone control on your receiver or amp cranked to the maximum and the loudness contour punched in, you may hear some very strange (and possibly damaging) sounds coming from your woofer. Better to start with the tone controls flat and work up to full bass gradually. The lead singer and co-composer of all the songs (Carole Pope) has a pleasing but strident voice, yet there seem to be a few rough edges to the whole performance. This, of course, might well be the result with any rock group that can not go back and electronically clean up the recording. The album includes a total of eight songs.

The second Umbrella release, "Nexus," consists of a collection of ragtime music played on xylophones and marimbas with assorted percussion thrown in. Technically, the disc is flawless and has all the things one looks for in direct cut: wide-open dynamic range and sharp, clear transients. The playing is note-perfect and the musicians are, obviously, first-rate masters of their instruments. The question that you, as a prospective buyer, must answer for yourself, is whether or not a full LP of this type of music is to your liking.

(Continued on page 81)

Opera

For Today

Franco Corelli

by Speight Jenkins

□ Anyone who was present at the Metropolitan Opera on the night of January 27, 1961, will never forget it. On that occasion the color barrier in opera fell forever with the triumphant debut of Leontyne Price as Leonora in *Il Trovatore*, and though not as politically significant, it was also the night when a young tenor named Franco Corelli made his debut as Manrico. Corelli wore a blond wig—something he never sported again in his 14 years of performance with the Met—but his voice was not disguised. From the first offstage serenade, a robust spinto tenor, it rang out with power, assurance and undeniable, almost palpable, sensuality.

Miss Price drew the lion's share of applause on that occasion, but Corelli would get his again and again. He became an idol in New York, and though he had a fine European career, as the years went on he sang more and more at the Met, giving up more of his European assignments. For the first decade of his Met career the name Corelli on the opera meant a sellout. The Metropolitan, then under the leadership of Sir Rudolf Bing, paid well for his services.

In the first season it was immediately apparent that his talents lay in opulent vocal production, not in musicality or taste. Corelli told interviewers that he had never had a singing teacher, that he was a natural talent and the course of his career



While performing *Tosca* at the Met, Corelli posed in full costume for the role of *Cavaradossi*.

proved this all too clearly. With his large, rich, heady tenor, he was a natural for Puccini, and in that first season he was Calaf in the first Metropolitan production of *Turandot* in more than two decades. With Birgit Nilsson as the Chinese princess, the two offered nine sold-out houses that year and repeated the opera time after time during the next decade. The combination with the Swedish soprano was a strange one, but it worked. Miss Nilsson, one of the world's most musically fastidious singers, could always blend her style to encompass the less accurate Corelli. He would al-

ways enjoy a high note, and, even in Verdi, interpolate high notes for effect. She could always sense what he would do (Corelli often changed between final rehearsal and performance), and blend her interpretation with the music and with him. Both voices were enormous—hers perfectly focussed, his a mammoth-sized instrument, and the blend was thrilling.

Corelli also had the God-given gift of looking like a movie star onstage. Offstage he appeared an average man, but in makeup and costume, he was a combination of Rudolf Valentino and Al Pacino, with a little Steve McQueen thrown in. Indeed, his very lack of being stylish, of singing with joy and excitement and revelling in the high notes excited audiences.

Other roles that suited the tenor perfectly were the works of verismo: *Andrea Chenier*, when he could seem a poet and revolutionary, lost, beau-



Corelli never had a singing teacher from whom to learn the techniques that could have helped as he matured.



Audiences drank up the rich, golden voice of Corelli when he sang in *Masenet's Werther*.

tiful and voluptuous in each of the work's four arias for tenor, and *Adriana LeCouvreur*, when he could do the same with Maurizio, dramatizing the character's lover for the two women and his military ways. If this implies that Corelli was a great actor in the operatic sense, the implication is wrong: Corelli assumed an image—his image—and held it throughout his performances, letting his voice supply the wings on which the audience could soar. Most of the time he just stood, sometimes ignoring the soprano, but the vocal sound seemed to make him into the characters he wanted to portray.

He appeared as Enzo in the new *La Gioconda* of the Metropolitan's opening weeks, in 1966, which was a great success. A near-verismo opera, *Gioconda* gave Corelli exactly what he needed in the way of high
(Continued on page 78)

TEST REPORTS

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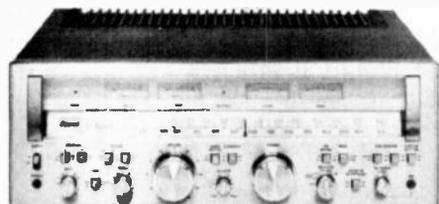
63 / PREAMPS

63 / POWER AMPS

67 / CASSETTE DECKS

72 / RECORD PLAYERS

72 / HEADPHONES



Sansui G-6000—\$630.00

Circle No. 89 On Reader Service Card

RECEIVERS

SANSUI G-6000 AM/FM Stereo Receiver

Features an AM tuner considerably better than average. Appealing to those who also do considerable AM listening. \$630.00 in wood cabinet.

Description: An AM/FM stereo receiver FTC-rated at 65 watts RMS per channel into 8 ohms, 20 to 20,000 Hz, at no more than 0.03% THD. Features include a stereo beacon, FM center channel and AM/FM signal strength tuning meters, left and right output power meters calibrated 0 to 200 watts into 8 ohms, front panel switched "break in" connection for a 4-channel adaptor or noise reduction system, 75 and 25 uSec FM de-emphasis, subsonic filter, tone control defeat, front panel monophonic microphone input that can be mixed with other signal sources, automatic dubbing from one tape to another, and an output hold-off that prevents power supply turn-on transients from being fed to the speakers.

There are stereo inputs for two magnetic phono, aux, two tape, and 4-CH/NR system. Outputs for two speaker systems, two tape, phones, and 4-CH/NR system.

Controls are provided for tuning, volume, balance, ganged bass, ganged treble, microphone mixing level, and input selection. There are switches for power, speaker system A, speaker system B, tone control defeat, subsonic filter, high filter, audio mute, loudness compensation, FM mute, stereo/mono, 75/25 uSec de-emphasis, 4-CH/NR adaptor, tape monitor 1/dub, and tape monitor 2.

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 19 $\frac{1}{8}$ in. wide x 7 $\frac{1}{8}$ in. high x 16 $\frac{1}{8}$ in. deep. Weight is 38.6 lbs.

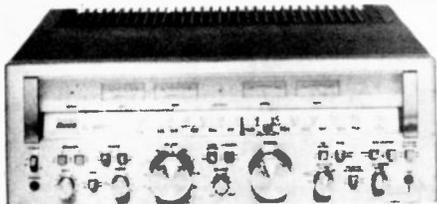
Performance—FM Tuner: Full limiting was attained with 3.1 uV. The monophonic high fidelity sensitivity (60 dB quieting) measured 10 uV. The stereo high fidelity sensitivity (55 dB quieting) was 70 uV. Full mute release was attained with 4.5 uV.

At standard test level the stereo frequency response with 75 uSec de-emphasis measured +0/-1.5 dB from 30 to 15,000 Hz; down 2 dB at 20 Hz. Monophonic distortion measured 0.09% THD. Stereo distortion was 0.018% THD. The signal-to-noise ratio measured 72 dB.

With 25 uSec de-emphasis the stereo frequency response measured +0/-1.6 dB from 20 to 15,000 Hz.

Stereo separation was 40+ dB. Selectivity was very good. Note: Tuning must be critically adjusted for minimal distortion.

Performance—AM Tuner: Considerably better than average. Excellent sensitivity and substantially less than average background noise level.



Sansui G-6000—\$630.00
Circle No. 89 On Reader Service Card

Performance—Amplifier: The power output at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 75 watts RMS. The frequency response at 75 watts/8 ohms measured +1.2/−0 dB from 20 to 20,000 Hz at a distortion no higher than .035% THD at any frequency. With the subsonic filter switched in, the response was down 2 dB at 20 Hz.

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

The magnetic input hum and noise measured −68 dB; stereo separation was into the noise level.

The power output meter calibrations are essentially accurate from 20 to approximately 3000 Hz. Above 3000 Hz the response falls rapidly, down approximately 13 dB at 10,000 Hz. Because the response is flat in the most important frequency range the meter readings give a good representation of the actual output to the speakers when reproducing program material. ▲

SETTON RS220 AM/FM STEREO RECEIVER

Big features are low FM and amplifier distortion and an unusually good and sensitive AM tuner. \$499.95 in wood cabinet.

Description: An AM/FM stereo receiver FTC-rated at 50 watts RMS into 8 ohms from 20 to 20,000 Hz, with no more than 0.08% THD. Features include a stereo beacon, FM center channel and AM/FM signal strength tuning meters, dual level phono sensitivity, automatic dubbing between two recorders, midband tone control, an output hold-off that prevents power supply turn-on transients from being fed to the speakers, and a security panel with indicators for excessive heat build-up inside the cabinet, clipping of the output signal (volume control set too high), and shorted speaker wires.

There are 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 midband, ganged treble, input selection, and speaker/power control. Switches for loudness compensation, mono/stereo, high filter, tape monitor A/dub, tape monitor B/dub, and FM muting.

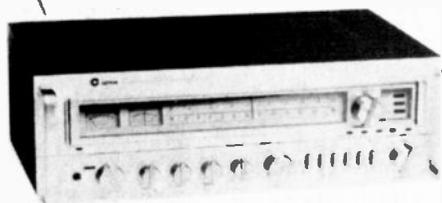
The FM antenna input is 75/300 ohms. A rod antenna and external connection are provided for AM.

Overall dimensions are 21.3 in. wide x 6.7 in. high x 11.8 in. deep. Weight is 26.5 lbs.

Performance—FM Tuner: Full limiting was attained with 1.5 μ V. The monophonic high fidelity sensitivity (60 dB quieting) measured 7.5 μ V. The stereo high fidelity sensitivity (55 dB quieting) was 55 μ V.

At standard test level the stereo frequency response measured +0/−1.5 dB from 30 to 15,000 Hz; down 3 dB at 20 Hz. Monophonic distortion measured 0.05% THD. Stereo distortion was 0.18% THD. The signal-to-noise ratio measured 75 dB. Stereo separation was 40+ dB. Selectivity was very good.

Performance—AM Tuner: Notably excellent sensitivity and very low background noise level. Overall performance is well above average. (If you do a lot of AM listening this is an important factor in this receiver's performance.)



Setton RS-220—\$499.95
Circle No. 91 On Reader Service Card

Average is the rigid performance standard we require a component to pass to make it a good buy in its price range. Anything less than this rating we do not consider suitable for review purposes or for you to consider buying. An average rating is in no way derogatory, because we have deliberately kept our standards high. For example, if a \$1,000 Pilgrim receiver is rated average, this means it is equal to other average-rated receivers in the same price range, is superior to an average \$600 Minuteman receiver, and far superior to an average-rated \$200 Tory receiver. Each receiver is average within its own price range, and should be compared only with similarly priced components.

Worst case: The test results given are the "worst case" for stereo and 4-channel equipment. For example, if the frequency response of an amplifier's left channel is ± 2 dB from 20 to 20,000 Hz while the response of the right channel is ± 3 dB from 20 to 20,000 Hz, the test report shows the worst case, which is ± 3 dB. Similarly, if an FM tuner's stereo separation is 40 dB left-to-right and 32 dB right-to-left, the test report will show a separation of 32 dB. You can therefore be certain that the performance levels of all other channels are equal to or better than the indicated results.

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. Manufacturers list prices in several ways. For example, some precede all prices with "approximately," while others list "nationally advertised value." For the purpose of simplicity and consistency, our editorial policy is to report prices as prices. It is assumed that prices vary at the discretion of individual dealers and that advertised prices may change.

Performance—Amplifier: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 50 watts RMS. The frequency response at 50 watts/8 ohms measured $+0/-1$ dB from 20 to 20,000 Hz at a distortion no higher than 0.038% THD at any frequency.

The tone control range measured ± 11 dB at 50 Hz; ± 5.5 dB at 1000 Hz; $+8/-9$ dB at 10,000 Hz.

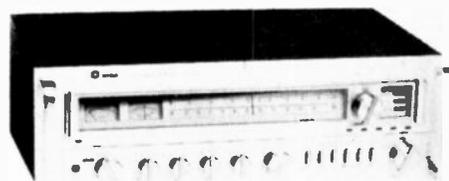
The magnetic input hum and noise measured -65 dB; separation was into the noise level. ▲

INTEGRATED AMPLIFIERS

JVC JA-S55 INTEGRATED AMPLIFIER

An excellent sound, with outstanding deep bass. \$299.95 in metal cabinet.

Description: An integrated stereo amplifier FTC-rated for 60 watts RMS per channel into 8 ohms, 20 to 20,000 Hz at no more than 0.02% THD. Features include left and right output power meters calibrated from 0 to 100 watts into 8 ohms and -35 to $+3$ dB with 0 dB representing 50 watts, a subsonic filter, tone control defeat, 20 dB audio mute, phono-jack front panel connections for



Setton RS-220—\$499.95

Circle No. 91 On Reader Service Card



JVC JA-S55—\$299.95

Circle No. 74 On Reader Service Card

TEST REPORTS/ INTEGRATED AMPLIFIERS



JVC JA-S55—\$299.95

Circle No. 74 On Reader Service Card



Sansui AU-517—\$450.00

Circle No. 89 On Reader Service Card

one of two recorders, 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 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, input selection, and speaker selection. There are switches for power, tape 1/tape 2/source selection, tape dubbing selection, stereo/mono, 20 dB muting, tone control defeat, subsonic filter, and loudness compensation.

One switched and two unswitched AC outlets are provided.

Overall dimensions are 16 $\frac{3}{4}$ in. wide x 6 in. high x 13 $\frac{3}{4}$ in. deep. Weight is 22 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 was ± 0.5 dB from 20 to 20,000 Hz at a distortion no higher than 0.012% THD at any frequency.

The tone control range measured +10/-8.5 dB at 50 Hz; +8/-9 dB at 10,000 Hz. The subsonic filter produced a roll-off of 2 dB at 30 Hz, 3.5 dB at 20 Hz.

The magnetic input hum and noise measured -67 dB; stereo separation was into the noise level.

The output meter(s) frequency response measured +0/-0.5 dB from 20 to 10,000 Hz; down 1.5 dB at 20,000 Hz. The power output meter readings ranged within 5% of the actual power output over a test range of 1 to 50 watts. ▲

SANSUI AU-517 INTEGRATED AMPLIFIER

Permits taping off tuner while listening to a record. \$450.00 in metal cabinet.

Description: An integrated stereo amplifier FTC rated (through the power amplifier input) at 65 watts RMS per channel into 8 ohms, 20 to 20,000 Hz, at less than 0.025% THD. Features include: a means to record the associated tuner while listening to a record through a special "tuner" position on the tape copy switch; automatic tape dubbing from/to either of two recorders; a subsonic filter, tone control defeat, 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. The preamplifier outputs and main amplifier inputs are available on the rear apron.

Controls are provided for volume, balance, ganged bass, ganged treble, input selection, speaker selection, and tape copy/tuner record. Switches for power, tone control defeat, subsonic filter, loudness compensation, source monitor, tape 1 monitor, and tape 2 monitor. The preamplifier output/main amplifier input separation switch is in the rear.

Two switched and one unswitched AC outlets are provided.

Overall dimensions are 16 $\frac{3}{4}$ in. wide x 6 $\frac{3}{4}$ in. high x 15 $\frac{3}{4}$ in. deep. Weight is 36.4 lbs.

Performance: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 65 watts RMS. The frequency response at 65 watts/8 ohms meas-

ured +1.2/-0.1 dB from 20 to 20,000 Hz at a distortion no higher than 0.035% THD at any frequency.

The tone control range measured +11/-13 dB at 50 Hz; +9/-10 dB at 10,000 Hz.

The magnetic input hum and noise measured 72 dB; stereo separation was 66 dB.

With the subsonic filter switched in the frequency response was down 2.5 dB at 20 Hz. ▲

PREAMPLIFIERS

HAFLER DH-101 PREAMPLIFIER

Features exceptionally low distortion. \$199.95 in kit form with metal cabinet, \$299.95, wired.

Description: A stereo preamplifier (kit) featuring patch (break in) connections for accessories such as a graphic equalizer, automatic dubbing between two recorders, tone control defeat, and chassis space for an optional moving coil cartridge head amplifier.

There are inputs for two magnetic phono, tuner, aux, and two tape. Outputs for line and two tape. The break-in connections are located ahead of the volume and tone controls.

Controls are provided for concentric volume/balance, ganged bass, and ganged treble. Switches for power, tone control on-off, input selection, tape monitor 1, tape monitor 2, and mono/stereo.

Two switched and two unswitched AC outlets are provided.

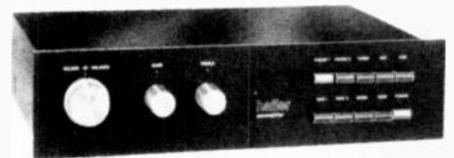
Overall dimensions are 13.75 in. wide x 3.25 in. high x 8.5 in. deep. Weight is 9 lbs.

Performance: Note: The output level is rated for 3 volts, 7 volts maximum, and tests were conducted at these levels.

At 3 volts output the frequency response measured +0/-0.3 dB from 20 to 20,000 Hz at a distortion no higher than 0.006% THD at any frequency. At the 7 volts output the distortion did not increase significantly. The clipping threshold was 10 volts output.

Tone control range measured ± 15 dB at 50 Hz; +11/-14 dB at 10,000 Hz.

The magnetic input hum and noise measured -61 dB. Stereo separation was into the noise level. Note: our standard 3 mV phono test input level produced a maximum output of 1.8 volts. ▲



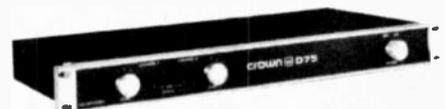
Hafler DH 101—\$199.95, kit; \$299.95, wired
Circle No. 139 On Reader Service Card

POWER AMPLIFIERS

CROWN D-75 DUAL CHANNEL POWER AMPLIFIER

An unusually compact amplifier which is well suited for rack installations. \$349.00 in metal cabinet with end cover and rack mounting hardware.

Description: A stereo power amplifier FTC rated at 35 watts RMS per channel into 8 ohms, 20 to 20,000 Hz at no more than 0.05% THD. Features include standard line inputs (at phone type jacks) and 20,000 ohm balanced and 10,000 ohm unbalanced inputs at



Crown D-75—\$349
Circle No. 102 On Reader Service Card



Crown D-75—\$349

Circle No. 102 On Reader Service Card

XLR connectors, IOC—a front panel indicating circuit that compares input and output signals indicating overload (distortion) condition, and front panel presence lamps that illuminate when the output signal exceeds 1 volt. Power-up anti-thump is provided.

There is one set of line inputs. Outputs are provided for one speaker system per channel, and phones.

Controls are provided for power, left level, and right level. A switch on the rear apron connects both channels together for mono operation when channel 1 is driven. A terminal strip permits chassis electrical/ground isolation.

Overall dimensions are 19 in. wide x 1¾ in. high x 9 in. deep. Weight is 10 lbs.

Performance: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 35 watts RMS. The frequency response at 35 watts/8 ohms measured +0/−0.3 dB from 20 to 20,000 Hz at a distortion no higher than 0.05% THD at any frequency. (Note: Distortion rose unusually fast above the clipping threshold, particularly at the higher frequencies.)

An input of 0.8 volts was required for 35 watts output. The signal-to-noise ratio for these values was 107 dB.

The red front lamps labeled IOC illuminate when the peak signal exceeds the clipping level—hence, they serve to indicate that the amplifier has been overdriven. The green lamps labeled presence indicate output level is available at the speaker terminals—even if there are no connections to the terminals.

Inserting a headphone plug does not disconnect the speakers. Separate speaker cutoff switching must be provided when it is desired to monitor only with headphones. ▲

MITSUBISHI DA-A15DC STEREO POWER AMPLIFIER

Not only is the distortion of this amp almost unmeasurable, but the deep bass is also awesome. \$630.00. No Cabinet.



Mitsubishi DA-A15DC—\$630.00

Circle No. 78 On Reader Service Card

Description: A stereo power amplifier FTC-rated at 150 watts per channel into 8 ohms from 20 to 20,000 Hz at a distortion no higher than 0.01% THD. This unit can be used as an independent power amplifier or “docked” with one of two preamplifiers to form an integrated amplifier; or it can be “docked” with a tuner/preamp whose features include left and right peak power meters and independent output level controls. The DA-A15DC contains its own power and speaker selection switches, functions transferred through a special patch cable to any of the docking accessories.

There are left and right line level inputs with individual screw-driver-adjust gain controls. Outputs are provided for two speaker systems and the remote control patch cable.

An output hold-off prevents power supply turn-on transients from being fed to the speakers. This hold-off is operative even when the amplifier is used with an associated preamplifier having its own output hold-off. For local control a front panel power switch and rear apron speaker selection switch are provided.

Overall dimensions are 16¾-in. wide x 6¾-in. high x 11¼-in. deep. Weight is 39 lbs.

Performance: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured

152 watts RMS. The frequency response at 152 watts/8 ohms was ruler flat from 20 to 20,000 Hz at a distortion no higher than 0.008% THD at any frequency, falling to even lower values below 125 watts RMS/8 ohms. The signal-to-noise ratio referenced to 10 watts/8 ohms was better than 90 dB.

With the input gain control set to maximum, rated power was attained with an input of 1 volt.

• The listening panel reported "awesome deep bass," combined with an overall notably clean sound quality. ▲

NIKKO ALPHA II STEREO POWER AMPLIFIER

Overall, a notably clean sound combined with output power meters you can really rely on for frequency response tests. \$420.00 in metal cabinet with 19-inch rack panel. (\$430 with matte black panel)

Description: A stereo power amplifier FTC-rated at 110 watts RMS per channel into 8 ohms from 15 to 20,000 Hz at a distortion no higher than 0.03% THD at any frequency. Features include left and right output power meters calibrated from 0 to 240 watts into 8 ohms, and -20 to +30 dB, 0/-6/-12/-24 dB meter calibration attenuators, and an output hold-off that prevents power supply turn-on transients from being fed to the speakers.

One set of line level inputs is provided. There are outputs for two speaker systems.

Switches are provided for power, speaker selection, and meter range(s).

Overall dimensions are 18-19/32 in. wide x 5 1/4 in. high x 12 1/4 in. deep. Weight is 29.7 lbs.

Performance: The power output per channel at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 126 watts RMS. The frequency response at 126 watts/8 ohms was ruler flat 20 to 20,000 Hz at a distortion no higher than 0.018% THD at any frequency. The signal-to-noise ratio referenced to a 10 watt output was 91 dB.

Full power output (126 watts) was attained with a 1 volt input.

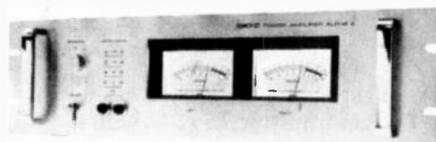
The meter scale calibrations are extremely precise between the test limits of 5 and 120 watts—essentially as accurate as our laboratory instruments. The frequency response of the meters was ruler flat from 20 to 20,000 Hz. ▲

POWERMASTER 75 POWER AMPLIFIER

A specialized amplifier specifically intended for disco and portable use. \$449.00 in wood trim console-type cabinet.

Description: A stereo disco-type power amplifier FTC rated at 75 watts RMS per channel into 8 ohms 20 to 20,000 Hz, at no more than 0.1% THD. Features include integral bass and treble tone controls, tone control defeat, left and right output power meters calibrated 0-100% and -20 to +3 dB (100% = 0 dB), and left and right LED peak power level indicators.

Each channel has one line input and one speaker output. Slider-type (linear) controls are provided for left output level, right output level, ganged bass, and ganged treble. There are switches for power and tone control defeat.



Nikko Alpha II—\$420.00
Circle No. 79 On Reader Service Card



Powermaster 75—\$449.00
Circle No. 144 On Reader Service Card

TEST REPORTS / POWER AMPLIFIERS



Powermaster 75—\$449.00
Circle No. 144 On Reader Service Card



SAE 3100—\$350.00
Circle No. 88 On Reader Service Card

Overall dimensions are 10.5 in. wide x 2.5 to 7 in. high x 12 in. deep. Weight is 20 lbs.

Performance: The power output per channel at the clipping with both channels driven 20 to 20,000 Hz into 8 ohms measured 75 watts RMS. The frequency response at 75 watts/8 ohms was essentially ruler flat from 20 to 20,000 Hz at a distortion no higher than 0.05% THD at any frequency.

The tone control range measured ± 12 dB at 50 Hz; ± 9 dB at 10,000/Hz.

Full output (75 watts) required a 1.1 volt input. The signal-to-noise ratio referenced to 75 watts output was 82 dB.

The frequency response of the output meter(s) measured $+0/-1$ dB from 20 to 20,000 Hz. The LED peak indicator lamps illuminated precisely at the clipping level of 75 watts.

The meters are damped, serving as volume level indicators when a "match" is required for sequential program (music) sources.

The amplifier itself is specifically styled for portable or disco use, the sloping front panel providing a "console" type of operation. Though the amplifier tends to run somewhat warm under continuous high power output, it is unusually small and light for its power handling capability and is an excellent choice for its intended purposes. The overload recovery is unusually good, again making it a good choice for portable/disco use where volume levels tend to be pushed toward the threshold of pain. ▲

SAE 3100 POWER AMPLIFIER

A basic power amplifier featuring unusual power output indicators. \$350.00 in metal cabinet with 19-in. rack panel.

Description: A stereo power amplifier FTC-rated at 50 watts RMS per channel into 8 ohms, 20 to 20,000 Hz, at a distortion no higher than 0.05% THD. The front panel features a "light bar" power output consisting of 17 light emitting diodes (LEDs) with the center LED representing *idle* (power on), or zero output. Eight LEDs per channel are calibrated for 8 ohm loads at .02, .09, .37, 1.5, 6, 25, 50, and 72 watts per channel—with 72 watts representing overload. During operation the LEDs form a "light bar" expanding from zero which indicates the power output from the left and right channels. An output hold-off prevents power supply turn-on transients from being fed to the speakers.

There is one set of line inputs and speaker outputs per channel.

There are no switches and controls. Power and volume level are determined by the associated equipment.

Overall dimensions are 19 in. wide x 5.25 in. high x 8 in. deep. Weight is 18 lbs.

Performance: Power output at the clipping level with both channels driven 20 to 20,000 Hz into 8 ohms measured 50 watts RMS. The frequency response at 50 watts/8 ohms measured ± 0.1 dB from 20 to 20,000 Hz at a distortion no higher than 0.15% THD at any frequency.

A 1-volt input was required for a 50 watts output. The hum and noise referenced to a 50 watts output measured -95 dB.

The power indicator calibrations were unusually accurate for an LED power display, almost precise at the lower power levels, and within 10% from 6 watts and up. The frequency response, as can

best be estimated from lamps that range from low to full brilliance, would be considered "flat" from 20 to 20,000 Hz. ▲

CASSETTE DECKS

AKAI GXC-750D STEREO CASSETTE DECK

Can be optimized to any type or brand of tape. \$695.00 includes wood cabinet.

Description: A front-loading three-motor, dual capstan, three-head system Dolby recorder featuring ADRS (Akai's Automatic Distortion Reduction System); microphone/line input mixing; a selector for normal with low bias, normal with high bias, Ferrichrome, and chrome tapes; left and right VU meters with switch-selected VU or peak-reading modes; left and right Dolby calibration controls; a Dolby tone (calibration) oscillator; Dolby MPX filter; automatic tape-slack tightening when the cassette is first installed; memory reset counter; a remote control socket for optional remoting equipment; automatic end-of-tape stop/disengage.

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 screwdriver adjust controls for left and right Dolby calibration adjustments. Switches for power, tape/source monitor, peak/VU meter mode, tape type, Dolby, Dolby calibration tone, Dolby MPX filter, and counter memory on-off.

The tape mechanism has touch buttons for the record interlock, REW, stop, FWD, FF, and pause. A pushbutton for eject.

Overall dimensions are 17.3 in. wide x 6.2 in. high x 12.5 in. deep. Weight is 21 lbs.

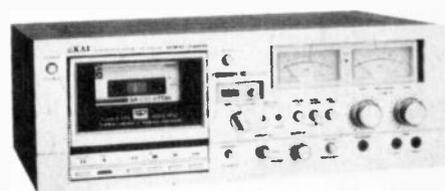
Performance: The playback from a standard test tape with a 50 to 10,000 Hz frequency range measured $+0.8/-3$ dB from 50 to 6000 Hz; down 8 dB at 10,000 Hz. The high frequency attenuation was caused by a non-standard head alignment. As shown in the test results, the head(s) are in self-alignment for recordings made on the recorder.

Using BASF Professional Type 1 tape: without Dolby, the record/play frequency response measured $+1/-2$ dB from 50 to 15,000 Hz; down 3 dB at 48 Hz. Distortion at the meter-indicated 0-VU record level measured 0.14% THD with 9 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 48 dB.

With the Dolby active, the record/play frequency response measured $+2.5/-2$ dB from 50 to 15,000 Hz; down 3 dB at 48 Hz. Distortion and headroom remained the same. The signal-to-noise ratio measured 50 dB wideband, 56 dB narrowband.

Using Sony Ferrichrome tape: with Dolby, the record/play frequency response measured $+2/-1$ dB from 48 to 15,000 Hz. Distortion at the meter-indicated 0-VU record level was 1.5% THD with 6 dB headroom to 3% THD. The signal-to-noise ratio measured 50 dB wideband, 59 dB narrowband.

Using TDK-SA tape (for "chrome"): with Dolby, the record/play frequency response measured $+0/-3$ dB from 40 to 14,000 Hz.



Akai GXC-750D—\$695.00

Circle No. 62 On Reader Service Card

TEST REPORTS / CASSETTE DECKS



Akai GXC-750D—\$695.00
Circle No. 62 On Reader Service Card



Optonica RT-6501—\$360.00
Circle No. 81 On Reader Service Card

Distortion at the meter-indicated 0-VU record level was 0.8% THD with 5 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level was 52 dB wideband, 60 dB narrowband.

The maximum output level corresponding to a 0-VU record level was nominally 500 mV.

Wow and flutter measured 0.08% with peaks to 0.12%.

The peak meter readings are exactly 8 dB above the VU indications, and best recordings are attained using the peak mode, allowing the signal peaks to just reach the 0-VU calibration—which now represents the level equal to 2-3% THD.

Note: The rewinds are extremely fast, approximately one second per minute of tape. ▲

OPTONICA RT-6501 COMPUTER CONTROLLED CASSETTE DECK

An on-board microprocessor (computer) permits virtually any timing, selection, or automatic-control combination. \$360.00 in metal cabinet with wood trim.

Description: A front-loading Dolby stereo cassette deck featuring an on-board microprocessor that provides an LCD (liquid crystal display) clock, timer, and function display, as well as computer control of timing, program selection (using Optonica's Automatic Program Locating Device, APLD), running time, partial-program search, memory, and almost every combination of automatic start and stop keyed to a 12- or 24-hour clock (as determined by the user). Two AA-type flashlight batteries in a rear compartment maintain the computer's programming in the event of a line power failure, even if the power is deliberately disconnected to permit moving the recorder. (The computer circuit automatically switches to battery power for its memory when AC power is disconnected. The batteries should last "shelf life" under normal conditions.)

Other features include microphone/line mixing, an editor switch that disables the input signal as long as the switch is depressed (while the tape continues driving), bias and equalization selectors for "normal," Ferrichrome, and chrome tapes (with Maxell UD specified for "normal" and Maxell UD XL II specified for chrome), two calibrated VU meters, automatic end of tape stop/disengage, and a peak record level indicator.

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/clock-only/auto control, LCD display light (needed only when there is virtually no ambient room light), memory rewind, Dolby, bias, equalization, and 21 pushbuttons for the clock/microprocessor programming.

The tape mechanism has piano key controls for the record interlock, REW, FWD, FF, stop, eject, pause, and edit.

Overall dimensions are 17 $\frac{1}{8}$ in. wide x 5 $\frac{1}{8}$ in. high x 14 $\frac{3}{8}$ in. deep.

Performance—Recorder: The playback frequency response from a standard test tape with a 50 to 10,000 Hz range measured +0.5/-1.2 dB.

Using Maxell UD tape: without Dolby, the record/play frequency response measured +0/-3 dB from 30 to 14,000 Hz. Distortion

at the meter-indicated 0-VU record level was 0.25% THD with 9 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level was 48 dB.

With the Dolby active, the record/play frequency response measured +0/-3 dB from 30 to 12,500 Hz. Distortion and headroom remained the same. The signal-to-noise ratio referenced to 0-VU record level was 50 dB wideband, 60 dB narrowband.

Using Sony Ferrichrome tape: with Dolby, the record/play frequency response measured +1/-3 dB from 28 to 14,000 Hz. Distortion at the meter-indicated 0-VU record level was 0.3% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 49 dB wideband, 60 dB narrowband.

Using Maxell UD XL II tape (for chrome) with Dolby the record/play frequency response measured +1.5/-3 dB from 30 to 14,000 Hz. Distortion at the meter-indicated 0-VU record level was 0.1% THD with 9 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level was 49 dB wideband, 60 dB narrowband.

The maximum output level corresponding to a 0-VU record level was nominally 800 mV.

The peak record level lamp turned on when the signal level was 6 dB above the 0-VU meter reading.

Wow and flutter measured 0.09% steady.

Performance—Microprocessor: The LCD display measured approximately 1½ x 2½ inches, displaying the clock, function and counting display(s). The main clock can be user-programmed for a 12- or 24-hour display. When a 12-hour display is selected, AM or PM is indicated. The timer function can be programmed to turn the recorder on and off in both record and play modes. The APLD can locate any of up to 19 programs on a tape. Proper APLD operation requires approximately 3-seconds "dead air" between selections. The microprocessor also provides an electronic digital tape counter, and can locate a program by electronic count.

There are so many variations possible through microprocessor control, "hands on" experience at your local Optonica showroom is required for a full appreciation of its potential. ▲

PIONEER CT-F900 DOLBY CASSETTE DECK

Wow! Features adjustable bias and microprocessor control. Well worth a trip to your hi-fi dealer even if you're not presently in the market for a cassette deck. \$475.00 in metal cabinet.

Description: A front-loading Dolby cassette deck featuring two motors, a closed loop (dual capstan) drive, three-head system (simultaneous record/play), automatic tape type selector for chrome tapes suitably encoded with a "chrome detection hole" in the shell, manual selection of "standard" and Ferrichrome tape types, user adjustable bias (calibration chart for popular brands and types of tape is supplied), automatic end of tape stop/disengage, time-controlled record or play preset, left and right "bar light" fluorescent record level display (meter) with user-selected average, peak, or peak-hold ballistics, and a microprocessor (computer) controlled digital display counter that provides memory rewind stop or repeat, or partial play or repeat.

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



Optonica RT-6501—\$360.00
Circle No. 81 On Reader Service Card



Pioneer CT-F900—\$475.00
Circle No. 85 On Reader Service Card



Pioneer CT-F900—\$475.00
 Circle No. 85 On Reader Service Card

phones.

Controls are provided for concentric-clutched left and right record level, ganged output level, and bias adjust (detent at "center" position). Switches for power, input selection, Dolby, tape type, tape monitor, source monitor, counter reset, memory stop, memory play, memory repeat, memory full play (end), counter memory OFF, timer start play, timer start record, timer control off, average meters, peak meters, and peak-hold meters.

The tape mechanism has micro-sensitive pushbuttons for record interlock, REW, stop, play, FF, and pause.

Overall dimensions are 19 $\frac{1}{8}$ in. wide x 7 $\frac{3}{8}$ in. high x 14 $\frac{1}{2}$ in. deep. Weight is 22.25 lbs.

Performance: The playback frequency response from a standard test tape with a 50 to 10,000 Hz range measured +1/-1.5 dB.

Note: Tests were conducted with the bias control set to the value indicated in the supplied chart. The chart also gives a normal range "to try." In all instances we found the high frequency response could be extended about 3000 Hz by setting the bias control one unit lower in value than the "prime" value given in the chart. The frequency responses that follow are "worst case"—all could be substantially improved at the high end by using one unit less bias.

Using Maxell UD/XL Type 1 tape: without Dolby, the record/play frequency response measured +0/-3 dB from 35 to 12,000 Hz. Distortion at the meter-indicated 0-dB record level was 0.9% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 46 dB.

With the Dolby active, the record/play frequency response measured +0/-3 dB from 35 to 10,500 Hz. Distortion and headroom remained the same. The signal-to-noise ratio measured 47 dB wideband, 59 dB narrowband.

Using Sony Ferrichrome tape: with Dolby, the record/play frequency response measured +0/-3 dB from 45 to 10,000 Hz. Distortion at the meter-indicated 0-dB record level was 1.6% THD with 9.5 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 47 dB wideband, 63 dB narrowband.

Using Maxell UD/XL Type II (chrome) tape: with Dolby, the record/play frequency response measured +0/-3 dB from 40 to 13,500 Hz. Distortion at the meter-indicated 0-dB record level was 1.1% THD with 7 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-dB record level was 48 dB wideband, 63 dB narrowband.

Maximum output level corresponding to 0-dB record level was nominally 700 mV maximum.

Wow and flutter was a rock-steady 0.08%.

The fluorescent display is extremely good, particularly when making "live" recordings via microphones, as the peak function indicates those signal peaks (normally not displayed on VU meters) which drive into tape saturation. The peak-hold mode shows the highest peak level of a complete program or segment, either "live" or pre-recorded, and permits the recorder to be adjusted for optimum record level in terms of minimum distortion and maximum signal-to-noise ratio.

The microprocessor counter control is excellent, particularly

in view of the fact that it can be easily understood without constant recourse to an instruction manual. At the push of a single button it permits virtually all modes of automatic preset rewind/replay, or repeat.

This is the type of machine you must try "hands on" in order to fully appreciate its unusual metering and microprocessor functions. ▲

TOSHIBA PC-2460 CASSETTE DECK

This deck features wide range record level meters. \$149.95 in metal cabinet.

Description: A front-loading Dolby cassette deck featuring individual bias and equalization selectors for "normal" and chrome tapes, wide range record level meters calibrated -40 dB to +6 dB, a headphone monitor, automatic end of tape stop/disengage, and a reset counter.

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

Controls are provided for left and right record level. Switches for power, bias, equalization, and Dolby.

The tape mechanism has piano key controls for stop/reject, record interlock, REW, play, FF, and pause.

Overall dimensions are 16.6 in. wide x 6.5 in. high x 11 in. wide. Weight is 9.9 lbs.

Performance: The playback from a standard test tape with a 50 to 10,000 Hz range was down 3 dB at 2,000 Hz. The high frequency attenuation appeared to be caused by a non-standard head alignment. In normal use, of course, the combination record/play head is always in alignment to itself.

The machine is factory-adjusted for Sony HF and TDK SA tapes, and these tapes were used for the tests.

Using Sony HF tape: without Dolby, the record/play frequency response measured +1.5/-3 dB from 40 to 14,000 Hz. Distortion at the meter-indicated 0-VU record level was 1.1% THD with 8 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level was 45 dB.

With the Dolby active, the record/play frequency response measured +0.7/-3 dB from 40 to 13,000 Hz. Distortion and headroom remained the same. The signal-to-noise ratio measured 48 dB wideband, 53 dB narrowband.

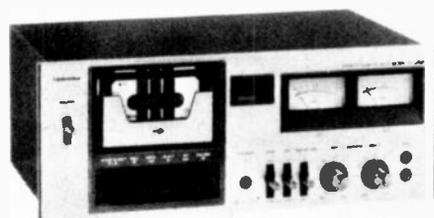
Using TDK SA tape (chrome settings): with Dolby, the record/play frequency response was +2.5/-3 dB from 30 to 13,500 Hz. Distortion at the meter-indicated 0-VU record level was 1.2% THD with 10 dB headroom to 3% THD. The signal-to-noise ratio referenced to 0-VU record level measured 47 dB wideband, 56 dB narrowband.

The output level corresponding to a 0-VU record level was nominally 580 mV.

Wow and flutter measured 0.2% with peaks to 0.25%. ▲



Pioneer CT-F900—\$475.00
Circle No. 85 On Reader Service Card



Toshiba PC-2460—\$149.95
Circle No. 99 On Reader Service Card



Dual 621—\$300.00
Circle No. 27 On Reader Service Card



Koss K/6ALC—\$34.95
Circle No. 76 On Reader Service Card

RECORD PLAYERS

DUAL 621 AUTOMATIC TURNTABLE

For its price range the sound quality from pickups appears to be somewhat better than average. \$300.00, with integral base and dust cover.

Description: A two-speed (33, 45) electronically controlled automatic turntable with integral base and dust cover featuring full-time illuminated 33 and 45 rpm strobes around the platter's rim, pitch adjustment (one control for both speeds), and continuous repeat play. The motor starts when the tonearm is moved off its rest, or automatically when the start switch is activated. In the auto mode the tonearm automatically indexes for 12-in./33 rpm, 7-in./45 rpm. The tonearm recycles to off or repeat play at the end of the record.

Controls are provided for speed select, pitch, single/repeat play, start/stop, and tonearm lift.

The tonearm has a micrometer-adjust counterweight and an 0-3 gram VTF adjustment calibrated in 0.1 gram increments up to the 1.5 gram point and in 0.25 gram increments up to 3 grams. There is a calibrated anti-skate. The pickup mounts in a special Dual plug-in carrier for which a stylus overhang gauge is provided. There is a locking tonearm rest. The output cable capacity was 250 pF.

Performance: Both speeds held constant over an applied test range of 90 to 140 volts with total immunity to transient line voltage variations. The single pitch control simultaneously provides the correct adjustment for both speeds (as indicated by the built-in strobes). The pitch control ranges measured +4/-6% at 33 rpm; +4/-5% at 45 rpm. Wow and flutter measured 0.05% with peaks to 0.1%.

The VTF calibrations were exactly "on the mark."

Note: The listening panel reported the sound quality from pickups appeared slightly better than average for this player's price range, with somewhat higher than average sensitivity to external shock and vibration. ▲

HEADPHONES

KOSS K/6 ALC STEREO HEADPHONES

Overall, a good budget value. \$34.95.

Weight: 16 oz. Cord; 7 feet long. Cushioned headband, circumaural phone cushions, and built-in volume controls are all included in these phones. Weight on the head is moderate, with moderate pressure on the ears. They lack deep bass, but nevertheless have an overall pleasant, rich sound quality. Their efficiency is well above average. Overall, they're a good value for the money. ▲

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.

© Berlioz: *Symphonie Fantastique, Op. 14*, Royal Philharmonic Orch., cond. Massimo Freccia, Quintessence PMC 7057. Is a new *Fantastique* really necessary when the LP catalog already offers about two dozen, many of which are outstandingly good? Definitely, there always is room for another really fine version, and that is what is heard on this Quintessence reissue of a recording made in 1962 in England's famous Walthamstow Town Hall, previously available only by mail from the Reader's Digest. Massimo Freccia is a solid conductor of strong musical convictions whose career has not attracted wide publicity. For a decade he was music director of the Baltimore Symphony followed by a long association with the Italian Radio, during which period he also appeared extensively as a guest conductor of leading European orchestras. His performance of the Berlioz is outstanding. The orchestra plays superbly for him and the reproduction is remarkably

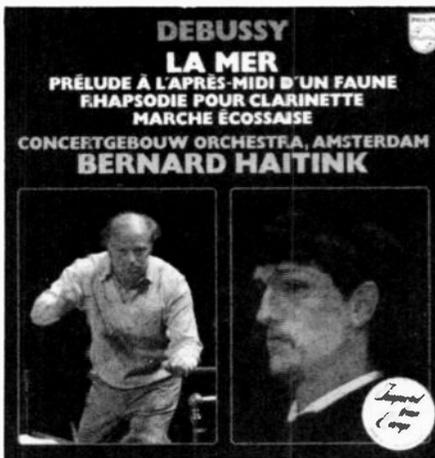


Outstanding performance

SEPTEMBER/OCTOBER 1978

natural in perspective with an extraordinary dynamic range. As a bonus the disc includes the exciting "Rakoczy March" from the same composer's *Damnation of Faust*, played by the New Symphony Orchestra of London directed by Alexander Gibson. Towards the end an instrument called the "cannon drum" is utilized with quite thrilling effect. After you hear this you'll probably find all other recordings of this music quite tame. No question, this is another winner from Quintessence.

© Debussy: *La Mer, Prelude to The Afternoon of a Faun, First Rhapsody for Clarinet and Orchestra*, Amsterdam Concertgebouw Orch., cond. Bernard Haitink, Philips 9500 359. The great Concertgebouw Orchestra has recorded Debussy's masterpiece, *La Mer*, twice before in stereo, once with Eduard van Beinum conducting, a version available for some years on Epic, and later with Eliahu Inbal conducting, which also was discontinued but has been announced for reissue on the new Philips Festivo label (6570.089). Haitink's new recording is powerful,



A splendid collection

exquisitely played, lacking only the touch of imagination to be found in the best of competing versions, by Bernstein, Boulez and Ormandy on Columbia, Giulini on Angel and Stokowski on London. "Faun" is here given a reading of extreme sensuality, and the pianissimo sounds of the Concertgebouw strings are wondrous. George Pieteron, principal clarinet of the Concertgebouw, is a brilliant soloist in the *Rhapsody*, and the program ends with the haunting and seldom-heard *Marche ecossaise*. This is a splendid Debussy collection that should have great appeal. Sonically it is not as successful as other recent Concertgebouw recordings; excessive reverberation masks clarity.

© Rachmaninoff: *Piano Concerto No. 1 in F Sharp Minor, Op. 1; The Isle of the Dead, Op. 29*, Earl Wild, pianist; Royal Philharmonic Orch., cond. Jascha Horenstein, Quintessence PMC 7052. Here is another welcome reissue



Highly recommended

taken from the Reader's Digest Rachmaninoff set that was available only by mail and discontinued some years ago. In the mid-sixties Wild, Horenstein and the Royal Philharmonic recorded all of Rachmaninoff's concertos plus the Paganini Rhapsody, and now all have been reissued on Quintessence. This performance of the *Concerto No. 1* is second to none, with a particularly electrifying first-movement cadenza. This concerto contains some of Rachmaninoff's most imaginative writing, and it deserves to be played more often; hopefully this superlative recording will gain a larger audience for it. The somber symphonic poem, *The Isle of the Dead*, is given an appropriately brooding reading by Horenstein, and there is no question that sonically this is the finest of the available recordings. As a filler this LP also contains "Vocalise" played by the National Philharmonic, conductor Charles Gerhardt.

© "Reveries." Andre Segovia, guitarist, RCA Victor ARL1-2602.

The Master's latest disc should suit Segovia's vast army of admirers. The octogenerian guitarist recorded this program in RCA's Madrid studio June 1977 and it features eight of Segovia's transcriptions of miniatures from Schumann's *Album for the Young, Op. 68*, as well as the same composer's *Träumerei* and *Romanza*. The LP opens with the *Dance of the Blessed Spirits* from Gluck's "Orfeo ed Euridice." The second side offers Ascencio's *Mystic Suite, Ronsard* by Castelnuovo-Tedesco and *Castellana* by Moreno-Torroba. The reproduction is rather antiseptic, but Segovia's sensitivity in this generally reflective music is always apparent. ▲

SOUND PROBE: KOSS

(Continued from page 28)

attaching (or detaching) a brass weight that screws into the cone's center. The added mass puts drone cone resonance down to 35 Hz where, in our opinion, it belongs, making the bass clean, lean and solid. If you unscrew the weight, the drone resonance rises into the mid-bass region, making the bass plump and juicy. Some people like it that way.

Above the 3500 Hz crossover frequency, a 1-inch dome tweeter takes

over. Directly in front of the tweeter dome is a loading plug designated to improve transient response and broaden dispersion. It does both these jobs successfully. We could walk anywhere in the room without being aware of any change in the high-frequency sound field—proof of excellent treble dispersion. As for transients—they're ultra-clean and razor sharp.

In our rather "live" and reflective

listening room, the sound was notably bright. This isn't necessarily a fault, and in any case, flipping the tweeter control to the -3 dB position promptly restored sweetness and warmth.

It takes a recommended minimum of wpc to drive the CM-1010, and with a power capacity of 100 watts it will give a highly satisfactory account of itself in almost any setting and with any kind of music. ▲

SOUND PROBE: EPICURE

(Continued from page 28)

response in the upper region is ragged, the violin sounds as if it were made of chrome instead of wood. On the Epicure, that fiddle sounded alive—proof of the exceptional smoothness of the tweeter. But to gain this kind of naturalness, we had to turn down the tweeter-level control to the -3 dB position. Otherwise the speaker sounded bright to the point of sizzling—but that may have been partly due to reflections from the smooth plaster walls of our room.

We were particularly curious about the dispersion of high frequencies because of the unusual dished shape of

the tweeter diaphragm. We found no noticeable difference in the character of the sound while walking all across the room, proving that the highs are evenly distributed over a very broad angle. (The specs claim uniform distribution over "nearly" 180 degrees, both laterally and vertically.)

The designers have given special attention to eliminating false midrange resonance and filled the hollow of the drone-cone with a solid styrofoam plug to suppress spurious mid-bass radiation. While this produces highly accurate sound, it makes the overall effect rather cool. Listeners accustomed to the mid-

bass response hump in many speakers may perceive this as a certain lack of warmth in reproducing the texture of a full orchestra. Others may like it just the way it is. In any case, you can warm up the sound with a slight upward nudge on the bass control (or switching in the loudness compensation) if you like the velvety feeling created by gently pushing the frequency region around 150 Hz.

To sum up: For lucidity, definition, true bass, and outright musicality, the Epicure 14 can play in any league and would be hard to beat in its price class. ▲

SPOTLIGHT ON: TDK

(Continued from page 42)

tape eraser, apply power to it, and then turn it off without changing the position of the screwdriver. At least 70% of the time the screwdriver will become magnetized and will "pick up" paper clips. On the other hand, if you slowly withdraw the screwdriver while power is applied the screwdriver will be left demagnetized.

In TDK's HD-01 head demagnetizer, electronic circuits automatically provide the decaying field; you don't have to move the cassette or the R/P head.

The HD-01 works remarkably well. The only fault we could find with the sample we tested was the difficulty we had in gaining access to the battery compartment. In our sample, the small plastic plug which covers the battery compartment had no screwdriver slot to help us rotate it to the open position. Instead, we had to combine an unwound paper clip with finger pressure to get the compartment open. As we go to press, we have learned from TDK that they have modified their

design of the head demagnetizer to include a screwdriver slot. As soon as this design change is incorporated, we have no other complaints.

The plug design notwithstanding, the TDK HD-01 head demagnetizer is the best we've seen. It is certainly the most convenient.

The device is available for \$21.99, from TDK tape dealers who also handle TDK tape accessories. For additional information circle Reader Service Card Number 107. ▲

SPOTLIGHT ON: NAKAMICHI

(Continued from page 48)

er level and the percent THD. (The top bar graph should indicate an input level of -10 to +10 dB for proper operation of the distortion meter's automatic level adjustment; you set the input level switch to attain the correct bar graph reading.) The lower bar graph directly indicates the percent THD. If the distortion is below 0.01% THD there will be no indication on the lower bar graph. The meter range switch provides THD ranges of 0.01 to 0.3%, and 0.1 to 3% THD.

When testing an amplifier for 400

Hz distortion, you can apply the accessory *wattage* scale and adjust the 400 Hz input to the amplifier until the T-100 indicates the desired amplifier output power. Then you remove the *wattage* scale and measure distortion.

Frequency response plots of amplifiers and recorders, and saturation plots of tape are easily done because of the wide range of switch-selected oscillator frequencies. The pink noise oscillator output is particularly useful when "tuning" the system to a room with a

graphic equalizer (which generally requires a pink noise source).

One of the most useful functions from the stereophile's viewpoint is the peak reading meters. You can connect the T-100 to a recorder's "record monitor" output and then adjust the T-100's input level controls so the bar graphs indicate 0-dB at the recorder's maximum peak record level, or tape saturation level (whatever you prefer as the "peak signal" reference level). Once the peak meters are calibrated you adjust the recording signal so the peaks—

as indicated on the T-100—don't exceed 0-dB. In this way you are virtually guaranteed maximum record level coincident with minimum distortion. Yes, you can forget about the VU meter readings on the recorder, for unless the meters are the peak-reading variety they cannot equal the T-100 for indicating the true peak record level.

Summing Up. We've touched on the

T-100's highlight features. A rather extensive instruction manual illustrates other tests you can perform both in the shop and home. It is important to keep in mind, however, that the T-100 is basically a test set for recorders, with certain functions applicable to amplifier tests and measurements.

Since a wow and flutter meter alone costs as much as the T-100, you can

figure that everything else is thrown in for free.

As a recorder test set, the T-100 is as much as you or a repair shop will ever need. Overall, it's a well thought out idea that deserves a special trip to your local dealer for a demonstration.

For additional information on the Nakamichi T-100, circle Reader Service Number 112. ▲

AMPLIFIER SPECIFICATIONS

(Continued from page 39)

modulation Distortion, also known as TIM. The crucial question is not involved with the intricacies of how to measure the distortion. Rather, *what is the threshold of audibility?* The answer is no one knows for sure, or if they do, they're not telling, since no standard for the threshold exists. Nevertheless, many hi-fi enthusiasts love buzzwords, and there are always new buzzes for those eager to embrace them.

A New Standard

After three years of technical committee work, the IHF has recently promulgated a new amplifier standard that is intended to "place greater emphasis on those characteristics that reflect the ability of an amplifier to faithfully aid in the reproduction of the original sound under conditions similar to those used by the listener..." A close reading of the standard reveals a new effort to resurrect the old concept of *dynamic music power*, the concept that helped produce those mythical and astronomical power claims that eventually led to the crackdown by the Federal Trade Commission.

Also in the new standards is a new means of measuring and specifying harmonic distortion. The new standards make an issue of the fact that current (FTC-required) THD specs include noise level, and actually should be termed THD + N (Total Harmonic Distortion plus Noise). Now however, it is suggested that we will need spectrum analyzers to make distortion measurements so as not to confuse distortion with noise measurements. While tape machine testing requires spectrum analyzer measurements and THD breakdown of this sort, current ampli-

fier noise levels are well below even the lowest distortion values common to currently available high fidelity amplifiers, and have virtually no effect on an amplifier's THD spec. The real spec "killer" in terms of really laying performance on the line are the individual odd distortion products (including harmonics). Itemizing these is not called for in the new standard.

About the only thing the new standard *does* insure is that the few test labs with spectrum analyzers will be getting a lot of new business as many manufacturers and many magazines attempt to accommodate yet another means of measuring total harmonic distortion. (One of the comical aspects about this is that our lab, one of the first consumer labs to a spectrum analyzer for audio tests, is being consulted by other labs and manufacturers, yet it believes (as we do) that THD measurements taken from the spectrum analyzer are of no extra value when applied to power amplifiers.)

Summing Up

Overall, comparison of the tests reports of modern amplifiers with those of ten years ago discloses only three significant facts: 1) The THD distortion values common to present-day amplifiers are but 1/10 to 1/100 of those measured in early solid-state amplifiers. 2) While an amplifier capable of greater than 100 watts per channel was a rarity in 1970, today's consumer has a choice of many amplifiers rated at 100 watts per channel (RMS) and even higher. 3) Whereas in 1970 you could count the number of *great* amplifiers on one hand, and not-so-great-but-adequate amplifiers on two

hands, in today's marketplace you'll find a *wide selection* of superb amplifiers in almost all showrooms, with the remainder falling in the good-to-excellent category. Performance depends a great deal on price. The days when 1% THD was considered "hi-fi" is long gone. Today, even budget priced amplifiers feature THD values of 0.5% and lower, with 0.1% THD not an unusual value in the very latest *budget* amplifiers.

In a sense we've come full circle. Old vogues in measurement which were confusing at best have fallen by the wayside to make room for new vogues in measurement which are also confusing at best. An output power measurement is being promoted which will always produce higher measurements than would be possible using the RMS measurement standard. (The FTC requires that the RMS figures must still appear prominently in manufacturer's published specs.) And much hype is being given to a more complicated method of discussing distortion.

Ten years from *now* when we look back, the one constant performance improvement we can expect is in the area of less distortion. Perhaps there will be other ways of measuring power and distortion, and unquestionably someone will discover at least one new form of distortion that will be dubbed *the latest* "one and only true key to listening quality." But somewhere in the whole mess of specifications will be those guides that have served us so well for so long: RMS power output and Total Harmonic Distortion (THD), and the editors of this publication intend to continue to use them as the mainstays of its amplifier test reports. ▲

MINI SPEAKERS

(Continued from page 54)

While some minis are said to be deficient in power-handling, the ADS300 and Visonik David 602 models have a hefty power handling capability. Using a 200 wpc amplifier to drive them, we found the gain control pegged at about 50 wpc before hearing clipping of any consequence. A few recently auditioned models—JVC's new Model SM-3

at \$80 each, Canton's new Model GLE-40 at about \$125 each, and Hitachi's new Model HS-1 at \$100 each—also exhibit this high power handling capability.

The units we checked in a home environment also acquitted themselves admirably in handling transients. Massed sounds were handled with more

clarity than many systems costing twice as much. Highs were exceptionally crisp, clear, and open. Overall, our test units produced an open, well defined, and balanced sound, including a solid measure of bass.

For music lovers wanting the kind of bass common to large bookshelf or floor models, the answer is to use a

pair of minis in conjunction with a subwoofer. Many dealers display minis in such ensembles. Appropriate sub-including Visonik, Miller & Kreisel, woofers are available in several lines, Tamon and Mesa, among others. The subwoofers are generally more expensive than the pair of minis they are to work with, but to some listeners the cost is well worth it. While the forte of the minis is space saving, the use of a subwoofer need not cancel out that attribute; some of the woofer units can be called on to do double duty as end tables, coffee tables, or lamp tables.

In a brochure discussing the use of Visonik's David mini-speakers with M & K subwoofers, Miller & Kreisel notes: "The tiny David elements can be placed where they are innocuous, and virtually invisible; or they can be decorated with small mirrored surfaces, or crystal, fabric or panel, and being so small, become part of the decor. Now beauty of home decoration and room filling superb sound can be had simultaneously. Once you hear this system we believe you can forever discard the myth that a large box is necessary for 'Big' sound."

Since most minis are acoustic suspension types they are, therefore, likely to be inefficient as compared with ported models. Which means they will likely need more amplifier driving power. In making your selection, be sure that your amplifier (or receiver) is adequate to the needs of the minis you buy. While some models can be driven with 10 watts, we'd suggest your amplifier be at least 25 wpc to

accommodate such models, for that added "extra" in reproducing transients.

If your amplifier power substantially exceeds the minimum power required for the speakers, beautiful. If it is virtually the same, you run into a potential for clipping with certain types of music. We suggest you insist that the speakers you intend to buy be played for you through an amp or receiver with the same power output as yours, for a realistic evaluation. Up the gain to see how well the speakers handle big bursts of music without distorting.

If you have a hefty reserve of amplifier power, your selection will be made easier. For example, you might be in the position of comparing a model that is more efficient than another, although they may both sound equally good to your ears. But the more efficient model is less appealing visually than the inefficient model. The prices are the same. So you trade off efficiency for better looks—at no cost to you other than setting the volume control up one or two notches.

While the status of four-channel sound is somewhat nebulous, we suggest that anyone considering quad will find the mini-speakers a boon for use in such a system. In fact, we'll go so far as to say that had mini-speakers been around a half decade ago when four-channel sound was first trying to make the grade, its success would have been easier with enlistment of mini-speakers to get around the multi-speaker aspect of quad that deterred so many people from buying it.

If you have a quad setup now and the speakers are crowding you, you have an option of replacing the rear channel speakers with mini models, or, carrying the matter to extremes, replacing all four speakers with minis, for quad in a miniscule amount of space. The key consideration in either case is to make sure your amplifier power relates to the power needs of the minis to be used.

Many HFSBG readers own receivers and amplifiers with outputs for a second pair of speaker systems, but have not utilized them because of the space another regular set of speakers would occupy. Here's another appropriate area of application for minis. A pair of such speakers in the listening room would enhance the overall sound, for a semi-quad kind of sonic ambience, as well as a total sound from virtually any point in the room. With the aid of long, heavy-gauge cables, mini-speakers might be used to play in a nearby room in conjunction with the main systems in the listening room.

If the relatively high price of the higher quality mini-speakers turns you off, you might consider going the do-it-yourself route and make your own at a worthy saving. Speakerlab of Seattle offers the digitally handy buff mini-speaker kits at \$55 the unit that can be put together in less than an hour with only a tube of special adhesive. The kits are designated "Point One," and each contains a six-inch woofer and one-inch dome tweeter, in a cabinet whose largest dimension is 10 inches. ▲

JAZZ

(Continued from page 24)

a piece as effortlessly as a horn player might embroider its melody; a colorist who could draw a round, clear and even tone from cheap and ill-used instruments; a technician who could throw off streams of clean sixty-fourth notes with keen expression. With all his sophistication, though, Tatum never lost his feeling for the blues; in fact, he liked to sing blues for the entertainment of friends, in a voice not far from that of Sleepy John Estes.

Yet Tatum's arrival in New York in 1932 was not followed by a quick success. Much of his music went over the average listener's head, and it must have confused and even angered many to hear music of such complexity from a black pianist. For a decade, Tatum played as a soloist in night clubs, acquiring a cult following that included Vladimir Horowitz, Leopold Godowsky and George Gershwin—but never reaching a wider fame. (Once he even returned to Cleveland for over a year.) In 1943, he took the makeup of the

newly popular King Cole Trio as the basis for his own group with Tiny Grimes (later Everett Barksdale) on guitar and "Slam" Stewart on bass. Finally, from the mid-1940s until his death from uremia in November of 1956, he was able to alternate trio jobs in nightclubs with increasingly frequent tours as a soloist on the more appropriate concert stage.

A generation later, Tatum's influence remains strong. His most popular disciples have been Oscar Peterson and Billy Taylor; and the versatile Hank Jones, though not confined by the Tatum style, is perhaps his best interpreter today. Less famous pianists like Herman Chittison and Paul Smith owe even more to Tatum's work; and for every pianist who might be considered a Tatum follower, there are several who have pursued Bud Powell's development of Tatum. Indeed, if asked for an unaccompanied version of a popular standard song, most of today's jazz pianists will still respond with a read-

ing in a kind of simplified-Tatum manner.

In 1971, only one Tatum LP was readily available, but today nearly all of his recordings are in print. The best introduction to his work is probably *Solo Piano* (Capitol M 11028), a collection of his solos from 1949; its "Aunt Hagar's Blues" is perhaps the most telling distillation of Tatum's approach to the blues, and many of its other selections are definitive versions of songs Tatum recorded several times.

Tatum's first decade of recording is in *Masterpieces* (MCA 2-4019), which has fifteen 1934-1940 solos recorded for Decca; seven selections by the 1944 Grimes Stewart trio; and eight 1941 pieces by a sextet, with singer Joe Turner in excellent voice. *Masterpieces Volume II* (MCA 2-4112) adds nine more solos from 1934 and 1937, and four 1937 titles wherein Tatum surrounds five lesser musicians single-handedly; there is also a complete record by James P. Johnson. ▲

LITERATURE LIBRARY

201. There are over 400 kits described in the new *Heathkit* catalog for virtually every do-it-yourself interest—amateur radio, hi-fi components, color TV, test instruments, digital clocks and weather instruments, radio control equipment, marine, aircraft and auto accessories, and many more.

202. *Electro-Voice* will send complete information on Thiele-Small parameter speakers and systems which combine flat, wide response, high efficiency, and small size (to half size of sealed systems) including Interface and Sentry systems. There's also information on new separate component speakers.

203. *Crown* offers a new four-color brochure illustrating and describing the company's complete line of hi-fi amplifiers, preamplifiers, speaker systems, control centers and tape recorders.

204. *Sony's* "High Fidelity Components" has a glossary defining major specification, control and convenience feature terminology, which complements the reference chart of specifications for components.

205. The new 20-page, full-color stereo-phone catalog from *Koss* features lively photography and art to show 15 of the company's dynamic and electrostatic stereophones and listening accessories. There is a specification comparison chart and prices.

206. *Kenwood's* wide range of receivers, amplifiers, tuners, tape decks, stereo compacts, and speakers is described in a new brochure.

207. The full range of *Magnavox* audio products from the tuner/amplifiers to combination stereo FM/AM radio phonographs and 8-track tape player/recorders are featured in this new 60-page four-color audio catalog.

209. *JBL's* brochure describes the Decade "family" of loudspeakers: the L26, the L16 and the L36. Each system features styling, hand-craftsmanship, and sound quality, yet is priced for the budget-minded. Their enclosures are finished in natural oak.

210. *Klipsch* loudspeaker systems are attractively presented, including explanation of the Klipschorn corner horn and corner mirror effect. Available for a few dollars are reprints covering design, stereo re-creation, etc.

211. "Hearing Is Believing," a booklet from *ESS, Inc.*, has a serious theme and a constructive purpose. Fundamentals of loud-speaking technology are examined. How to develop a superior loudspeaker is spelled out.

213. *Pickering* has attractive specification sheets on stereo headphones. Also offered is a colorful brochure on cartridges in the UV-15, XV-15 series, as well as the V-15 Micro IV series.

216. For tips from leading sound engineers, send for "The Music-Maker's Manual of Microphone Mastery" from *Shure*. It describes how to match voices and instruments. 220. This full-color booklet by *Dynaco* is subtitled "High Fidelity Components for the Audio Perfectionist." There are two intro-

ductory articles to help you choose your component stereo system. Following is detailed information on the components.

221. A new series of product literature is now available from *Jensen Sound Laboratories*. The new catalogs feature four-color photographs and graphic illustrations of the high fidelity line.

222. *TDK* has a new booklet, "SA... a new state of the cassette art," in which they claim great things: much lower noise levels, greatest dynamic range, unexcelled frequency response, high precision, among others. So send for the booklet to see if you agree.

223. *Technics-Panasonic* has a complete condensed catalog of its line of stereo and 4-channel receivers, separate amplifiers, turntables, tape decks, speakers, separate tuners, microphones, headphones, integrated amplifiers, and CD-4 4-channel demodulators.

224. Before you purchase your hi-fi equipment, read "The *Garrard* Guide," what every hi-fi shopper should know about *Garrard* automatic turntables. There are 11 pages of information and pictures.

225. As part of a broad educational campaign, *Sansui* is making available a booklet, "A Non-Technical Guide to QS 4-Channel Sound," for the consumer. It describes the various forms of 4-channel, their advantages, disadvantages and availability of material.

227. *Tandberg* has an attractive color booklet displaying its tape decks, cassette deck, receivers, speakers and accessories.

228. *Pioneer* value-packed receivers are gracing more and more living rooms as audiophiles turn on, and tune into, the quality sounds of *Pioneer*. Circle, the number 228 and let *Pioneer* do the rest.

230. Make your own evaluation of why *Acoustic Research* (AR) components, designed basically for home use, are often selected for critical professional and scientific applications.

231. *JVC* offers three catalogs—"Tape-it-Live" is in English, French and German and features portable stereo cassette deck and accessories. "Listening for the Future" is all about the *JVC* FM/AM-stereo receiver series. The "JVC High Fidelity Catalogue" is a 36-page full-color delight.

232. *Sherwood Electronics Laboratories* has literature available on its full line of receivers, amplifiers, and tuners. Included are specifications and independent reviews.

233. In "Meet the Creator," *TEAC* invites you to explore the realm of musical creativity with the *TEAC* 3340 4-Channel Simul-Sync Tape Deck. The booklet introduces some of the basic effects that can be produced, using ample diagrams.

237. The 32-page *Pioneer* booklet, "How I Install Car Stereo," by a 26-year-old expert who has installed nearly 5000 car stereo systems, shows in detail how to mount, wire, troubleshoot and maintain hi-fi in your automobile.

238. *Fuji* has just made available a new booklet on their tapes—"Cassette Tape and How to Make It Work for You." It is written on a non-technical level and contains practical information on the selection and use of cassette recorders/players.

241. *Allison* loudspeaker systems claim to be unique in producing in real-room environments. This booklet on their models One through Four explains in quite some detail how they work. Each system is pictured alongside its specifications.

242. A new four-color brochure from *VOR* describes in detail the inner workings of the patented automatic "dry" vacuum record cleaner—the *Vac-O-Rec*. It cleans by lifting dust and dirt with mohair brushes, and a fan blows them away.

243. A new 12-page catalog from *Quam-Nichols* lists 127 loudspeakers, covering virtually any application and providing a tool for selection. It includes listings for new mobile 2-way radio replacement speakers—CB and land mobile business.

244. *Beyer Dynamic's* full-color brochure presents their large assortment of dynamic microphones and headphones. They claim to have the right headphone for every job—monaural, binaural, 2- or 4-channel listening, hi-fi equipment, receivers, televisions and dictating machines.

245. *Celestion* speaker systems are created in England, but are now being made available throughout the world. Send for this brochure to see why they claim such excellence in the speakers they conceive, design and produce.

246. *B&F Enterprises' Truckload Sale* catalog features 10% off their already low prices. All merchandise is high-grade military or industrial surplus: speaker kits, TV games, computer terminals, tools, TV components, lenses, transformers, semiconductors, and more.

247. *Ace Audio Co.* offers a short form catalog of kits and wired units. Pictured are preamps, equalizers, and amplifiers. Descriptions and specifications aid you in making your choices.

248. *NCI Premium Distributors* has a completely illustrated 165-page wholesale price catalog for \$4. Send for information on how to get this display of all major brand radios, televisions, stereos and appliances.

249. Send for information on *Dubie's* Recording Control Systems with mixing, fading, and monitoring controls. Special features and capabilities are described, and specifications listed. Check their customer satisfaction guarantee and the one-year warranty.

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For the later solo Tatum there is *Piano Starts Here* (Columbia CS-9655) also released as *An Art Tatum Concert* (J-2), from a 1949 concert; this album also has the first four Tatum solos, from 1933. But the overwhelming landmark of Tatum's later career is the thirteen-volume *Tatum Solo Masterpieces* (Pablo 2625703), recorded by Norman Granz in four marathon 1953-1955 sessions. So far, eight volumes of this "Ring des Nibelungen" of jazz piano has been issued singly, and any choice between them would necessarily be highly personal.

Granz also recorded most of Tatum's work away from the solo and guitar-trio settings; these records are also available singly or in a box as *Tatum Group Masterpieces* (Pablo 2625706). A quartet with tenorist Bew Webster

(Pablo 2310737), is the unquestioned masterwork of this lot, as well as Tatum's last recording; the haunting contrast of intricate piano filigree and broad-phrased subtone saxophone is unmatched anywhere in the catalog. Tatum's only trio record is Pablo 2310735 with bass by Red Callendar and drums by Jo Jones; the pianist's restraint here makes this another good introduction for beginners. Of the two trio LPs with altoist Benny Carter (Pablo 2310732 and 2310733), Pablo 2310732 is preferred for its earthy "Blues in C." There are also uneven albums with Lionel Hampton (Pablo 2310720 and 2310731), and Roy Eldridge (Pablo 2310736), and an occasionally hilarious duet-duel of virtuosi with clarinetist Buddy DeFranco (Pablo 2310736).

Finally, there is the after-hours Tatum, recorded at parties, in friends' homes, and during jam sessions. Much of the best of this is out of print, including some low-fidelity 1956 material on Twentieth Century Fox (and also on Movietone), and the well-recorded but controversial *Works of Art* (Jazz 101), which some experts dispute as a Tatum item. But you can still find *God is in the House* (Onyx 205), a collection of Jerry Newman's 1940-1941 portable-disc recordings of Tatum on his after-hours rounds through Harlem. Here is Tatum sitting in with major musicians and amateur whisk-broom drummers, Tatum milking tone from a tinny barroom spinet, Tatum singing—in short, an indispensable rounding-out for any collection of Tatum's studio work. ▲

OPERA: FRANCO CORELLI

(Continued from page 58)

notes, a breathtaking ensemble and a wonderful bravura aria. The next year he turned in a peculiar direction: rather than increasing his concern with verismo and eventually moving to Verdi's *Otello*, he tried to go backwards to a more lyric repertory in Charles Gounod's *Romeo et Juliette*. Though he was romantic and sang the music effectively, his French was a joke, bearing no relation to the language, and his style was worse. He sang Gounod as though it were Puccini or Giordano. Still, the audiences loved him, and they drank up his occasional Faust and eventually his Werther in Massenet's opera.

In the early 1970's, however, things began to go wrong. Corelli, for the first time, became unreliable. By 1970 he started missing performances, and by 1973-74, his last major season at the Met, his cancellation level was extremely high. With tenors in the past the problem had been liquor. Never so, with Corelli. His absences came from his steadily growing fear about the reliability of his instrument. When he got to the age where technique must carry a singer, he found that he had very little technique and was terrified. In the first decade of his Met singing and in the decade before in Europe (he made his debut as Don Jose in 1953, opening La Scala as early as 1954, with Maria Callas in Spontini's *La Festale*), he had made his career on the full, rich, sound of his natural voice. Now confronted with the forties of his life, he found that his voice was not as rich and that suddenly he had moved from a beautiful sound to something much less than pretty. Corelli tried for many effects in the opera house—one can remember his achieving some fine pianissimos—but the

general attempts late in a career to learn how to use his voice intelligently were not successful. Finally, he just stopped singing, at a very young age.

One day he was on the roster of the Met—his last major company—and still recording for Angel Records, the next day he wasn't. There is no question that Corelli, who is about 50, should be singing today. He lives in New York and there are repeated rumors that he will again begin to sing, but nothing ever happens. If he does come back, it will be because he has learned how to master his instrument, one of the most spectacular tenors of this century.

In recordings he is well represented in most of his great parts. A record called *Operatic Arias* (Angel S-35918) captures much of the sound of the young Corelli in a wide repertory of favorite arias. One can simply stand amazed at so much sound, so much even singing, and if his approaches and withdrawals from a high note were never very graceful, the high notes themselves were matchless.

In complete operas his *Andrea Chenier* (Angel S-3645) is somewhat handicapped by Antonietta Stella as Maddalena and the conducting of Gabriele Santini, but it is Corelli at his best; a role in which no one has ever really duplicated his passion and virility. Another great one is, of course, the *Turandot* (Angel S-3671). Here he is joined by Miss Nilsson, Renata Scottò as a passionate, well-conceived Liu and Zubin Mehta in the pit. This is a blazing reading, with everyone singing at full voice and in command of their considerable faculties. Note Corelli's melting cantilena in "Nessun Dorma," the first phrase of which is so charac-

teristically his style and sound. He joins with Miss Nilsson on two other interesting recordings: *Aida* (Angel S-latter finds him in rare form. This was a great opera for him, the simple character of Cavaradossi was extremely good for Corelli to interpret, with the two arias lyrically strong and the "Vittoria" outburst unforgettable. Miss Nilsson was never my idea of Tosca—she was musical and accurate but not a real Roman diva—and the combination is not quite right here. On the other hand, the *Aida* of the two is sensational. Mehta again assumes command of the orchestra, and Corelli is kept very much in Verdian line. Like most singers with a strong conductor he is at his best, and here although there could be a more gracefully Verdian line, the sheer, dramatic excitement of Radames has rarely been so well detailed. Corelli is also sensitive in the Nile Scene duet and expressive in the Tomb Scene, if a shade elephantine. It is a fine performance, reminiscent of many nights at the Met with the two together.

In Italy he began his career singing with Maria Callas, and there were many times at La Scala in his early days when his experiences with Callas were extraordinary. On records, though, the two are found only in Miss Callas' second *Norma* (Angel S-3615). She is very expressive though not really in command of her high notes. Pollione is a role that no one can do much with, and Corelli does about as much as is necessary. His first act aria is ringing and he holds up his part of the trio and final scene. Just because of her interpretation it is an interesting recording to have, but one that can best be suggested for those who have her

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CORRECTION: In the summer issue the ad directly above this notice was printed incorrectly due to the illegibility of the advertiser's copy. It should have read earwires not earrings.

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first pressing of *Norma* as well.

In the French repertory discussed above, Don Jose in *Carmen* was not mentioned as it has always been the domain of the Italian tenor. So it was with Corelli, whose Don Jose was ringing and though somewhat uninvolved, vocally thrilling. He sings it on records with Leontyne Price (RCA LSC-6199). Neither seem very much into their

roles, but it is good sound. Corelli indeed comes off as the more involved of the two, but it is not a Don Jose that develops throughout the four acts. *Romeo* (Angel A-3734) is a fair realization of the performances of the Gounod work at the Met, with Mirella Freni as Juliette. One can hear all the sweetness of his approach, but the whole thing is a French opera treated

in a totally Italian manner.

The saga of Franco Corelli is probably over, but it might not be. There is probably still time if the right person could teach him how really to use his magnificent vocal instrument. But if, as seems likely, this never happens, he made a great many people happy over the 20 years in which he poured out golden, rich, sensual sound. ▲

FALL FORECAST

(Continued from page 47)

ducing it. One of the standouts is a new full-range direct drive electrostatic speaker system from Acoustat Corp. The Monitor, priced at \$2,700 per pair complete with required built-in servo-charge amplifiers. Standing 62 inches high, it projects sound from a pitched four-panel front only five inches deep to maintain excellent balanced sound pressure levels throughout the listening environment.

Thorens has introduced its new Swiss-made "Sound Walls," Models HP 380 at \$900 each, and HP360 at \$700 each. These electrostatic speakers are a mere four inches deep, with the HP 380 measuring 44½ inches tall by 31½ inches wide, and the HP 360 measuring 31½ by 22½ inches.

Sonic Systems, a recent comer in the speaker field, offers three large, deluxe systems geared to critical listeners with big budgets and lots of listening space. One is The Tower, a 40-inch tall unit with 12-inch woofer, coupled to the firm's "radical slot port" loading system, and a pair of high-compression back-to-back tweeters that fire forward and backward. Price, \$1,695 a pair. The Summit, at \$2,195 a pair, uses a 15-inch woofer and slot port loading, plus back-to-back tweeters, in a 40-inch tall cabinet. The Sonic Monolith, priced at \$2,995 a pair, is 46 inches tall, and features four tweeters in a surround array, and two 15-inch slot-loaded woofers. Sonic claims that its radial-slot port-loading boosts efficiency while maintaining "dead accurate" transient response.

Janszen, one of the chief architects of the electrostatic speaker system, has recently introduced its latest contribution to that art. The form it takes is "Z-Big One," a system costing \$3,200 the pair. It contains 32 mid/high frequency electrostatic panels in a top panel array, and four 12-inch woofers in the low-frequency base (sic) section. A spokesman noted that electrostatic speakers are "no longer prone to the problems of their early years. We're proving that by offering a 10-year warranty on the electrostatic elements in our systems."

Perhaps the most unusual looking

speaker system you'll come across is Design Acoustics' D-12A, a dodecahedron-shaped system mounted on a round chrome pedestal base. This 12-plane model contains two 8-inch woofers, one 1½-inch dome midrange, two 5-inch cone midrange, two 1-inch tweeters, and three 1½-inch cone tweeters, mounted for a totally spherical dispersion pattern. It sells for \$675 each in walnut, and is also available in rosewood at somewhat higher (unspecified) cost.

Among new woofer systems you'll be seeing are Fundamental Research's "Low Frequencies," a column type unit 38 inches tall, and Acoustique 3a International's SB 800, a 30-by-27-by-11-inch corner table model using two 11-inch woofers, and SB 1000, a 48-by-27-by-11-inch lounge table model with three 11-inch woofers.

Would you believe, speaker accessories? Yes, there are such things. This category consists mainly of speaker stands, for raising speaker systems off the floor for more natural reproduction of the bass spectrum, or to put the mid and upper range drivers at a point closer to ear level when listening. The latest offering comes from Osawa Co. in the form of the "Universal Vari-Tilt Stand" bearing the AVF brand name, priced at \$74.95 the pair. The units not only raise speakers off the floor, but permit tilting them several degrees upward for "fine-tuning" them to the listening environment.

Three major manufacturers are offering totally new product lines, representing a broader involvement in audio for each of them. One company is Dynaco, known in the past for equipment that had little styling "pazzazz," albeit state-of-the-art in technology and performance. Now Dynaco via its "Dynasty 2500 Series" is showing that it, too, can be in the forefront in terms of exciting styling. The Dynasty group consists of a 100 wpc power amp at about \$600, a bi-polar/FET preamp at about \$500, an integrated amp at approximately \$750, and a varactor FM tuner that sells for about \$800.

Harman/Kardon's totally new line is notable for a "family" look, in which

the cosmetic design elements are related, unlike in the past when many of the firm's products had individual design "personalities." The new line is comprised of four stereo receivers tentatively priced at \$250, \$320, \$370, and \$520; three cassette decks with approximate prices of \$260, \$320, and \$480; an AM/FM stereo tuner at about \$230; and a pair of integrated amps, one at about \$260, the other at \$360. An unusual feature of the \$480 cassette deck (Model 3500) is a variable speed control for tape play to enable the user to correct the speed of tapes recorded on less precise machines. It can also be used to change the pitch of a recording to facilitate live musical accompaniment.

The third company presenting a new image is Jensen, an old-line speaker manufacturer. Jensen has entered the car sound field with a line of six deluxe AM/FM stereo receiver/tape player combinations, priced from \$299.95 to \$469.95. Three are cassette modules, three are cartridge. The cassette units are designated R410 (10 watts RMS), R420 (20 watts RMS), and R430 (60 watts RMS). The eight-track models are R310 (10 watts RMS), R320 (20 watts RMS), and R330 (60 watts RMS). The 20 and 60-watt models have bi-amplified audio outputs, and the 60-watt models also have separate power amplifiers.

Another company presenting a new face is SAE (Scientific Audio Electronics). Known primarily as an all-American electronics manufacturer, SAE has branched out as a "full-line" supplier, via its SAE Two line. The new line, manufacturer to its specifications in Japan, is done in the same black styling that SAE is known for. It consists of: a semi-automatic direct-drive turntable at \$225; front-load, solenoid-operated cassette deck at \$400; 30 wpc AM/FM stereo receiver at \$325; AM/FM stereo tuner at \$275 featuring large signal strength and FM center-tuning meters that match the power output level meters of the final SAE Two product, a 50 wpc control amplifier with a THD spec of 0.05 per cent, priced at \$325.

SAE has also introduced two new products in its American-made line. One is a 150 wpc power amp with an

LED array for power level output checking, and a competitively priced FM digital tuner at an attractive price

of \$400—reflecting high end technology moving down into the affordable region. ▲

DIRECT-TO-DISC DIRECTORY

(Continued from page 57)

Umbrella has a super big band disc available, entitled "Big Band Jazz" by Rob McConnell and the Boss Brass. Considering that most direct-cut discs go for around \$15.00 each, this one represents a bit of a bargain as it is a two-record set priced around \$20.00. One entire side is taken up with a brass arrangement of the "Porgy And Bess Suite" while the remaining three sides have three fairly long songs on each. Even if none of the song titles are familiar, chances are you'll be familiar with most of the music. Selections include "Fred" by Neal Hefti and "No More Blues" by Antonio Carlos Jobim. The lesser known titles include "A Tribute To Art Fern," "Runaway Hormones," and "Dirty Man." Particularly enjoyable is the drumming, especially on the piece "Fred."

Lovers of classical music have not been ignored by Umbrella. Their recording of the Toronto Chamber Orchestra is marvelous for the sounds therein. If you are an audiophile who has never been overly fond of chamber music, this disc might very well change your mind. Naturally, with straight classical music such as Mozart's *Serenade No. 13 in G Major (Eine Kleine Nachtmusik)* there are no rocking drums or blaring trumpets. Still, this is an exceptional disc and deserves an audition. The very few minor bits of surface noise can not mar the beauty of the disc. Umbrella records are distributed in the United States by Audio-Technica.

Sonic Art is another label whose direct-cut efforts are being handled by Audio-Technica. Sonic Arts' most interesting release (from a technical standpoint) is called "Woofers, Tweeters and All That Jazz." The musical selections will never become standards—those of you looking for a tune you'll go away humming might consider the music less than ideal. But, on technical merits this disc has quite a bit going for it. Not only is it direct cut, but it is binaural as well. To fully appreciate the pinpoint localization and three dimensional sound of binaural, it should be heard via headphones—the same as it was recorded. However, in the pamphlet which accompanies the album, owners of quad systems are urged to play it through an SQ decoder. At first hearing the sound may seem a bit distant, but that is the beauty of binaural. When the musical instruments are moved closer to the microphones (as they are

on this album) the particular music actually sounds *closer*, not just louder. The titles of the four jazz songs are "Keith's Blues," "Sometimes Plums, Sometimes Turnips," "Cneway To Brazil," and "Spend It First."

M-K Sound (Miller and Kreisel) have released a 12-inch 45 rpm direct-cut disc titled "Joe Marcinkiewicz and Blu." It is termed a disco-jazz album, but don't expect anything like Donna Summer, Meco or The Salsoul Orchestra. And, although the percussion sounds direct-cut, the rest of the sound is not really anything spectacular. There is also more surface noise than one usually finds in direct-cut recordings. Still it is an interesting disc. Not yet available for review is a forthcoming disc on a new M-K label (RealTime Records) titled "For Duke" which will feature the late Duke Ellington's orchestra playing such Ellington classics as "Take The A Train," "Satin Doll," and five other selections. Even if the overall sonics are no better than the "Blu" disc, the Ellington release is one

I'll go out and buy.

Crystal Clear Records has a rather large selection of direct discs from which to choose, ranging from disco to jazz and classical. A few words about Crystal's "sound" and policies are in order. Their popular discs are all 12-inch 45s while the classical recordings are 33s. Their albums for domestic sale are pressed on white vinyl, while European versions are done in black. It is their claim that the white vinyl is less prone to surface noise. True, their records are quiet, but so are those from other direct-cut companies who use black vinyl. In any event, their discs are far quieter than most "conventional" recordings. One of their latest releases features organist Virgil Fox playing the Fratelli-Ruffatti pipe organ (116 ranks, 6,791 pipes) installed in the Garden Grove Community Church in Garden Grove, California. Side One is devoted to Bach's "Toccat, Adagio and Fugue" while Side Two has Bach's "Toccat and Fugue in D Minor" and Jongen's "Toccat from the Symphonie Concer-

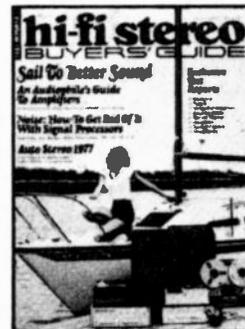
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tante." This album is, in my opinion, the finest recording ever done of a pipe organ to date. For the sheer power and majesty of a classical organ, this disc must be heard—preferably on a system with a sub-woofer as the frequency range extends down to 16 Hz.

A second Virgil Fox disc is due out shortly and I, for one, am very anxious to hear it. Also just around the corner is a Crystal Clear direct-cut disc of Arthur Fiedler and the Boston Pops playing "Capriccio Italien" and "Capriccio Espagnol."

At the other end of the musical spectrum are some of Crystal's other efforts: "Direct Disco" which, as the title implies, is a direct-cut disco album featuring Gino Dentie & The Family. Selections (six, total) include "The Hustle," "Sexy," and "Get Down Tonight." At first listening you might be a trifle disappointed. If your previous exposure to disco albums was one of overblown super bass, this one has a much more natural sound—less overpowering bass but a much more realistic sound.

San Francisco Ltd. is the name of a group and the title of another Crystal Clear record. The selections with female lead singer Terry Garthwaite, range from gospel/rock ("Reap What You Sow") to Dixieland ("Just A Walk Closer With Thee") and some instrumentals: "Cannonball" and "Mambo Del Norte." Quiet surfaces add to the enjoyment of this disc. A good buy.

Other Crystal Clear recordings include Peter Nero playing songs from the Broadway musical "The Wiz" and recent hits such as "Send In The Clowns" and "Laughter In The Rain." Charlie Byrd and his jazz guitar are available playing such tunes as Janis Ian's "At Seventeen" and his own standard fare like "Mojibendo Cafe" and "Swing 39." Mr. Byrd is backed up by drums, bass, flute, and trombone. Classical guitar is offered by Laurindo Almeida on Side One of his Crystal disc along with Frederick Seykora on the cello playing the premier recordings of Radames Gnattali's "Sonata for Guitar and Cello." The other side of the album has Lennon-McCartney's hit "Yesterday" and two Almeida compositions: "Late Last Night" and "Jazz-Tuno At The Mission." Space does not permit a more detailed of these Crystal Clear recordings. Suffice to say that the label's name is an apt description of the sound—clean & natural.

Nautilus Recordings (a division of Orion Marketing) has a real winner with their direct-to-disc recording of Randy Sharp. Sharp's soft rock/folk songs are backed up by an eight-man rhythm section along with horns, woodwinds, a string section and three female back-up singers. The recording and

pressing is first rate with a dead quiet surface and super dynamic range. The title song, "First In Line" and eight other pieces (including "The Womanizer" and "Banjo Man") make up this truly superior disc. This recording is also available as a DBX-encoded tape (10½-inch reel) at a cost of (gulp!) \$75.00.

Nautilus also distributes direct-cut discs from other labels as in the case of two exceptional JVC releases. Two of the JVC albums are showcases for the talents of pop guitarist Lee Ritenour. His two albums are titled "Gentle Thoughts" and "Sugar Loaf Express" and if you like jazz/soft rock instrumentals, these discs are a must. There is absolutely no surface noise to mar these fine recordings. Here you can listen to electric guitar (along with a complement of other musicians) as it is meant to sound. Not some equalized, compressed, limited and *generally messed up* sound as you'd find on conventional recordings. If only all conventional discs could sound this clean and "open."

Obviously, this article does not cover all of the direct cut albums currently available. The increasing popularity of these discs makes it impossible to list them all in one article let alone review them—a truly monumental task, albeit an enjoyable one.

In the event that your local retailer does not have any of the discs, you may try writing to the record companies directly. Some will sell a single album via the mail while others may refer you to a different retailer.

Considering the growing demand and supply of direct cut discs, it is natural to wonder what will be released in the near future.

Crystal Clear has a forthcoming disc of Cal Tjader's jazz. Sheffield has two recordings of the Los Angeles Philharmonic doing some Wagner orchestral music and one of Prokofiev's "Romeo And Juliet," as well as an upcoming disc of bluegrass music. Great American Gramophone has a whole slew of albums "in the can" including Robert Cudnick playing the Mormon Tabernacle organ, Phil Woods jazz, Woody Herman, Mel Torme as well as some disco and rock. And, theater organ fans can look forward to *three* direct cut albums from G.A.G. by the undisputed master of the theater pipe organ: George Wright. ▲

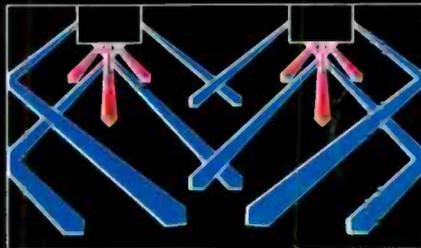
Equipment used in reviewing and evaluating these discs includes a Bang & Olufsen 4002 turntable equipped with their MMC6000 pick-up. A Crown IC-150-A pre-amp, assorted SQ matrix decoders, two S.A.E. 2200 power amplifiers and two pair of Bose 901 speakers.

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SA-300	35 watts	0.04%	10.8 dBf	45 dB
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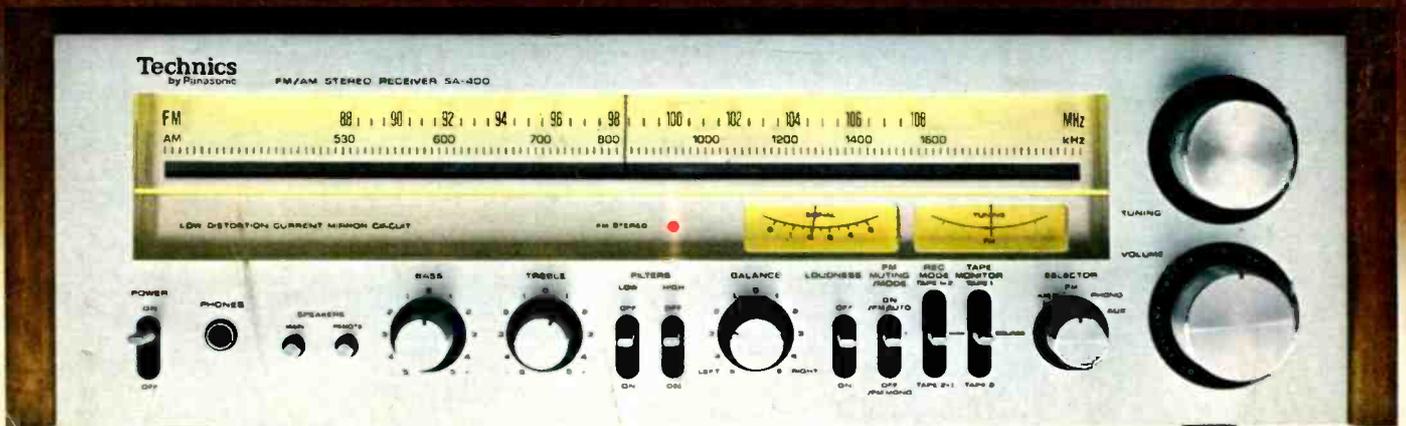
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