

# Audio

FEBRUARY 1986 • \$2.00

INTERVIEW  
BOB THIELE

## ROBERTSON 6010

ENORMOUS PUNCH  
VERY LISTENABLE

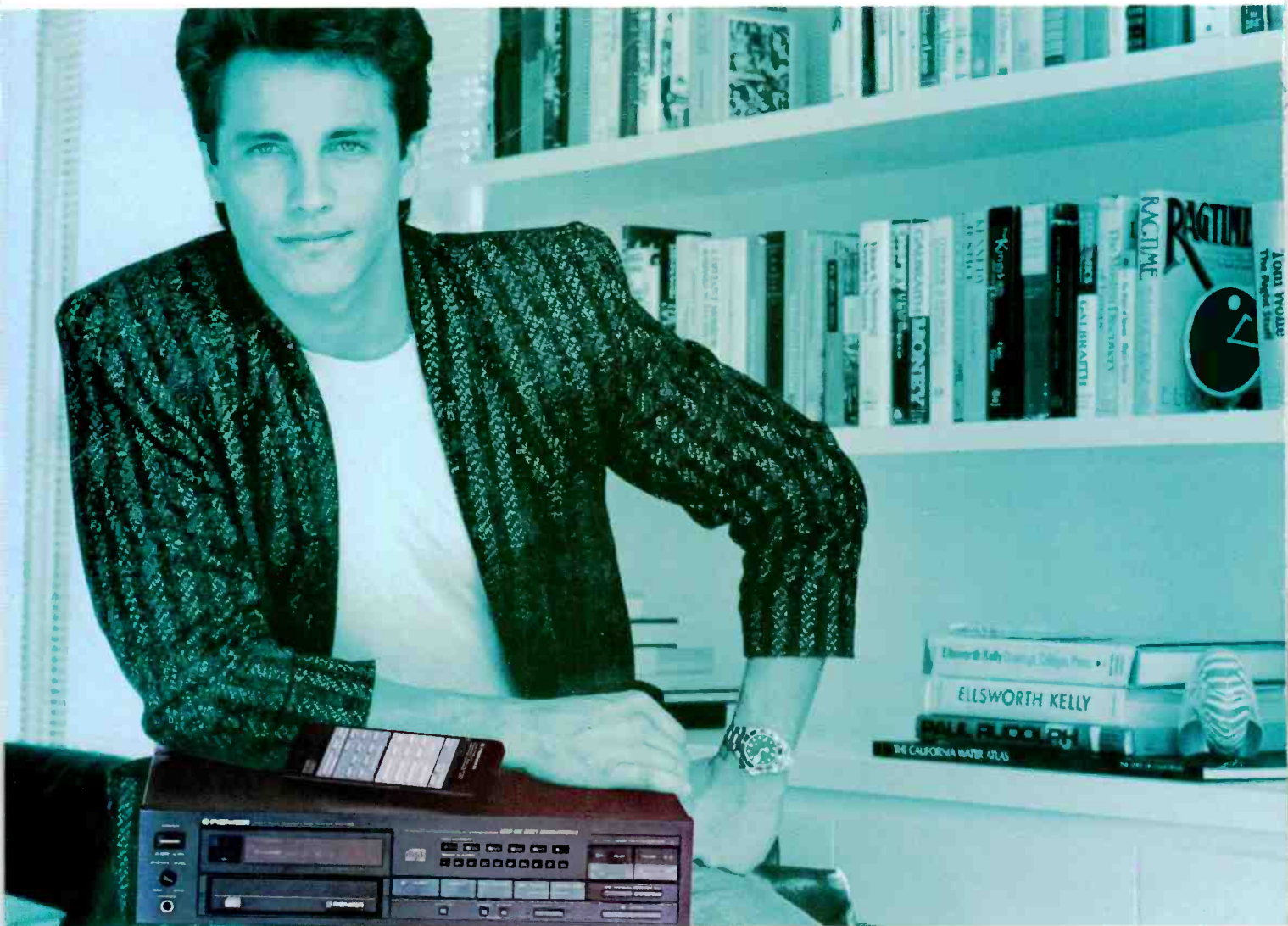
## TESTED

FRIED STUDIO IV  
LOUDSPEAKER

ALPINE 5900  
CAR CD PLAYER



A CD PLAYER THAT'LL PLAY SIX DISCS?  
I SAID I'D TAKE IT BEFORE THE SALESMAN  
EVEN OPENED HIS MOUTH.



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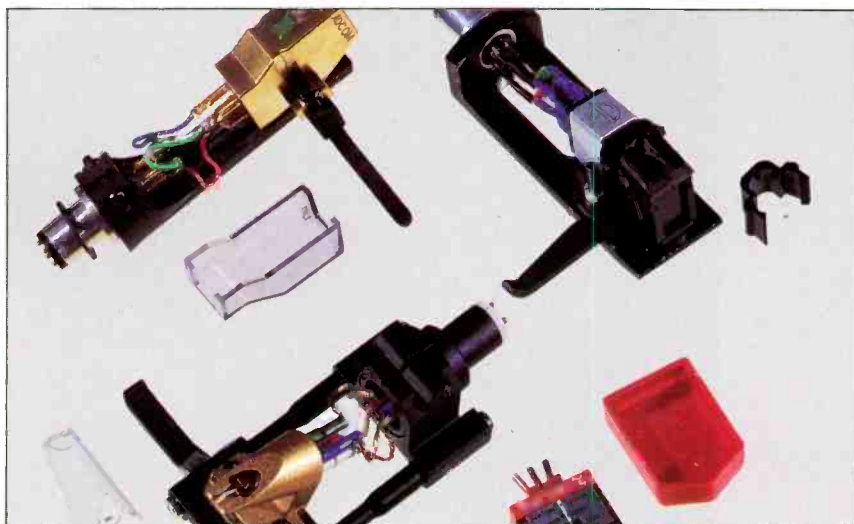
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# Audio

FEBRUARY 1986

VOL. 70, NO. 2



See page 86



See page 12

## FEATURE

<b>THE AUDIO INTERVIEW:</b>		
<b>BOB THIELE</b> .....	Ted Fox .....	36

## EQUIPMENT PROFILES

<b>ROBERTSON SIXTY TEN</b>		
<b>AMPLIFIER</b> .....	Bascom H. King .....	52
<b>FRIED STUDIO IV SPEAKER</b> .....	David L. Clark .....	58
<b>ALPINE 5900 CAR STEREO</b>		
<b>COMPACT DISC PLAYER</b> .....	L. Feldman and I. Berger .....	70
<b>PIONEER PD-9010X</b>		
<b>COMPACT DISC PLAYER</b> .....	Leonard Feldman .....	78
<b>AURICLE: A CLUTCH OF</b>		
<b>CARTRIDGES</b> .....	Anthony H. Cordesman .....	86

## MUSIC REVIEWS

<b>COMPACT DISCS</b> .....		90
<b>ROCK/POP RECORDINGS</b> .....	Michael Tearson, Jon & Sally Tiven .....	94

## DEPARTMENTS

<b>DIGITAL DOMAIN</b> .....	Ken Pohlmann .....	12
<b>ROADSIGNS</b> .....	Ivan Berger .....	16
<b>SPECTRUM</b> .....	Ivan Berger .....	21
<b>BEHIND THE SCENES</b> .....	Bert Whyte .....	22
<b>AUDIO ETC</b> .....	Edward Tatnall Canby .....	26
<b>AUDIOCLINIC</b> .....	Joseph Giovanelli .....	32
<b>TAPE GUIDE</b> .....	Herman Burstein .....	33



See page 16



See page 26



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## LEADING, BY FOLLOWING THROUGH

*The professional, alert with anticipation, is ready to meet the challenge, anywhere on the court, anytime. Then to respond quickly, with a fluid full-swing—from the draw to the follow through...the apparently effortless movement that is the winner's edge.*

*In cassette decks, the principle's the same—if high fidelity sound reproduction is to be achieved.*

*That winning edge is in every Harman Kardon cassette deck. It's called Ultrawideband Frequency Response—the ability to react smoothly and quickly through the total range of human hearing (from 20Hz to 20kHz  $\pm$  3dB). From the most inexpensive to the most sophisticated, every Harman Kardon cassette deck delivers this level of performance, with any tape formulation.*

*Other manufacturers simply don't follow through the entire range and therefore miss many of the hard to reach notes.*

*Harman Kardon cassette decks expect the unexpected, anticipate the highs and and lows...to accurately reproduce all of the music.*

*In meeting the challenge of high fidelity, every Harman Kardon cassette deck shows the seemingly effortless superiority needed to take the title—every time.*



*Shown is the new TD392 Cassette Deck featuring 3 heads, Dolby HX Professional,\* Dolby B\* and C,\* Meter Weighting, Auto Repeat, Output Level Control and Solenoid Operation.*

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



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HARMAN KARDON HIGH INSTANTANEOUS CURRENT CAPABILITY

## POWER ON COMMAND

*When you listen to your audio system, the power your loudspeakers demand constantly fluctuates with the music\*, requiring huge current surges from your amplifier.*

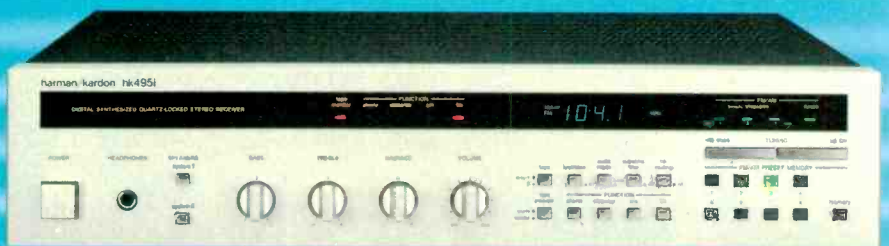
*Since most receivers and amplifiers are built to merely meet FTC power rating requirements, they simply don't have the current, and ultimately the power, to respond.*

*Just as the martial arts master is able and prepared to respond instantly with the climactic power needed... so is Harman Kardon. From the least expensive to the most sophisticated, every Harman Kardon receiver and amplifier is equipped with High Instantaneous Current Capability (HCC) to provide the power you hear as loud, clear, distortion-free music.*

*In the world of uncompromising quality, you can depend on the demanding master of high fidelity... Harman Kardon.*

*\*A low frequency transient, such as the beat of a kick drum, can make a nominally rated 8 Ohm speaker instantaneously demand up to 6 times as much current as the amplifier's FTC power rating would suggest.*

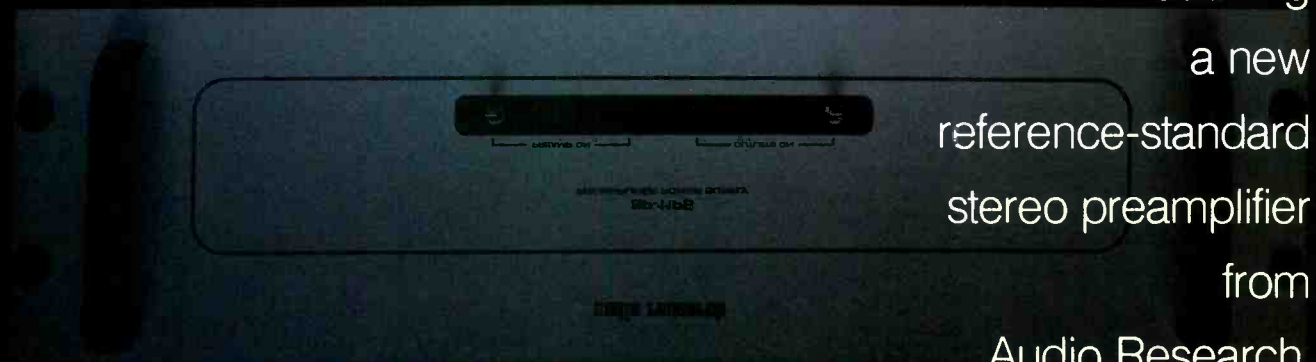
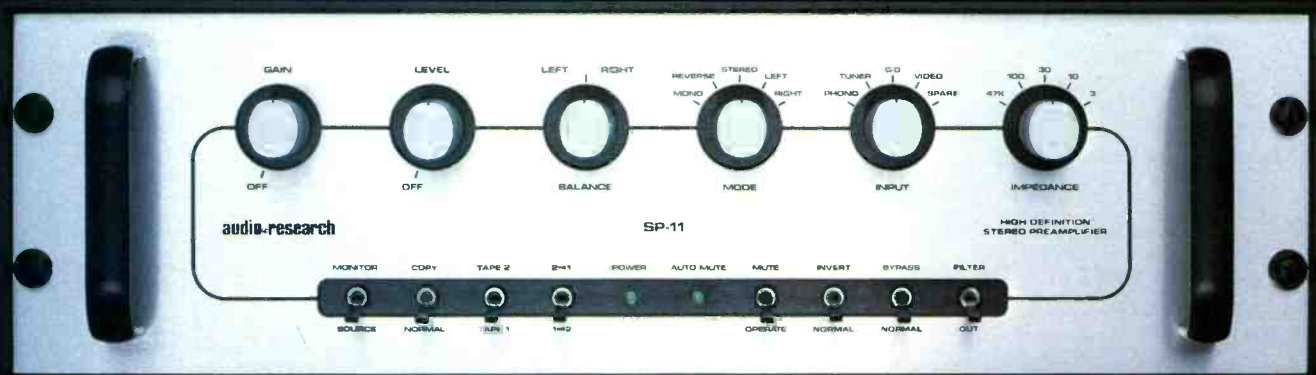
*Shown on the right is the new hk495i receiver featuring power of 45 Watts per channel with <.09% THD (RMS, per channel, both channels driven into 8 Ohms, 20Hz-20kHz), 95 Watts Dynamic Power into 4 Ohms, 115 Watts Dynamic Power into 2 Ohms. The hk495i has 18 amps of HCC, 25dB of Negative Feedback, Ultrawideband Frequency Response of 0.5Hz to 150kHz, Digital Synthesized Quartz-Locked Tuning with 16 memory presets.*



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### SPECIFICATIONS

FREQUENCY RESPONSE: High level,  $\pm 5$ dB 1Hz to 100kHz, -3dB points .2Hz and >250kHz.

PHONO:  $\pm 2$ dB RIAA accuracy 20Hz to 40kHz.

HARMONIC DISTORTION: <.005% @ 2V RMS output, 5 to 30kHz (Typically <.001% midband).

GAIN: High level inputs, 30dB; Phono, 76dB.

NOISE: Output noise (gain down), -110dB IHF weighted ref 2V RMS output. Input noise, high level, gain maximum <5uV equivalent input, IHF weighted, or 106dB below 1 Volt RMS input. Phono, RIAA IHF weighted <2uV or 74dB below 1mV input.

### FEATURES

- Automatic warmup, brown-out, power-line interruption muting and manual muting at all preamplifier outputs, with new shunt circuitry.
- Subsonic phono filter with 6dB/octave rolloff (to eliminate ringing) with transition to 18dB/octave. Front panel switchable.
- Bypass switch for use with "audiophile quality" program material.
- Absolute phase switch for main outputs, plus unswitched inverting and non-inverting outputs.
- Full tape functions: two inputs, two recording outputs, plus tape copy and tape monitor functions.
- All input/output connectors have heavy gold plating and connect "ground" before "hot".
- Level set control in addition to normal gain control. Allows essentially unlimited input signal range while preserving optimum gain control usage.
- Toroid power transformer for low mechanical noise and low external magnetic field.
- Aircraft quality power connectors and cable.

Partial specifications above are preliminary and subject to change. SP11 shown in optional solid-wood cabinets, available in light oak or dark walnut. Black front panels available at additional cost.

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# a BUYERS' 1986 GUIDE to SEPARATES

## PROFESSIONAL 19" RACK-MOUNT COMPONENTS FOR THE SERIOUS AUDIOPHILE

### Power Amplifiers

#### PM1600 Power Amplifier

MOSFET stereo power amp. 600 watts per channel continuous RMS power into 4 ohms; 375 watts per channel continuous RMS power into 8 ohms, 20-20,000 Hz with no more than 0.05% THD; 900 watts per channel RMS into 2 ohms; Freq. resp. 20-20,000 Hz  $\pm$  0.1dB; S/N -105dB; slew rate 50V/msec; TIM unmeasurable; IM 0.05%; 19"W x 5 1/4"H x 16 1/2"; 60 lbs .....\$1,399

#### DDR1200 Power Amplifier

1,200-W power amp with 100-LED frequency spectrum analyzer display. Features class-H Vari-Proportional circuitry; autobuffer circuitry for continuous 2-ohm operation; 40-LED power output meter from 0.02 up to 2,000



W; Truclip clipping indicators for each ch; mono bridging switch on rear panel. TIM <0.02%; 250 W/ch into 8 ohms; 375 W/ch into 4 ohms continuous RMS, 20-20,000 Hz, THD <0.09%; 750 W at 8 ohms; 19"W x 7"H x 12"D; 58 lb .....\$1,199

#### A5002 Power Amplifier

Power amp with class-H Vari-Proportional circuitry and Autobuffer for continuous operation into 2 ohms. Features auto crowbar protection circuit for output protection without current limiting; 20 LED/ch 0-1,000 W  $\pm$  3 dB (4 ohms) meters; front-panel switching for 2 pairs of speakers; true clipping indicators; input level controls. Output power 250 W/ch into 8 ohms, 375 W into 4 ohms continuous rms, 20-20,000 Hz at <0.09% THD; S/N >105 dB; slew rate >50 V/microsec; TIM <0.02%; 19"W x 7"H x 12" D. ....\$899

**A5001.** Same as A5002 except no meters and no input level controls. ....\$749

#### A2502 Power Amplifier

MOSFET stereo power amp with 20-LED 0-500 W (4 ohms) power meters. Features switching for 2 pairs of speakers; input level controls; true clipping indicators. Output power 125 W/ch into 8 ohms, 190 W/ch into 4 ohms, continuous rms, 20-20,000 Hz at <0.05% THD; S/N >105 dB; damping factor 200 .....\$649

**A2801.** Same as A2502 except no meters and level controls .....\$549.

#### PCR800 Power Amplifier

MOSFET stereo power amp. 205 watts per channel continuous RMS 20-20,000 Hz into 8 ohms <0.05% THD; TIM unmeasurable; S/N -105dB; 8 1/2"W x 5"H x 12"D; 18 lbs. ....\$449

#### PM840 Power Amplifier

MOSFET stereo power amp features no-current-limiting power supply, 300 w/p/c RMS into 4 ohms; 450 w/p/c



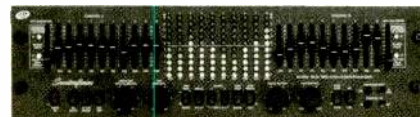
RMS into 2 ohms; 205 w/p/c into 8 ohms @ <0.05% THD; Freq. resp. 20 to 20,000 Hz  $\pm$  0.1dB; S/N -105dB; slew rate 50 V/microsec; TIM unmeasurable; damping factor 200; 8 1/2"W x 5"H x 12"D; 20 lbs .....\$499

**PCX-1 19" Rack-mount.** Panel kit for PCR800 or PM840 .....\$49

### Signal Processors

#### AE2000 Real Time Analyzer/Equalizer

World's most accurate (0.1dB) Real-Time Analyzer/Equalizer. The first and only analyzer with two independent real-time analysis systems. Pink-noise generator. Features 100-LED (10-octave) real-time display with adjustable decay rate; mike preamp; input for analysis of 3-head tape deck, or any signal processor; Auto-scan mode. Center frequencies 32, 64, 125, 250, 500, 1k, 2000, 4,000, 8,000, 16,000 Hz; boost/cut range  $\pm$  15dB; display accuracy 0.1 dB; Auto-Scan sweep rate 0.1-10 secs/octave; THD and IMD <0.01% at 2 V; S/N ratio 114



dB at max output; mike preamp input imp 2,000 ohms; Frequency response 20-20,000 Hz  $\pm$  0.1 dB; 19"W x 5 1/4"H x 11"D; 18 lbs .....\$799

#### DC 4415 Third-Octave Equalizer

Third-octave stereo equalizer with 21 controls/channel. Center frequencies 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1,000, 1,600, 2,500, 4,000, 6,300, 10,000, 16,000 Hz. Features EQ defeat; infrasonic filter; tape monitor and tape record; Differential/Comparator<sup>®</sup> circuitry for unity gain setting to within 0.1 dB accuracy for highest dynamic range capability. THD and IMD 0.01% at 2 V; S/N 114 dB at full output; input imp 47,000 ohms. 19"W x 5 1/4"H x 11"D; 16 lbs. ....\$599

#### DC 2215 Differential/Comparator<sup>®</sup> Equalizer

Stereo 10-band equalizer with Differential/Comparator<sup>®</sup> true-unity-gain circuitry for input to output balancing accuracy to within 0.1 dB. Equalizer filter circuits use precision wire-wound passive-coil inductors for high gain, low noise and distortion. Front panel controls include tape monitor, LED defeat/EQ defeat and EQ tape record. THD and IMD <0.01% at 2 V; S/N ratio 114 dB at 10 V; boost/cut range  $\pm$  15 dB. Includes frequency spectrum analyzer test record, compute tone charts, cables. 19"W x 5 1/4"H x 11"D; 17 lbs .....\$399

**DC 2214.** Same as DC 2215 except equalizer filter circuits have op-amp synthesized inductors. THD and IMD <0.01% at 2 V; S/N ratio 106 dB at 10 V; boost/cut range  $\pm$  12 dB. ....\$299

### Preamplifiers

#### DX 4200 Preamp/Equalizer

Combination preamp/equalizer with Compact Disc Player and Video/Audio inputs. Phono preamp has variable cartridge loading (50-800 pF, 100/47,000 ohm); adjustable  $\pm$  20 dB gain; MC variable reluctance or MM cartridge inputs; 3-way tape dubbing; 2 external signal-processor loops; conventional line outputs plus separate autobridge line outputs for mono bridging of most amps; EQ S/N 114 dB; Passive-Coil filters with 15 dB boost or



cut for each octave; Differential Comparator circuitry for true 0.1 dB Unity-Gain EQ balancing; includes Frequency Spectrum Analyzer test record and instant reset Computone charts; 19"W x 5 1/4"H x 11"D; 20 lbs. ....\$699

#### DX 4100 Preamplifier/Equalizer

Combination preamp/equalizer with built-in conventional line outputs plus separate bridging line outputs for mono bridging of most amps. Features 2 external signal-processor loops; 2 phone inputs; 2 tape inputs with 3-way dubbing; phono S/N 97 dB, THD 0.01%; 12 dB EQ boost and cut for each octave; Differential/Comparator circuitry for 0.1 dB Unity Gain; includes Frequency Spectrum Analyzer test record and instant reset Computone charts; 19"W x 5 1/4"H x 11"D; 19 lbs. ....\$549

**DX 4000.** Same as DX 4100 without graphic equalizer but with 3 external signal-processor loops; 19"W x 3 1/2"H x 11"D; 15 lbs. ....\$399

#### DX 3000 Preamplifier

Inputs for CD player, video/audio, tuner, phono, two tape decks with dubbing, bass and treble controls, and signal processor loop. THD -0.01%; S/N 95 dB; 19"W x 2 3/8"H x 10"D; 10 lbs. ....\$299

### Tuners



#### T6200 AM/FM Stereo Digital Tuner

Digital quartz PLL tuner with 16 station presets, 5-digit station readout, auto scan tuning and active high blend filter. 19" rack-mount front panel. IHF sens 1.6  $\mu$ V; S/N 75 dB; distortion 0.08%; 19"W x 2 3/8"H x 12"D, 12 lbs .....\$299

## GUARANTEED \* TO IMPROVE AND ENHANCE YOUR STEREO SYSTEM—JUST PLUG IT IN!

Each of our separate Amplifiers, Preamp-EQ's, and Analyzers is U.S. made and expressly designed to perfectly match your present system...you can add to, or replace, any one or more of your components with the full assurance that each Soundcraftsmen S-E-P-A-R-A-T-E will immediately improve and enhance your system's sound to your complete satisfaction.\*

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Or, add the PM840 to your present system for an immediate and incredible improvement to your system's sound!



## COMPARE...THE NEW PM840'S HIGH PEAK CURRENT CAPABILITY, OVER 50 AMPS AT \$499 IS A TREMENDOUS PRICE BREAKTHROUGH!



**PM840—\$499** (Shown in system above installed in a PCX-1 Rack Mount Kit, optional \$49.00)

With its tremendously high current, this new amplifier makes available over **One Thousand Two Hundred watts RMS** of "demand responsive" peak power—more than 600 watts RMS per channel! Our **unlimited MOSFET** output stages assure clear undistorted high power with **none** of the audible distortion associated with conventional current-limiting or clipping eliminators. Soundcraftsmen's revolutionary new High-Efficiency Patent-Pending circuitry makes possible this high power, low weight, and true

"audiophile" musical performance. Its 8-ohm power is **410 watts**, 205 Watts per channel, 20Hz to 20kHz, less than 0.05% THD. And you can add this tremendous high current amplifier to your present stereo receiver system, by using our famous **\$39.00 PC-1 Power Coupler**. Just hook up the PC-1 to your receiver's speaker terminals, then plug its 2 cables into the PM840 for an immediate transformation of your present system into a new high powered world of incredibly improved sound!

## FOR A DEMONSTRATION, VISIT NEAREST DEALER LISTED BELOW

However, many additional Dealers—too numerous to list here—are located throughout the U.S. with many models on display. If no dealer is shown near you, or you encounter any difficulty, please phone us at 714-556-6191, ask for our "Dealer Locator Operator."

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## A New Reference

The sole value of an audio system lies in its ability to evoke emotional pleasure through the accurate reproduction of a musical event. Holding to this philosophy is essential, for if other values interfere, performance and enjoyment will be compromised.

Products recognized for their ability to reproduce music and to advance our perception of high fidelity emerge from unique companies. Within such a company the personal philosophies of those involved in the design, and the working environment in which they function, directly contribute to the results achieved. The community of individuals dedicated to the production of Mark Levinson components has established an unequalled tradition of excellence and accomplishment, while accepting the responsibility for refining the state of the art in music reproduction within the boundaries technology and imagination allow.

The design of products to serve as a reference is an essential element of our vision and they are conceived as ultimate statements of our craft while serving as a benchmark for future designs. To further define a reference product, its presence in a system yields a level of performance which is unachievable through the use of any other comparable component.

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The No. 20 is designed to significantly advance current concepts of sonic performance and audio technology. The power supply of the No. 20 is the most sophisticated design ever used in an audio amplifier. Within each mono chassis the plus and minus rails use completely separate components. Individual transformers, rectifiers and filter capacitors eliminate any modulation of one rail by the other so that the last nuance of detail is not masked by the amplification process.

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The No. 20 introduces new audio circuitry for all active gain stages. These gain stages utilize careful selection and matching of components assembled in modules to provide even more accurate matching of performance characteristics. Gas-tight, gold-plated pins are used for all modular connections eliminating the need for any wire in the signal path. The No. 20 is built to easily accommodate the most demanding applications, but is also completely protected against accidental abuse by innovative circuits that never compromise its sonic performance.

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In the final analysis, the sense of harmony between the artistic and the technical is the No. 20's greatest strength and the reason why it establishes a new reference.

All Mark Levinson products are hand-crafted in limited quantities to ensure their high standards and are available through authorized representatives.



The evolution continues...



The new No 20  
Monaural Reference Amplifier  
introduced February 1986

## HEAD LINES

**A**s you may recall from last month's column, you are the Chief and sole owner of Intergalactic Widget Corporation. Upon your return, tanned and relaxed, from your 12-year vacation in Monte Carlo, you asked your faithful factory manager for a review of your company's sales of analog cassette tapes. You panicked, despite seeing an apparently bullish trend, and beseeched your faithful engineer, Smedlap, to start a crash program to develop a digital audio cassette system. Clearly you had seen the bits on the wall. After pondering the limitations of magnetic recording, Smedlap responded with two possible solutions: A stationary-head system and a rotary-head one. When we left off, you were deep in thought, contemplating the advantages and disadvantages of each. . . .

At first glance, a stationary-head design is quite appealing. Analog tape recording has long used stationary heads, and they have proved themselves in terms of mechanical simplicity, low cost, long life, rugged and consolidated construction, and ease of editing. Indeed, in the professional recording world, a stationary-head design is the only choice, particularly for multi-track recorders.

Recording engineers have always labored to accommodate the needs of artists, coming up with rather sophisticated production techniques and the hardware to back them up. One very cost-effective piece of hardware is the razor blade; tape recorded on a stationary-head machine may be cut and spliced to achieve much better technical and artistic results.

Overdubbing is supremely important in popular music. Instead of recording all parts of a group together, in real time, as is usually done in classical recording, the artists record basic tracks on a multi-track machine, then record additional tracks while listening to the old. The new tracks must be performed and recorded synchronously with the old ones. This requires a feature called "sync," common on professional recording decks, which allows the old tracks to be played back from the recording head rather than the normal playback head. (Since the record and playback heads on open-reel decks are about an inch apart,



Illustration: Debra White


new tracks laid down while listening to the playback head would lag about an inch behind the other tracks on the tape, making them nearly 0.1 S out of sync.) The fidelity of the signal delivered to the artists' headphones in the sync mode won't be quite as good as if the playback head were being used, but the fidelity on the tape itself is unaffected.

Punch-in and punch-out—the ability to switch instantly from playback to record, and back, while the tape rolls—is also an essential creative tool. An otherwise acceptable track might be marred by a momentary flub—fingers caught in the guitar strings or a hiccup on a vocal track. Rather than re-recording the entire track, the engineer can replay the track, and the deck can be punched in and out of the record mode.

With overdubbing, punch-in/punch-out, and razor-blade editing, a song is thus recorded layer by layer, with only the best performances retained, then edited into a final product. With a stationary-head recorder, these cornerstone operations are easily accomplished. Although it might be possible to devise a system with multiple synchronous rotary heads, the complexity

and cost would be considerable, and precise punch-in and -out would be extremely tricky. Besides, tape splicing would never be practical on a rotary-head machine because of its helical-scan track format (Fig. 1); the razor would have to cut precisely on the same diagonal as the tracks, cut just on the boundary between tracks, and cut where an "odd" field would follow or precede an "even" one—all with the tracks of microscopic size and utterly invisible. So an electronic editing system would be mandatory. For a stationary-head digital recorder to accommodate overdubbing, punch-in/punch-out and razor-blade editing, more sophisticated hardware is required than for the analog equivalent, but those obstacles have already been overcome. In general, any multi-track professional recorder, analog or digital, seems destined to be a stationary-head design.

But as Chief of Intergalactic Widget, your main target is the profit from the mass consumer market, not the prestige of the smaller professional market. If you rule out multi-tracks, that leaves only stereo consumer models. Are stationary-head recorders still advantageous? Yes, but to a lesser extent. Without the advantages of editing, syn-



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**A rotary-head cassette recorder has precedents, as rotary-head VCRs have already been adapted to digital audio use.**

chronous recording, and punch-in/punch-out capability, a stationary-head machine is still mechanically simpler and more rugged.

However, the data itself presents problems. Any digital recorder must be able to distinguish one data field from another. This is fairly easy in a rotary-head design, where the signal is divided into thousands of short, diagonal tracks. However, with a stationary-head recorder, special synchronization data words must be inserted as place markers on the tracks, which run the whole length of the tape. This adds to the data overhead, which brings us to the biggest problem facing a stationary-head design—the fundamental problem of data storage—bandwidth.

As we have seen, the bandwidth requirements for digital audio are large indeed; because of the sheer number of bits in a data stream, the frequencies to be recorded could be as high as 1 MHz. Thus, a stationary-head tape recorder has its work cut out for it; the problem can only be solved by high tape speeds or the use of multiple tracks to distribute the data load over a greater tape area. But high tape speeds lead to long tape lengths and large cassette sizes. To achieve the required data densities at a tape speed slow enough to afford a small cassette size, a stationary-head digital cassette recorder might have to record 20 data tracks in each tape direction. Those tracks would have to be tiny, so tiny that strict alignment would be both vital and hard to achieve. Servo alignment systems would therefore be needed, adding both mechanical and electronic complexity. In addition, the high data density of a stationary-head digital cassette system would dictate

the use of a special, thin-film head—a tough piece of hardware to manufacture. Suddenly, the apparently simple stationary-head design isn't so simple after all. . . .

A rotary-head cassette recorder already has precedents in the digital audio field, and with good reason. Video signals demand a bandwidth of more than 2 MHz; it was therefore logical to adapt rotary-head video recorders, which already had such bandwidth, to digital audio recording. To fully understand the operation of a rotating-head video recorder, a look at a video signal might help. And to get a good look at a video signal, just flatten your nose to a television screen. You'll see the pixels—the triple pinpoints of primary colors which comprise the overall picture—and perhaps you'll also see the pixels arranged across the screen in slightly diagonal lines. In fact, your television has 525 such scan lines; using received video information, the electron beam illuminates each pixel as it scans across the line. To reduce flicker, all odd lines are scanned to make one "field," then all even lines are scanned to make another field; the two fields are interlaced on screen to make one complete picture ("frame") In total, 30 complete frames are scanned each second.

A video recorder uses a tape format quite similar in nature to the picture itself. Because of the high bandwidth requirements, a high tape speed is needed. This problem is neatly solved with a rotating head; the tape speed itself is slow, but the head moves across the tape quickly, thus yielding an effectively high tape speed. With helical scanning, two heads are mounted opposite each other across a

drum, which is rotated at 1,800 rpm in a direction opposite that of the tape. Since the drum is tilted across the tape path, the heads sweep diagonally across the tape. Thus, instead of a continuous tape path, a series of short diagonal segments is recorded, as shown in Fig. 1. Each segment is a video picture field, and so the tape is recorded as a series of odd and even sets of video information. Sync pulses are placed in the video information to separate video fields, and frequency modulation is used to overcome the tape's bandwidth limitations.

Of course, a video recorder will record any kind of program, as long as the data is properly formatted. For example, we can rather easily take digital audio data, put it in a video format (with sync pulses, etc.), then record this "pseudo-video" audio data on a video recorder. This is how PCM processors work, converting analog audio to digital, then formatting it for use on a VCR. Indeed, this is the method used for all Compact Disc mastering; the standard processor used to encode the digital information onto videotape prior to making the disc master is the Sony 1610, which requires professional, 3/4-inch videotape cassettes rather than the 1/2-inch tapes used in home VCRs.

Of course, any rotary-head format designed for the consumer market would take the next logical step: The video format would be discarded, and an audio-only format would be specifically developed. This would result in greater cost efficiency because the format could be designed strictly according to audio needs. But the essential advantages of the rotating head—high recording density and low tape consumption—would be retained. The electronics required for such a system are relatively straightforward; since both audio channels are multiplexed to a single recorded track, redundancy of recording circuitry is avoided. In addition, data synchronization is easily achieved because the synchronization pulses that delineate even and odd fields are an inherent part of the format. The only major drawbacks are the more complex mechanical assemblies required for the rotating head, and a shorter head life than that of a stationary head.

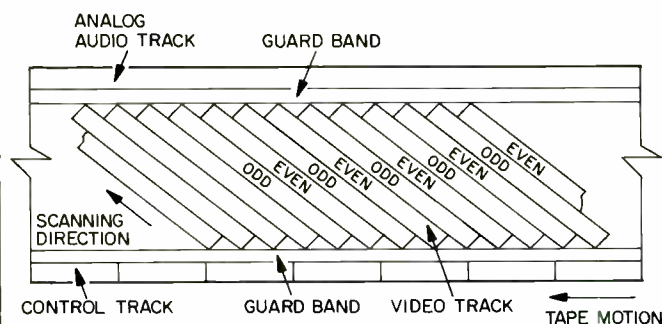


Fig. 1—  
Recorded pattern  
of videocassette  
recorder.



Both stationary and rotary designs are feasible from an engineering standpoint. Each would yield a tape about half the size of an analog cassette.

The rotary-head design looks pretty good, but just how compact can the complex mechanism of a rotary-head tape player or recorder be? Small enough for the all-important portable and automobile markets? Also, though the stationary-head design is more complex electronically, the rotary-head design is more complex mechanically. Through the years, manufacturing costs of electronics have decreased, while those of mechanics often have not...



Widget's top engineer, Smedlap, nervously reviews the balance sheet for the Chief. Either format, stationary-head digital audio tape (S-DAT) or rotary-head digital audio tape (R-DAT), is entirely feasible from an engineering standpoint. With 16-bit quantization and 44.1- or 48-kHz sampling, either tape would be about half the size of an analog cassette, with a playing time of 45 minutes per side on S-DAT and 120 minutes (one side only) for R-DAT.

Smedlap ends his presentation, nervously awaiting the Chief's decision. Will it be S-DAT or R-DAT? The fate of Intergalactic Widget hangs in the balance. Suddenly the door to the board room bursts open and Ms. Meyerbeer, Widget's ace marketing analyst, storms into the room! She furiously pulls a Compact Disc recording of the Verdi "Requiem" from her purse and flings it across the room, neatly separating the Chief's toupee from his perspiring brow. Everyone's mouth drops wide open.

To be continued. . . .

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IVAN BERGER

# VANTASIA

Once you escape the restrictions of real life, you can do wonders with car stereo. Take this showpiece system from Creative Car Stereo of Ashland, Mass. It wouldn't fit in my car and I wouldn't want it there, but boy, does it sound good!

The basic system layout is pretty standard: A head unit (in this case, the Alpine 5900 CD player, reviewed in this issue), an equalizer (the Zapco PX two-band parametric), crossovers, amps and speakers. But those simple elements add up, in this case, to a very complex system. All told, the system uses 14 ADS P120 amplifiers and 34 speaker drivers, plus two Nakamichi EC-200 crossovers.

This is, as I said, a showpiece, designed to display what its builders can do rather than to fit the cost and size constraints we run into in real life. For example, the system's bass comes from a massive subwoofer cabinet that fills almost the entire space behind the back seat of Creative's demo van; the box holds eight 10-inch woofers on its front panel and 12 of the 14 amplifiers on its back. This is obviously designed to make a visual (and aural) statement, not to conserve space or avoid theft by being inconspicuous.

The subwoofers work only at low frequencies, just as they should. (Crossover is at 70 Hz.) These are 8-ohm drivers from ADS's home-speaker line, so they are paralleled into 4-ohm pairs to get maximum power from the amplifiers. The amplifiers are then bridged for mono operation. Since a bridged Model P120 develops 90 watts into 4 ohms, the total power of the low-frequency section is 360 watts.

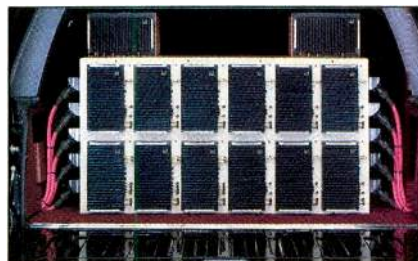
Frequencies from 70 to 150 Hz are handled by paired ADS CS700 subwoofers in each door. Each 4-ohm driver is powered by a separate, bridged P120, for a total of 360 more watts for this section of the spectrum.

Above 150 Hz, things get more complicated. To begin with, there are two ADS 300i plate speakers in each door; these are each driven by one channel of a P120, this time operated in its normal stereo mode. The tweeter of the forward 300i in each door is paralleled by an ADS 320i tweeter atop the dash.

Two more P120s, bridged again, drive a pair of Nakamichi SP-400 plate speakers in the van's side panels, be-



*The control section; note the equalizer and individual-speaker switching in the box between the seats.*



*All 14 amplifiers are easily accessible from the rear of the van.*

tween the front and rear seats. Highs are augmented here by Alpine ribbon tweeters just above the plates. Behind the rear seats, atop the subwoofer cabinets, sit a pair of ADS L400 minispeakers, powered by bridged P120 amplifiers mounted on the rear of the minis' cabinets.

The roof of the van is lined with Sonex, which improves the acoustics noticeably, compared to other vans. Power for all the electronics comes directly from the battery via a fat, 2-gauge welding cable.

As you'd expect from all these upper-frequency sound sources, the system is long on ambience and short on imaging; it didn't bother me, particularly, but our editor didn't care for this aspect. Still, the multiplicity of drivers (and the vast amount of amplifier pow-

er on tap) also ensures great dynamic range—the sound is clean, even when the system is driven very hard. The frequency balance is excellent, too, a tribute to the quality rather than the number of drivers.

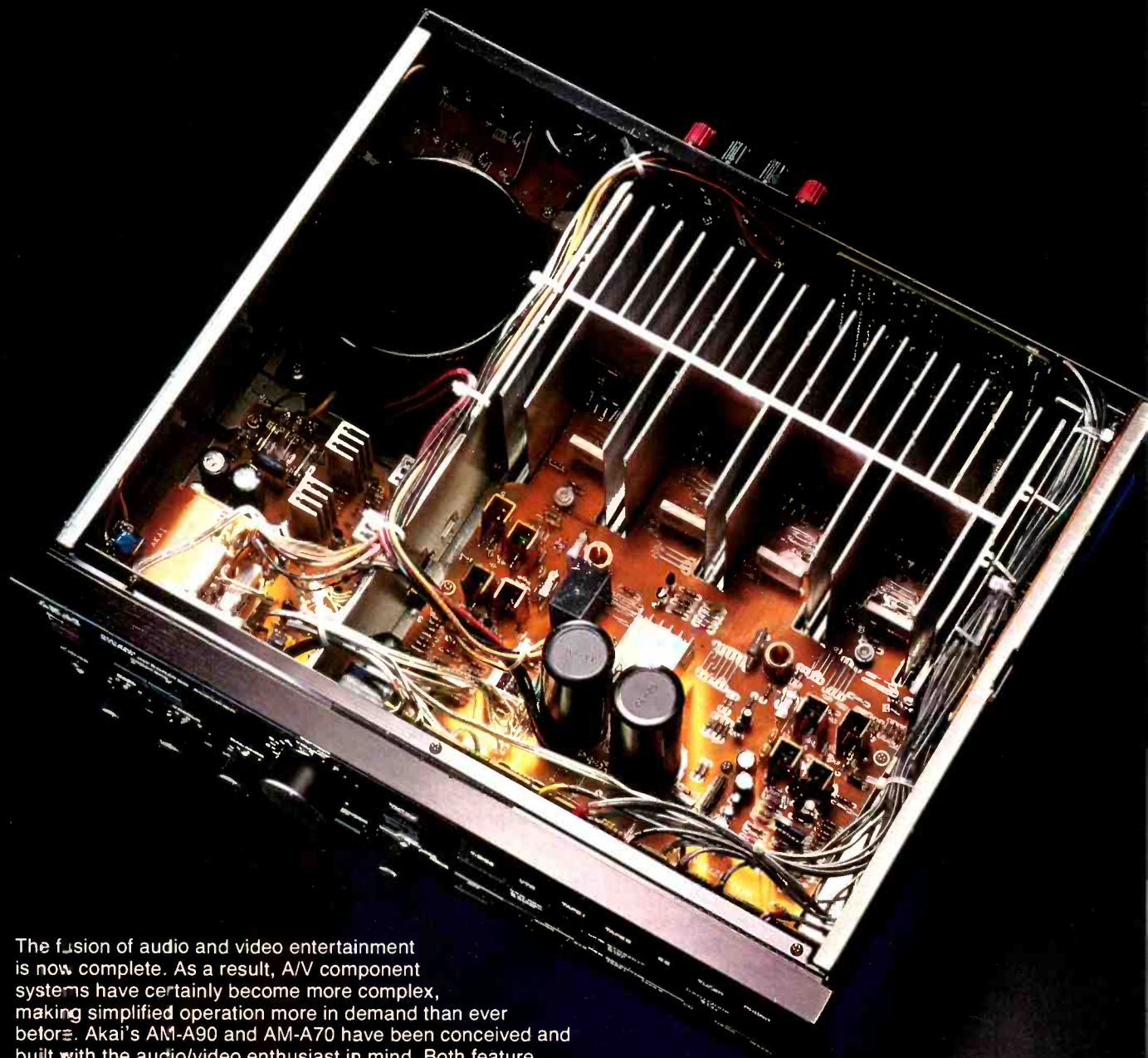
Fewer drivers and fewer amplifiers would probably yield equally good results—maybe better, if you count imaging. Creative Car Stereo's owner, Steve Colotta, who built the system with his brother Peter (the shop's foreman) and installer Jeff Bailey, admits as much. But this is show business, not the real world. The sound is not just fantastic, but a fantasy, designed to impress customers into ordering more realistically designed systems.

Some real-world features most listeners would want have been deliberately omitted. For instance, there is no radio, just a CD player—for now. When we heard the system last summer, its head unit was a Sony CDX-R7 tuner/CD combination, but since Creative is an Alpine dealer, they replaced the Sony with the Alpine 5900 as soon as it came out. Such political considerations would be irrelevant to ordinary customers, who'd probably want a radio (and, perhaps, tape) more than they'd want to buy one specific brand.

The front/rear fader you'd expect in a normal system is missing too. Colotta tried a fader but felt it affected the sound adversely; the full system's sound balance was set by adjusting the amplifiers' sensitivity controls during installation. In a normal system, this omission would cripple the user's ability to adjust sonic perspective, or to turn down the rear-seat or front-seat volume when passengers want to talk. In this system, the problem is solved differently: Switches on a control panel between the front seats let Colotta turn speakers on and off individually—not for sound balancing so much as to show what different speakers and combinations sound like.

"Instead of spending \$20,000 in my showroom, where the acoustics are so different," says Colotta, "I spent it in my truck." As I said, the resulting system is not one I'd want in my car, even if it fit. But it's very much a system I'd want were I in the car-stereo installation business, to impress customers with my firm's abilities. And business is a form of real life too. **A**

# High Fidelity Power for the Audio/Video Age



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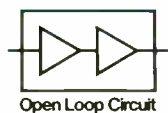
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### AM-A90

Design Sophistication for Superior Signal Amplification

Several Akai advances in amplifier design have been incorporated into the AM-A90 to ensure a remarkable 130W x 2 of Power Output (20Hz—20kHz, 8 ohms/0.5%) with a bare minimum of noise and distortion. All signal paths have been simplified to assure optimal sound performance, with carefully-chosen electronic components in all stages.

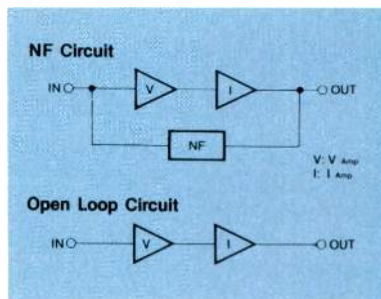
#### Open Loop Circuit



In order to achieve remarkably low distortion levels, Akai's Open

Loop circuit effectively streamlines the signal path. This does away with many of the components found in conventional amplifier designs. For instance, negative feedback designs often used as a

means of reducing several types of distortion still tend to introduce some types of distortion or sound degradation by their very presence within the circuitry. By side-stepping negative feedback configurations common to conventional amplifier circuitry, with their inherent TIM distortion, the Open Loop circuit provides a marked improvement in sound quality.



#### Dual Pole DC Servo Power Stage

Akai's Dual Pole DC Servo design incorporated in the high-capacity power stage eliminates the need for input and output coupling

capacitors, further contributing to greater circuit simplification. The BI-FET configuration enables wider dynamic range capability while assuring better music definition. In order to reduce the effects of constantly varying speaker impedances on the quality of sound reproduction, special electrolytic chemical capacitors have been adopted for an improvement in sound quality.

The utilization of MOS FETs in "parapush" configuration greatly simplifies the power stage circuitry, and results in far less switching distortion and intermodulation distortion compared to conventional power transistors. Distortion is cut to insignificant levels, providing a vast improvement in sound quality over conventional power transistors.

#### Carefully Chosen Electronic Components

Since Akai's Open Loop circuit design greatly reduces the number of electronic components

# Total Sound Experience

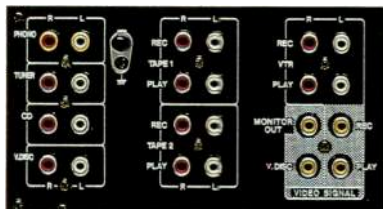


## Entertainment Control Center

necessary in the signal path, the selection of the remaining components becomes all the more critical for optimum sound quality. Akai carefully selects all electronic parts and materials that exhibit superior characteristics to ensure optimum sound quality and reliability. From the high performance MOS FETs and other semi-conductor components to the rugged aluminum block heat sink, the AM-A90 amplifier boasts quality construction throughout.

### Video Integration Capability

The rear panel of the AM-A90 features stereo audio terminals and video signal terminals that permit the connection of both a stereo-sound VCR and an extra stereo-sound video playback source, such as a video disc player. The front-panel function keys enable one-touch selection of both the sound and video image from either source. Dubbing of both stereo sound and the video image from the playback source to the VCR is quick and easy.



### Versatile REC SELECTOR Controls

The Rec Selector control keys just below the function keys enable simple video dubbing — as well as audio dubbing — all at a single touch. This design enables you to record from one source while listening, or watching, another. Selector keys for Video Disc, VCR, Tape 1, Tape 2, CD Player, Tuner, and Phono permit totally independent recording and playback freedom.

### Designed for Operation Simplicity

The crisp, simple layout of the AM-A90's front panel has been designed for enhanced operation ease. All function controls have clear indication, and are logically-arranged on the right, while the

tone, balance, and speaker controls are placed on the left. The large, centrally-placed volume control rotates smoothly, and has a large radius for precise level setting.

### Other Superior Features

- Independent A/B speaker system selection
- MC cartridge selector switch
- -20dB muting switch
- Smoothly finished aluminum front panel
- Line straight switch to bypass tone control circuitry
- Subsonic filter and Loudness switches
- Convenient front-panel headphone jack
- Stereo/L/R/L + R mode selector
- Stereo/Mono switch for video modes
- Available in black or silver



# AM-A70

This quality amplifier boasts nearly every feature of the AM-A90, with 100W x 2 of Power Output (20Hz—20kHz, 8 ohms/0.5%). The AM-A70 also incorporates Akai's Open Loop Circuit for clean, high-resolution power output. In addition, Akai's famous Zero Drive circuitry has been adopted for a significant reduction in distortion

for clearer imaging and impressive music fidelity.

Also featured is total audio/video integration capability, with the Rec Selector function enabling independent recording from any source while enjoying playback of another. With this and much more, the AM-A70 is ideal for affordable high-performance audio/video entertainment pleasure.

### Other Superior Features

- Independent A/B speaker selection

- MC cartridge selector switch
- -20dB muting switch
- Smoothly-finished aluminum front panel
- Line straight switch to bypass tone control circuitry
- Subsonic filter and Loudness switches
- Convenient front-panel headphone jack
- Stereo/Mono mode selector
- Stereo/Mono switch for video modes
- Available in black or silver

## AM-A90 Specifications

### POWER AMPLIFIER SECTION

Power Output (by FTC)	8 ohms
20 to 20,000Hz	130W x 2/0.5%
Rated Power Output	
(2 channels driven)	8 ohms
20 to 20,000Hz	130W x 2/0.5%
1kHz	140W x 2/0.7%
Signal to Noise Ratio (IHF-A)	
PHONO	MC: 67dB MM: 86dB
CD/AUX	100dB
Residual Noise (8 ohms)	0.2mV
Channel Separation (IHF, 1kHz)	60dB
Damping Factor (1kHz, 8 ohms)	30
Output Impedance	
SPEAKERS	4 to 16 ohms (A or B) 8 to 16 ohms (A and B)

### PREAMPLIFIER SECTION

Input Sensitivity/Impedance	Audio Section	Video Section
PHONO	MC: 0.2mV/100 ohms MM: 2.0mV/47k ohms	
CD/AUX	150mV/47k ohms	
TUNER	150mV/47k ohms	
TAPE	150mV/47k ohms	
VTR	150mV/47k ohms	1Vp-p/75 ohms
V. Disc	150mV/47k ohms	1Vp-p/75 ohms
Output Level/Impedance		
TAPE REC	150mV/1k ohms	
Frequency Response		
PHONO (RIAA deviation)	± 0.2dB	
TUNER/AUX/TAPE	5Hz to 100kHz (-3dB)	
Tone Control		
BASS	± 8dB	
TREBLE	± 8dB	
Subsonic Filter	-3db/oct at 18Hz	
Phono Max. Input Level (1kHz)	MC: 25mV, MM: 250mV	
Power Requirements	120V, 60Hz	
Dimensions	17.3(W) x 4.7(H) x 16.1(D) inches (440 x 120 x 410mm)	
Weight	27.6 lbs (12.5kg)	

## AM-A70 Specifications

### POWER AMPLIFIER SECTION

Power Output (by FTC)	8 ohms
20 to 20,000Hz	100W x 2/0.5%
Rated Power Output	
(2 channels driven)	8 ohms
20 to 20,000Hz	100W x 2/0.5%
1kHz	110W x 2/0.7%
Signal to Noise Ratio (IHF-A)	
PHONO	MC: 67dB MM: 80dB
CD/AUX	100dB
Residual Noise (8 ohms)	0.5mV
Channel Separation (IHF, 1kHz)	60dB
Damping Factor (1kHz, 8 ohms)	30
Output Impedance	
SPEAKERS	4 to 16 ohms (A or B) 8 to 16 ohms (A and B)

### PRE-AMPLIFIER SECTION

Input Sensitivity/Impedance	Audio Section	Video Section
PHONO	MC: 0.2mV/100 ohms MM: 2.0mV/47k ohms	
CD/AUX	150mV/47k ohms	
TUNER	150mV/47k ohms	
TAPE	150mV/47k ohms	
VTR	150mV/47k ohms	1Vp-p/75 ohms
V. Disc	150mV/47k ohms	1Vp-p/75 ohms
Output Level/Impedance		
TAPE REC	150mV/1k ohms	
Frequency Response		
PHONO (RIAA deviation)	± 0.2dB	
TUNER/AUX/TAPE	5Hz to 100kHz (-3dB)	
Tone Control		
BASS	± 8dB	
TREBLE	± 8dB	
Subsonic Filter	-3db/oct at 18Hz	
Phono Max. Input Level (1kHz)	MC: 25mV, MM: 250mV	
Power Requirements	120V, 60Hz	
Dimensions	17.3(W) x 4.7(H) x 16.1(D) inches (440 x 120 x 410mm)	
Weight	25.4 lbs (11.5kg)	

• For improvement purposes, specifications and designs are subject to change without notice.  
• The contents of this leaflet are not to be treated as representative as to current availability of products as described or as to products actually offered for sale.



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Hi-Fi & Video.

# MIKE & TINA TURNER



## Mikes in the Mouth

"Architecture is frozen music."

—Friedrich von Schelling

Music and architecture have two elements in common: More than other arts, both depend on structure (one in time, the other in space) and on technology.

The influence of music and technology on one another goes back well before electronics, when new materials and building techniques led to new instruments, such as the piano. (Architecture has influenced music too, through the acoustics of the spaces where it is presented.) But that influence has become most obvious since the invention of the phonograph. First, the phonograph led to the wide dissemination of performances, then to the creation of new instruments (such as the horn-equipped Stroh violin) whose sound the primitive recording gear could capture better. The microphone gave us the crooner; the instrument amplifier gave us rock.

And rock 'n' roll has influenced

microphone technique—in most cases, for the worse. The way a rock performer handles a microphone on stage makes sense, in context. Performers dance, so they have to hold the microphones rather than leave them on stands (the stands would probably get kicked over, anyway). The loudest sounds come from the speakers, not from the performers, so the singers must practically swallow the microphone so that it will pick up more from their mouths than from the speakers.

Microphone makers have cheerfully adapted to this new market. "Performance" microphones usually have internal suspension systems so they won't pick up noise from the performer's handling. They are built to withstand the high sound pressures of a singer belting out an inch away. They have big, mesh windscreens to reduce the popping of p's and the hissing of sibilants common when the mike is in the singer's mouth. And they're usually omnidirectional to avoid the proximity-effect boominess

that directional mikes exhibit from close voices. (When a performer holds a directional mike, it's usually to take advantage of that boominess.)

All this is fine for rock, where performer and microphone are working together. The problem arises in other areas, such as amateur recording or speech-making, where people try to copy rock microphone techniques with non-rock mikes. With most microphones, the sound is clearest and most natural when the singer or speaker is 1 to 3 feet away. Swallowing the microphone leads to overload, booms, pops and moans, for which the performer all too often blames the guy at the controls. Amateur (and even some professional) performers also tend to emphasize, by bringing the mike closer when they sing or speak loudly and to increase the distance when they get soft; this can drive recordists and live audiences crazy.

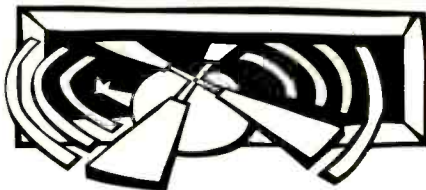
We imitate what we see, and most of what we see is wrong. The problem existed long before rock; movies have long shown pilots and highway patrolmen clutching microphones to their lips (the cockpit and the highway are, like rock arenas, high-noise environments). The only trouble with rock is that we see much more of it. Try to convince someone that you know more than Tina Turner does about how they should hold a mike!

Illustrations: Wendy Friedman

## Dolby Surround

Movies billed as "Dolby Stereo" when they played in theaters carry Dolby Surround information in any home-video incarnation, tape or disc. Add a suitable decoder, plus rear-channel speakers and amplification, and you'll hear the jets roaring past and gunshots behind you that levitated your hair in theaters. Without the decoder, you hear only stereo. If your VCR only plays mono, you won't get the surround effect even with a decoder, since decoding depends on interchannel differences.

Now there's a new complication: More and more of the new VCRs with Hi-Fi sound have stereo only on their Hi-Fi tracks, while their linear tracks are mono. Such VCRs can give



surround effects, or stereo, only from newer tapes which have Hi-Fi soundtracks; older Dolby stereo tapes (which have only linear stereo tracks) will play in mono. Eventually, all new tapes will probably have Hi-Fi sound, but that doesn't help owners of the newest hardware and the older tapes.

Oh well, at least we're spared the multi-system confusion that doomed four-channel sound; the current problem is, by comparison, a mere hiccup of history.

## Coda: Frank Hoffman

We honor the engineers and designers without whom our equipment would not exist; we rarely honor the salespeople without whom we would not have bought that equipment. Frank Hoffman was one of the people who made us buy decent turntables—first the Garrard, then the B-I-C. He served British Industries Corp. (later B-I-C) for 35 years, during which he was also responsible for the national introduction of Wharfedale loudspeakers and RJ enclosures, Genalex vacuum tubes (all very influential, in their day), as well as the B-I-C/Avnet Beam Box FM antenna and even Wilkinson Sword razors. He died last fall, after a long illness, at the age of 61.

# THE COLOSSUS OF CODES

**T**his month my concluding report on the 79th Audio Engineering Society convention will look at some new products I found particularly interesting.

At every AES convention, there is always something going on "behind the scenes," or at least some activity not on the exhibit floors. This time, in a suite on one of the upper floors of the New York Hilton, my dear friend and colleague John Eargle was demonstrating a fascinating new four-channel digital recorder.

The recorder, Colossus, is a product of a new company called By the Numbers. One of the principals of this company is Brad Miller, founder of Mobile Fidelity. You may recall that Mr. Miller became well known for his wonderfully exciting and highly realistic recordings of steam locomotives, many of which were issued by Mobile Fidelity. It was his desire for a compact multi-channel digital recorder that prompted him to enlist the aid of Lou Dorren. Back in the quadraphonic era, Dorren invented a format for quadraphonic FM that was widely acknowledged as the best system for quadraphonic broadcasting.

Lou Dorren has been working in the computer field since that time, and his Colossus digital audio recorder apparently is derived from some of his experience there. For the Colossus, Dorren developed a proprietary code which is especially tailored to the video recording medium and which makes no use whatever of data reduction. Dorren claims his system makes more efficient use of the video medium than current video-based PCM digital recorders.

The Colossus works with professional U-Matic video decks, and Dorren anticipates it will be able to interface with consumer videocassette recorders as well. The Colossus provides four digital channels with 16-bit resolution at a sampling rate of 50 kHz; bandwidth is in excess of 20 kHz. A special model for scientific application is now being developed that has four channels, 12-bit resolution and a bandwidth of more than 100 kHz. This unit is intended for such use as the recording of sounds made by whales and dolphins, which requires wide bandwidth but not wide dynamic range. An 8- to 12-channel recorder with 16-bit resolution and 20-kHz bandwidth is also en-



visioned. This would combine the video format for archival program storage with a high-density hard disk to facilitate overdubbing and insert recording.

Eargle was demonstrating the basic four-channel Colossus recorder through four JBL loudspeakers, with two stereo amplifiers. The indefatigable Brad Miller had taken the Colossus to the National Air Races at Reno, Nevada, and the sound of P-51 Mustangs screaming around the pylons was hair-raising, an impressive testimonial to the capabilities of this digital recorder. (Incidentally, Jack Renner of Telarc is currently testing one.)

This four-channel recorder from By the Numbers (P.O. Box 8359, Incline Village, Nev. 89450) is expected to cost \$15,000, and production models are scheduled for delivery this spring. Is it a direct attempt to resuscitate the moribund quadraphonic sound? Probably not, but with the availability of both CD and DAT formats, some form of multi-channel sound might eventually emerge. One obvious use for the

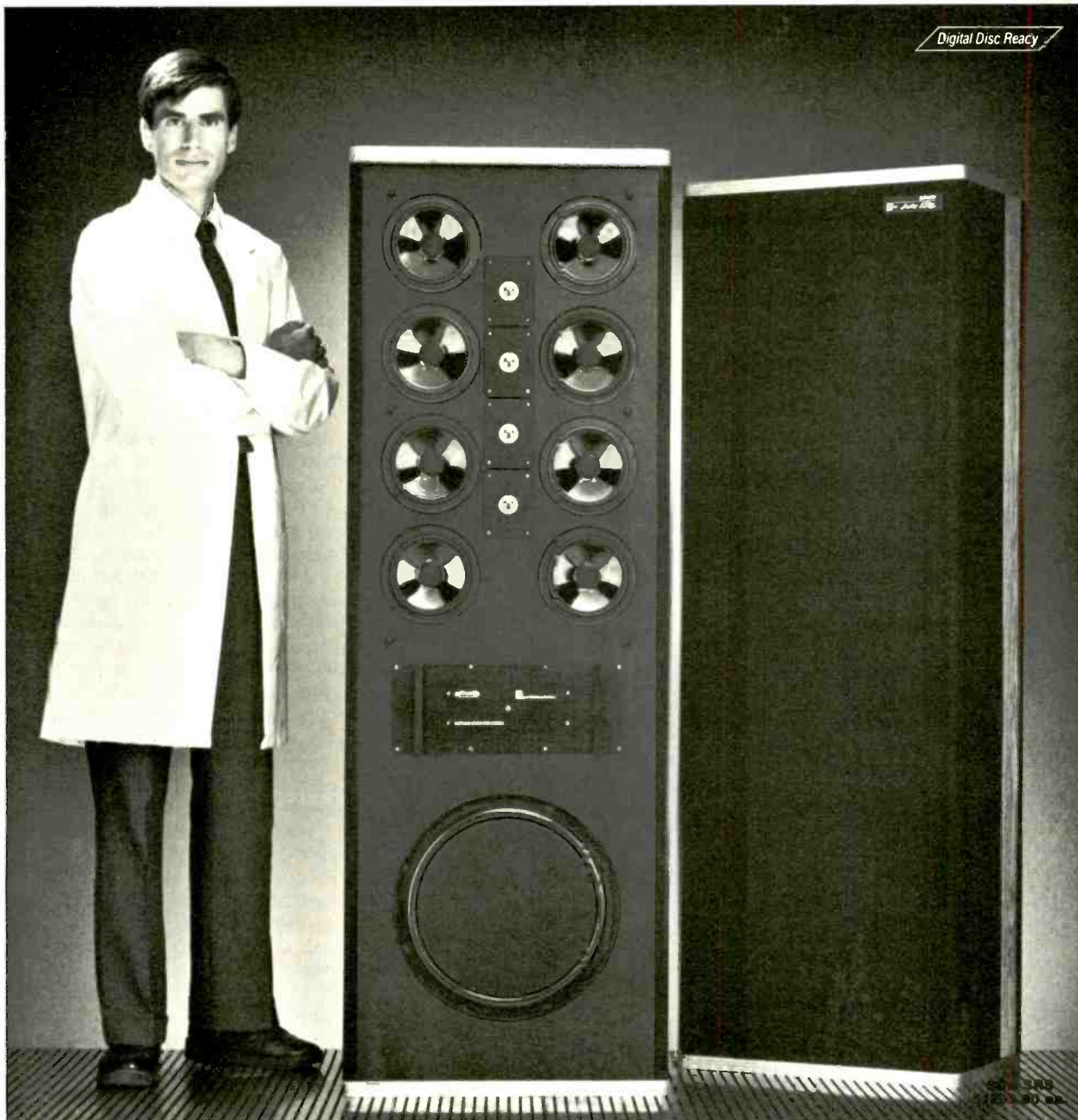
Colossus four-channel recorder immediately comes to mind; the unit would be ideal for recording the four signals from the B-format outputs of the Calrec Soundfield microphone for Ambisonic recordings. Those signals are front/back (called "X" in the Ambisonic system), left/right ("Y"), omnidirectional ("W"), and vertical ("Z") for height information. If all these channels were properly reproduced, with an overhead loudspeaker included for the height dimension, you would have full "periphonic" sound. Without the Z channel, the system can be reproduced as full horizontal surround or matrixed into a stereo signal which can be decoded into a surround signal. My opinion is that this type of recording will ultimately become very popular. Dr. Stanley Lipshitz, that dynamic doyen of digital technology from the University of Waterloo in Ontario, has been avidly recording Ambisonic sound with the Calrec Soundfield microphone; at the Colossus demonstration, he evinced great interest in this system.

At the Meyer Sound Laboratories exhibit, John Meyer showed his CP-10 complementary-phase parametric equalizer. John, a brilliant young engineer with some highly original ideas about new technology, was my systems engineer at Crystal Clear. He designed the special low-noise preamplifiers and power supplies that made it possible to use the Brüel & Kjaer 4133 instrument microphone for music recording. (Nowadays, Brüel & Kjaer produces several condenser microphones for recording, but back then we had to roll our own!) Meyer also designed high-intensity, very low-frequency speakers for playing the *Apocalypse Now* movie soundtrack.

The CP-10 provides five bands of parametric equalization, plus high- and low-cut shelving filters, for each channel. The unit employs complementary-phase circuitry, assuring minimum phase distortion even at extreme cut or boost settings. Under operating conditions, its dynamic range is more than 110 dB.

But what's really important about the CP-10 is its use as part of a unique measurement and compensation system for sound equalization in concert halls, studios, and listening rooms. The system is called SIMCAD, an acronym





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Meyer Sound's SIMCAD system equalizes sound in concert halls, using taped music as its test signal—with an audience present!

for "source independent measurement computer aided devices."

Meyer has devised a method of using a Hewlett-Packard 35B2A dual-channel FFT spectrum analyzer, plus some proprietary equipment, to accurately measure the amplitude and phase response of sound systems in

concert halls, using music as the test signal—and with an audience present! The advantages of this system are considerable. Obviously, a concert hall has a different acoustic character when an audience is present than it has when empty. However, since most sound-system/concert-hall measuring

devices use test signals (such as swept sine waves or random noise) that audiences would find objectionable, these measurements are performed in empty halls.

In the SIMCAD system, once the sampling microphones have been selected, the analyzer is set for dual-channel operation in the "transfer function" mode using rms averaging. Two hundred averages can be obtained in a couple of minutes. When about half the audience has filled into the hall, a cassette tape of music is played as a test signal. Amplitude and phase measurements are used for preliminary settings of the CP-10 to eliminate or reduce room resonances. When the hall is full and the music performance begins, the speed of measurement permits further fine-tuning of the CP-10. Meyer tells me that slight tuning adjustments can even be made throughout a concert to compensate for changes in temperature and humidity.

With the SIMCAD system and the CP-10 equalizer, Meyer has been able to compensate and apply anti-resonance correction to many notoriously overreverberant performing arenas and concert halls. He has accompanied the great Luciano Pavarotti on his U.S. concert tour, and Pavarotti has been delighted by the improved clarity and naturalness with which the system reproduces his performances. In an upcoming 1986 Pavarotti recital in Madison Square Garden in New York—a place that seats more than 20,000 people—Meyer will again be on hand with his SIMCAD system.

While the SIMCAD system has its major use in the concert hall, it can do some wonderful things in studios and in listening rooms as well. Meyer points out that after analysis, the anti-resonance equalization, plus the ability to suppress up to 40 mS of early reflections, can provide a superior listening environment, with the impression of a much larger acoustic space.

If one were to buy the \$3,500 CP-10 from a Meyer dealer or sound contractor, the contractor would bring the HP FFT analyzer and other equipment to the customer, analyze the room, and set the complementary equalization to complete the process. Not inexpensive nor easy, but from all reports well worth the effort and expense!



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## CANNED CHRONICLES

**B**y now you have read dozens of accounts of the Orson Welles Panic Broadcast of October 30, 1938, described in this space last month. Even Mitch Miller, in this very magazine (November 1985), mentions it. Mitch says he was in the studio orchestra that played supposed "hotel" music for the drama of the Martian landings on Earth. Sixty-odd miles to the south, in Princeton, N.J., 10 miles or so from the (supposed) Martians, I was listening to the show, as I said last month. And not believing. Between us, we had it nicely boxed in. Yes, I used to know Mitch, and often watched him oboeing his way through the classics in the notable CBS network broadcasts, a counterpart to the Mercury Theatre of Orson Welles. Both were sustaining programs, as they called them then. None of the fancy support from giant corporations and national endowments that we have today. CBS alone paid the bills. But everybody heard the shows.

What continues to interest me is the extraordinary view of radio technique of that time, which the revival of interest in the Panic Broadcast has brought us—thanks, alas, to Orson Welles' recent death. It is worth a further look, for that was the heyday of big-time AM network radio, entirely without television and minus FM, not only the nation's prime entertainment medium but also its greatest news source—still astonishing us with its literally instant, on-the-spot, live coverage. A thing we had never experienced before. Radio was only then replacing the ancient institution of the newspaper extra for big newsbreaks, rushed off the presses and hawked in the streets by shouting newsboys with their own special lingo: *Wuxtry, wuxtry! Read all about it!* When you heard that cry you rushed out and bought the huge headlines. It was a thrill, more so than anything on today's TV, which has jaded us for all except the most gory sensations. But radio—when radio first produced the remote news flash—had all the old excitement. In 1938 this sort of instant news was still astonishing, and more so as it cast out further afield with communication improvements. Those magic words, "We interrupt this program to bring you. . . ." were as dramatic in the times of Hitler and Mussolini as any old-time



Illustration: Gary Hovland

newspaper extra—*Titanic Sunk by Iceberg!* We heard about Pearl Harbor in one of those interruptions.

It was in a CBS AM network studio that this kind of excitement was put to work as radio drama on that October evening. And thus it was the standard radio sound of the day, realistically conveyed, that set off the great panic. But how different it all was!

In the big centerfold photo in Howard Koch's book on the Panic (see last month), we have, indeed, a visual summary of big radio at its zenith, the Mercury Theatre broadcast on the air, apparently the actual Panic Broadcast itself. The Producer (or whatever he was then called) stands at the rear, script in hand, gesturing. Orson himself. Asorted actors, more or less ill-kempt, ill-dressed, even sloppy looking, lounge in ones and twos around mikes on stands, scripts in hand. Ribbon-type mikes (RCA or CBS equivalent), bi-directional, with an actor on each side. So unlike any imaginable TV setup! Casual and messy. No huge, looming cameras, no blinding overhead lights, no suspended mikes above, and not a couch in sight. And, of course, no Beautiful People in bright colors. Just that old, comfortable radio slouch I remember so well.

After all, nobody was looking. The entire persona, all the energy, the magnetism, the charisma, went solely into the voice. It could be vibrant, compelling, a veritable Rudolph Valentino of a voice, or name your own female equivalent. But the visible sight was nothing. No wonder people were shocked, visiting a studio, to see the casual slouch and the messy, dun-colored surroundings for all that drama.

When TV came, after the War, there were as many broadcast casualties as in that earlier revolution, the talking movie, but for the opposite reason. Ugly bodies with gorgeous voices—out they went. Just as the gorgeous bods with the chicken-like voices faded from the movies. TV needed both. As the old movie stars faded, so did the great announcers and newscasters of radio, into diminishment and decline. Now we have TV anchors. And Carsons. Good posture. That TV smile! Ever optimistic and bright-eyed. On old, big-time radio, you could scowl and grimace while voicing dulcet words into the mike, and you probably did so when you felt like it.

In that same photo of Mercury Theatre on the air, there are other nice items. To the right is part of a live orchestra, strings. (Mitch Miller must

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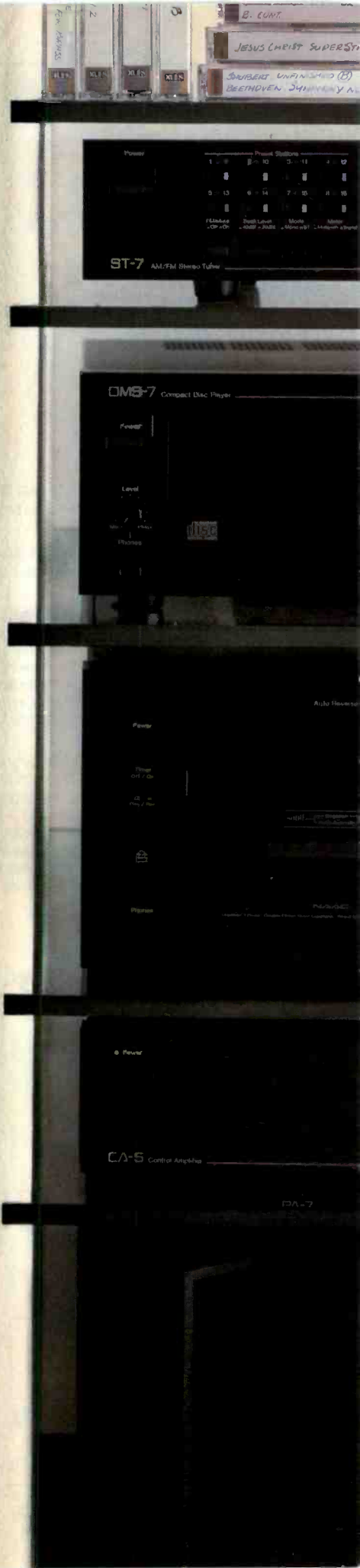
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# Rogers

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On radio, all the energy and charisma went solely into the voice; visuals were nothing. No wonder visitors to messy studios were shocked.

be hiding just beyond the frame.) And a conductor, no less, on a podium—for background music! No music carts, no pairs of tape recorders in the background. Music was live, or else. Other sounds, not so visible, were classed as sound effects, and some were wonderful as well as inexpensive. Crumple typewriter paper or, better, the cellophane wrapper from a pack of cigarettes, and you had a roaring, crackling fire, a conflagration. Horses for cowboys—did you think they trotted them around the studio? Thunder came from a big tin sheet, ancestor of the reverb unit. There were 78-rpm recordings of sound effects, but these were mostly too literal to be real. Real wind sounded like white noise minus the highs. Better a wind machine with a crank. You could have anything you might imagine. Like, say, the sound of Martians.

But the special stunt that the Panic Broadcast pulled off was the radio remote. The entire show was built, brilliantly, around a series of remote news pickups with brief returns to the supposed home studio and the hotel music. It was this that struck off the nationwide panic—remember, this was national network broadcasting, heard by millions. As a rule, people kept in touch via their radios, more or less as they do with TV today.

Of course, the "remotes" on the 1938 Panic Broadcast were faked, done in the CBS studio, but they sounded real enough. And they could have been real. The first, for instance, supposedly came from the Princeton University Observatory, the astronomy professor at his telescope, having seen the blast-offs on Mars. An interview—no, not on tape, nor by FM link, nor by microwave. If I am right (and if it had been real), it would have been by phone line (unreliable) or, more likely, via a bulky portable communications station, probably mounted in an old truck. There would have been long cables snaking over the street pavement and up into the observatory, and a microphone way up on the tower beside the telescope. Amazing! One channel, to the CBS building in New York. When all was ready, the announcer would say, impressively, "We take you now to Princeton, New Jersey. Come in, Princeton!" Then, amid

clunks and static and hiss, the remote interviewer would get down to business, sounding ever so far away. Instant news, on the spot. Astonishing.

But such formality! Such a lot of verbiage. Radio had not really found its voice. We are far more succinct today, and broadcasting is the better for it—most of the time. Nobody now would be fooled by those Orson Welles remotes, but they were precisely realistic for the time. Now, they sound quaint and antique, a residue from the past age of speech-making, minus mikes. So ponderous, so pompous! Just reading the script, you can sense it.

On every script page, at least four or five segments begin with a formal "Ladies and gentlemen. . . ." Virtually every speech begins with it. "Ladies and gentlemen, we take you now to. . . Ladies and gentlemen, we now return you to our studios in New York." And always in that polished, orotund, almost courtly fashion. The announcer did not hurry, even in the very face of the Martians and (supposedly) certain death.

You see, this was a carry-over, right out of the Victorian age, the formal, top-hatted Public Occasion, the rounded, all-acoustic oratory that depended on a sonorous vocal blast to carry to thousands. "Ladies and gentlemen"—every speech started that way. Now we hear it only on the most formal occasions—"Mr. President, Members of the such-and-such, ladies and gentlemen." A sort of sonic snobbism, but it did persist, if more gently, on into early radio right up to WW II. We still speak to thousands, if not millions. But now each of them is but a few feet distant. We are more realistic.

Then, in the Welles drama, there were the transitions, from the studio to the remote, out in the field, and back again. So formal! There must have been at least 150 "We take you now to. . ." announcements in the Panic Broadcast, as there would have been had it been real. And "We now return you to our New York studios." All so courtly and gracious, like a butler in some mansion. It is, in a way, a joy to hear—so old-fashioned. A joy even to read, sound unheard.

Today, for remotes, we just go. We are instantaneously there. No explanations—why bother?—or the minimum,

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—Julian Hirsch,  
*Stereo Review*

**"Tour de force"**

—Hans Fantel,  
*New York Times*

**"Glorious"**

—David Ranada,  
*Stereo Review*

**"Breakthrough"**

—Peter Mitchell,  
*Boston Phoenix*

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Today, we're so acclimated to lightning-fast news delivery that we don't always notice a lack of content. Reporters just pass the broadcast ball around.

casually. Or we don't go at all—somebody just pops up on a screen behind the anchor and they talk, face to face, maybe hundreds of miles apart, or more. Who is where? Often we hardly know. Doesn't seem to matter. Of course, you must get the lingo, understand the jumps in time and space, the

instant replay, the slow motion, the live and the recorded, not to mention the program and the commercials. All are run together, butt-spliced. No transition at all, except for the ubiquitous "Now this. . . ." Is anybody bothered? I am, sometimes. But then, I'm of another generation. I'm learning. Most peo-

ple take it all for granted, as they did "We take you now to. . ." in 1938.

Indeed, we are so acclimated to this lightning-fast technique that on too many occasions we don't even notice that these slick transitions are bringing us almost nothing at all in the way of content. These people just pass the broadcast ball back and forth—Jim? Bob? Judy?—like some sort of inane volleyball. Fortunately, not all of us swallow this silliness without noticing. Especially when the news is really important and we are needful.

I groaned, for instance, at the chaotic coverage of Hurricane Gloria on the air, while the storm headed straight at me. So did a high-school senior in New Jersey named Steve Kolb. He wrote a skit which was reprinted in my local newspaper, the *Lakeville Journal*, in Connecticut. Don't tell me *no* kids are onto reality! This guy hit the nail on the nose, as I like to say.

Kolb wrote of Hurricane Hogan—the Storm to End All Storms—in, of all places, South Dakota. (He's meteorologically savvy, too.) His anchor newswoman is lovely Lonna Hopponem, and she and her "remote" colleagues at station KOLB trade notes on the hurricane, managing to say precisely nothing about it at all, and a lot about the station's own excellent news coverage. Here's a condensed bit. First, Lonna:

"Well, Hurricane Hogan is really coming this time . . . but for an up-to-the-minute report, our own meteorologist, Dick Dunderfuttler. Dick?"

"Thanks, Lonna. Well, lucky for us, we just purchased the latest in radar dishes. . . ."

"But Dick, how about Hogan?"

"Oh, Hogan is really coming this time."

"Thanks, Dick. As you know, KOLB's experienced news team. . . ."

And so it goes, until Hogan actually hits one of the remote people. Poor Sue!

" . . . It's so dark. I've got to get out of here!! No. No, it's too late. We're all going to die!! It's all over!! We're going to die!!!!!!!"

"Thanks, Sue. And now to our own roving Ron Rinkersplat. Ron?"

"Thanks, Lonna. Dick?"

"Thanks, Ron. Well, Hogan is really coming now. Lonna?"

And so we take you now to. . . **A**

## Impressive Press

Ever since its introduction, audio critics have been writing rave reviews of the Revox B225 Compact Disc player. Following is a brief sampling of three impressions:

"I expected nothing less than sonic and mechanical perfection from the company's first CD player. I was not disappointed in the least. Sound quality was beyond reproach. . . . I felt the Revox sounded cleaner; instruments seemed better defined during ensemble playing and in orchestral works. . . . All in all, the Revox B225 is a superb instrument. I simply can't find anything to criticize, nor can I think of a single feature or control I would have arranged differently." — Leonard Feldman, **Audio**.

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If you'd like copies of the complete reviews, write or call and we'd be glad to send them. Or, better yet, visit your Revox dealer and hear what the critics heard. Then decide for yourself.



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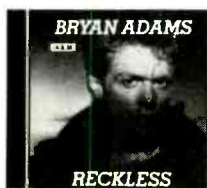
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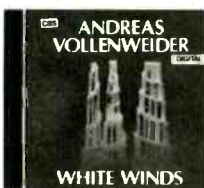
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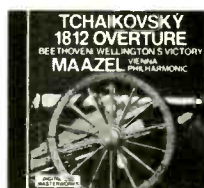
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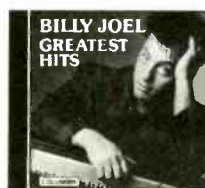
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## Foldback

*Q. My new microphone mixer has one control I don't understand: "Foldback." What is it used for?—Steve Moroukian, Edina, Minn.*

A. This control is used in live-performance sound reinforcement to regulate the volume of the on-stage "foldback" speakers through which musicians monitor their own performances and the sound mix reaching the audience. (The term is more common in Britain; Americans tend to say "monitor.") Some of the signal, in other words, is folded back to its starting point, the stage. This is necessary because the main speakers, which face the audience, are usually located so far from the stage that the performers cannot hear them clearly. The signal controlled by the pot you mention usually goes to a jack or jacks marked "foldback," whose output would feed external power amplifiers.

## Connecting an Auto Power Amp

*Q. I would like to connect my car-stereo system to a booster amplifier, to obtain extra output power. The system, as it stands, has a power output of approximately 10 watts per channel. None of the speaker leads are at ground potential. The unit does not have preamplifier outputs. What is the correct way to connect a power amplifier to the speaker leads of my present equipment?—Barry E. Lyons, Sandy Hook, Ky.*

A. I presume that you mean none of the speaker leads are at the same potential as the car's chassis ground. This is the case with most car-stereo units today, and boosting such units is a fairly common practice.

Two kinds of add-on amplifier are available. Simple boosters (sometimes combined with equalizers) have inputs only for speaker-level signals from low-powered amplifiers like yours. Many power amplifiers accept both preamp-level and speaker-level inputs, by means of either separate input connections for each signal type or an input-sensitivity switch or control.

If your system delivers a true 10 watts per channel, as measured at some reasonably low level of distortion (1% or less), then simple boosters may not accomplish much for you since they don't put out significantly more

power than that. Power amplifiers, however, are available with outputs of several hundred watts, if that's what you want.

More likely, though, your system puts out less power than you think. If its specifications actually say 10 watts per channel, odds are that this figure is reached only at a distortion level of 10%. (If a car amplifier's power specifications don't include the distortion level, you can usually properly assume that it is 10%). The amplifiers built into the vast majority of car-stereo units typically deliver far less than 10 watts per channel at low distortion. Your unit's lack of preamp outputs suggests that it may be either an older unit or a low-priced one, making such high power even less likely.

A word of caution: Amplifiers with floating grounds (which, judging from your letter, your unit might have) can be damaged by connection to amplifier inputs which are grounded. Check with the manufacturers of your stereo unit and your prospective booster or power amplifier to make sure this will not be the case in your system. If you do have this problem, however, floating-ground adaptors are available to deal with it. Check with a competent car-stereo installer.

## Damage from Lightning

*Q. We had a severe thunderstorm a few nights ago. The next day, upon turning on my system, the main power indicator light on my turntable came on as usual, but the platter would not turn and the strobe speed indicator did not operate. Is it possible that a lightning bolt could have done damage? If so, what can I do to avoid such damage again (besides unplugging everything)?—Teddy Herbst, Swiftwater, Pa.*

A. Lightning could well have damaged your turntable, even if all switches were turned off (your letter doesn't specify). A direct hit or a "near miss" can result in sufficient voltage arcing across the open switch contacts to get into your equipment and mess it up. If your neighborhood has overhead a.c. wiring, your equipment is very susceptible to such damage.

Some protection can be provided by using surge protectors. Still, a close call will likely wreck the surge protector. Therefore, though you may not like

to do it, if an electrical storm is likely you should pull the plugs on all delicate equipment.

If you use an a.c. junction box or power strip to supply power to your sound system, you only need to unplug one item, the junction box. If a timer is included, be sure that the timer you use has battery backup so that all its programs will be held during the storm.

## Loudspeaker Controls

*Q. I have a question concerning midrange/tweeter controls found in loudspeaker systems. Why do they always have a boost/cut range, with a "flat" setting at some midpoint on their L pads? As far as I know, such a passive network cannot possibly boost any signal that it receives. I must assume that the "flat" points on any speaker's L pad are simply the points where the high-frequency output is attenuated to match the woofer's output. Therefore, when the L pad is turned up to boost the high-frequency driver's output, it is, in fact, not boosting at all, but simply allowing the high-frequency driver to be driven by the full wattage being directed to it, without dissipating any of that wattage in the pad. Am I right about this?—Stan Wirth, Cleveland, Ohio*

A. You are correct about the way L pads operate. Midrange and tweeter units are designed to be more efficient than woofers so proper acoustical balance can be obtained. Of course, we could design a loudspeaker whose woofer was more efficient than the other elements, but the power lost in the pads would be excessive.

While passive circuits cannot amplify signals, they can nevertheless boost a given frequency range over other portions of the spectrum. Where this is done, there are capacitors associated with the resistors. Perhaps the aim is to compensate for a tweeter which is not "flat," perhaps it is to accommodate personal preference. In any event, an active network will, if desired, amplify any boosts or cuts, but these are produced by passive devices (resistors, inductors and capacitors). A

**If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1515 Broadway, New York, N.Y. 10036. All letters are answered. Please enclose a stamped, self-addressed envelope.**

**Audible Differences**

*Q. I notice that there are sometimes large differences among components' specifications for signal-to-noise ratio, distortion, frequency response, and channel separation. When do these differences become audible?—Ted Cumuze, Houston, Tex.*

A. The answer depends in large part on the program material, the level at which one operates an audio system, the listener's hearing acuity, and the extent to which he concentrates on the sound.

Signal-to-noise ratios of about 75 dB can yield a very quiet background for most circumstances; higher ratios offer relatively little improvement unless one plays at very loud levels. On program material such as we ordinarily listen to, harmonic distortion has to exceed about 0.5% before we notice it, and then we notice it only rarely; some tests have indicated that, for many listeners, it has to reach about 5% before becoming readily apparent. On single tones (and how often do we listen to those?), harmonic distortion of less than 0.1% is rarely, if ever, detectable.

As to frequency response, some listeners might be able to detect, on direct comparison of components, differences of smaller than  $\pm 1$  dB between 20 Hz and 20 kHz, but I think the difference could easily go to  $\pm 3$  dB before becoming apparent, as long as both components have flat response between 50 Hz and 15 kHz.

Channel separation is probably inadequate if it falls well below 30 dB, which is rarely the case except for some phono cartridges. Perhaps 30 dB or even 15 dB is the borderline.

**Introduction of DAT**

*Q. I am considering updating my system with a Nakamichi Dragon cassette deck, but I wonder if I should wait for DAT (digital audio tape) decks. Will DAT be a new cassette format altogether, or will it be compatible with present decks?—James M. Borzak, Raleigh, N.C.*

A. At present we are told that DAT decks may arrive sometime in 1986. Two different approaches are being weighed, one employing rotary heads and the other stationary heads; as of this writing, no single-format decision has yet been reached.

There may well be a period of several years before DAT decks offer prices acceptable to many of us. Judging from the past history of new electronic components (such as CD players), there will probably be desirable improvements and features worth waiting for. All in all, unless you are one of those who must be first with the newest, you will have a substantial period in which to enjoy a deck as fine as the Nakamichi Dragon. I think it will be quite a while before present analog tape decks are obsolete. Look at phono turntables, which as yet have refused to die in the face of digital CD players.

There are also some people, albeit a minority, who strongly proclaim that whatever the measurements say, analog reproduction is more pleasurable than digital. Here they are talking about analog phono discs versus CDs, but we may eventually hear the same claims about analog versus digital cassette decks.

DAT will also be a new format, incompatible with present cassette decks. DAT cassettes will be smaller than analog cassettes.

**Tape Types**

*Q. Your article in the June 1985 issue of Audio, "The Whys and Hows of Cassette Equalization," didn't make clear the different types of tapes. Is open-reel tape dead? I see little in the stores. I have not seen any metal tape for open reel. Wouldn't it perform better than ferric oxide tape generally does at 3¾ or 7½ ips?—Donald Bisbee, Columbus, Ohio*

A. The four types of cassette tape are ferric oxide (Type I), chromium dioxide and such equivalents as ferricobalt (Type II), ferrichrome (Type III, now rare), and metal particle (Type IV). For open reel, there is essentially only ferric oxide. There is also EE (extra efficiency) tape, much like Type II, for open reel, but the tape and the decks with bias for it may be hard to find.

Open reel is subdued but not dead. For top-quality recording, speeds faster than 1½ ips (cassette speed) are still desirable. If you look in *Audio's* Annual Equipment Directory, published in the October issue, you will find a fair number of open-reel decks and tapes.

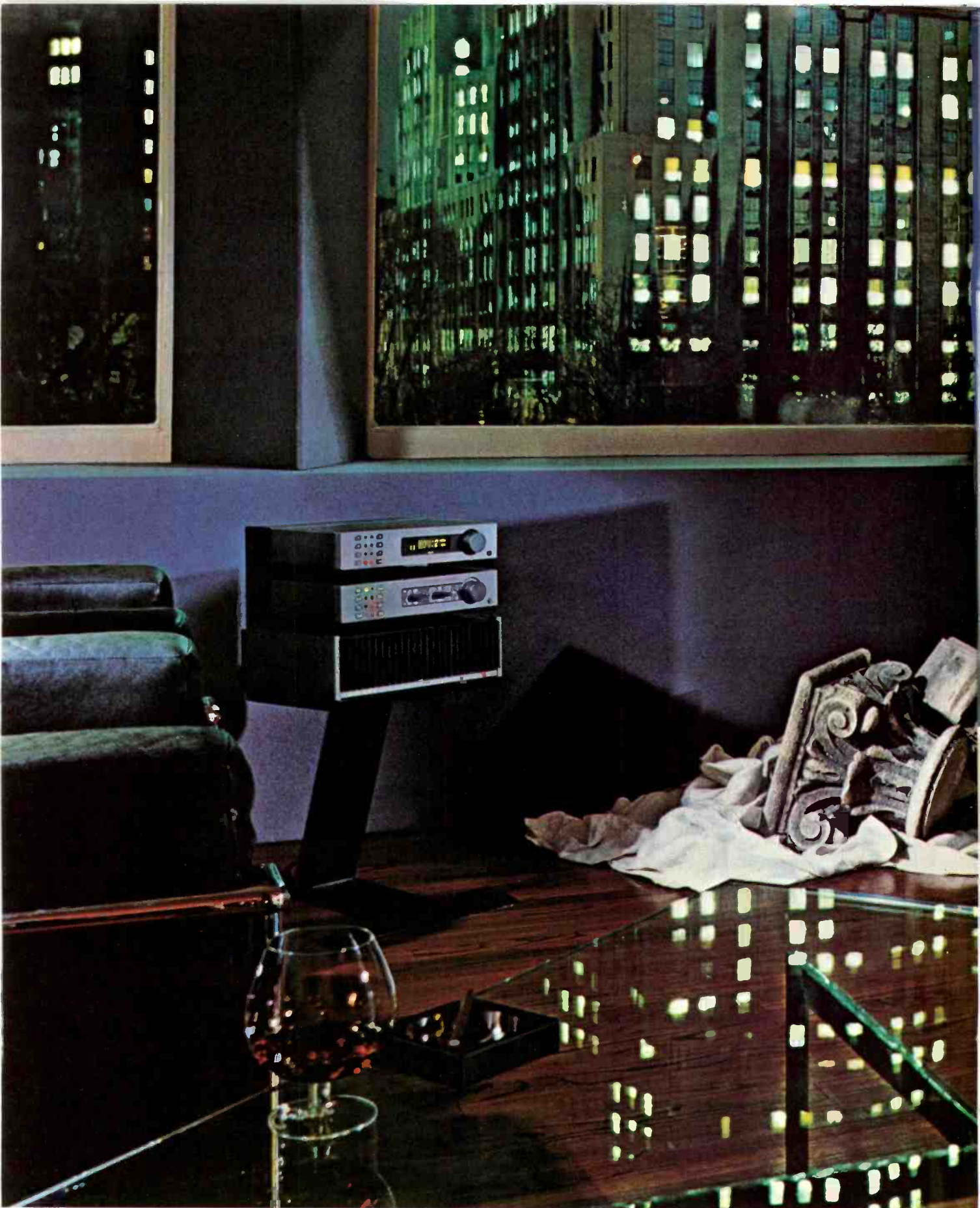
The advantages of metal tape over the others become less apparent as tape speed increases. Hence there is no open-reel metal tape generally available.

**Which Tape Format?**

*Q. In a comparison of open reel versus Beta/VHS Hi-Fi versus PCM (digital) recording, open reel appears to have the lowest fidelity of the three, at least in the case of models in the \$400 to \$800 range. Beta/VHS Hi-Fi would appear to be better, and PCM best. All three formats allow extended recording time. Since my use would primarily be for background music, my choice probably depends on how long the tapes will last. I know that, on an inexpensive VCR, dropouts can be seen after a relatively few plays. In the case of PCM, the error-correcting codes should help with respect to tape faults. But how about Beta/VHS Hi-Fi tapes? Will the dropouts seen in video also affect the audio, and is this degradation any more serious than the degradation of open-reel tape played the same number of times?—Douglas Atkinson, Rome, N.Y.*

A. Your question doesn't lend itself to a definitive answer, but some comments may help. Open-reel decks using good tape can satisfactorily play the same reel hundreds of times without noticeable deterioration. An important factor in tape longevity is tape speed relative to the heads. This speed is much greater in VCRs than in open-reel decks, inasmuch as the VCR heads are moving rather than stationary. Hence, open-reel decks appear to have the advantage so far as longevity is concerned. Of course, longevity will depend on the speed at which you operate—15, 7½, or 3¾ ips in the case of open reel. Very good results are possible today at 3¾ ips. If your interest is chiefly in background music, I doubt that you will find much, if any, audible superiority in PCM or Beta/VHS Hi-Fi. In addition, dropouts can be very audible on Hi-Fi videocassettes, which have no error correction. **A**

**If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 1515 Broadway, New York, N.Y. 10036. All letters are answered. Please enclose a stamped, self-addressed envelope.**



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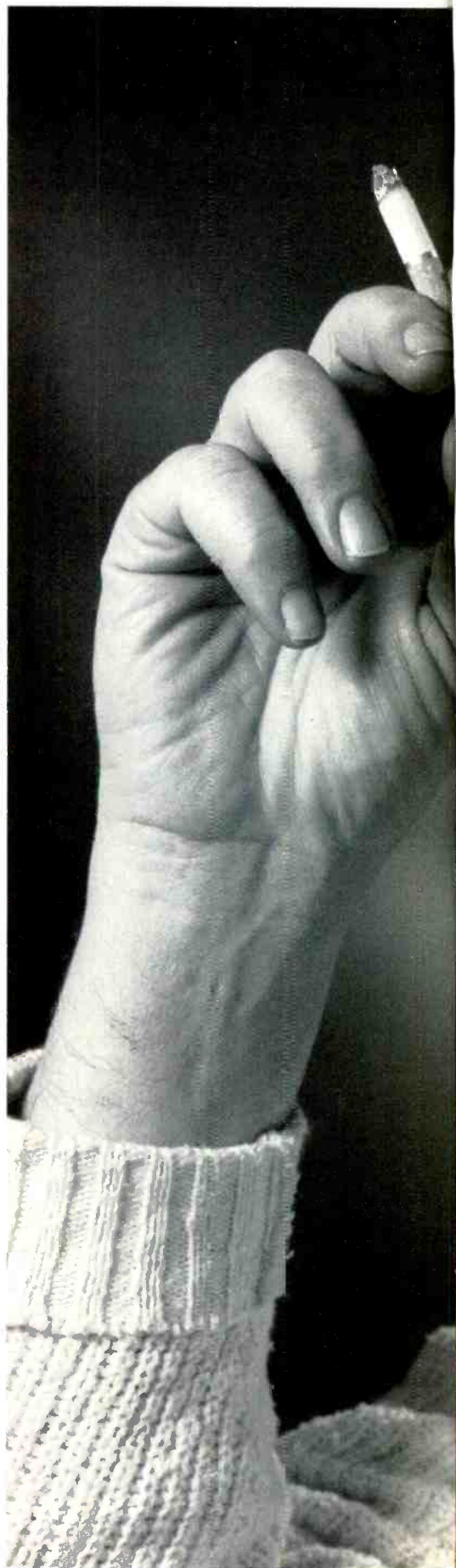
## CREATIVE IMPULSE

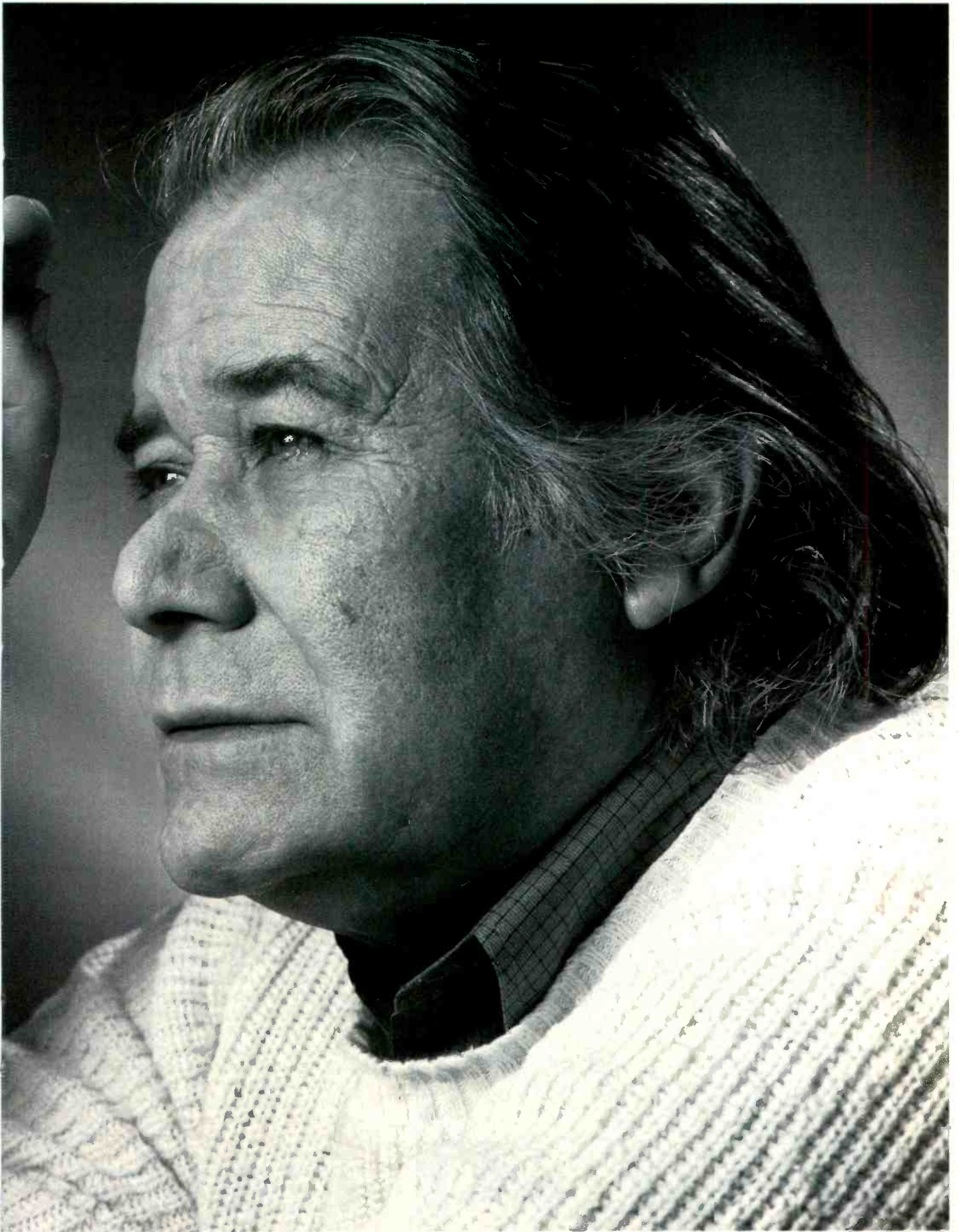
**F**ans of modern jazz know Bob Thiele as the man who produced John Coltrane's great ABC Impulse records, as well as those of Archie Shepp, Albert Ayler and many other jazz greats. His stature as a producer would be secure just on the basis of such outstanding and critically important recordings as Trane's *A Love Supreme* and his avant-garde masterpiece, *Ascension*. But Thiele's almost unbelievably varied career is comprised of so much more.

He began recording jazz as a teenager in 1939 when he founded an early and successful independent jazz record company, Signature, whose catalog boasted Erroll Garner, Coleman Hawkins, Lester Young, Pee Wee Russell, Eddie Heywood and others. At Decca, after much arm-twisting, he convinced his bosses to let him release, on the Coral subsidiary, the first records of a strange-looking young Texan, Buddy Holly. On another subsidiary, Brunswick, he made the debut recordings of soul legend Jackie Wilson. At Dot he recorded Pat Boone's big hits, as well as those of Lawrence Welk. He made records with Steve Allen, and with Allen released a controversial record by Jack Kerouac. At Roulette he put Louis Armstrong and Duke Ellington together for the first time.

During the blues resurgence of the '60s, Thiele made records with B. B. King, John Lee Hooker and T-Bone Walker. On his Flying Dutchman label he introduced new jazz stars like Gil Scott-Heron and Oliver Nelson. He produced the early hits of a lovely young singer, Teresa Brewer, married her in 1972, and is now making jazz records with her. He has resurrected Signature and is once again creating new jazz, putting out previously unreleased material on his Dr. Jazz label. In this interview he talks about it all.

T. F.





**It's always difficult to record popular musicians; they are always on the road. While Duke would do any song I wanted, I had to discuss the songs with Louis.**

*The Impulse jazz catalog is such a great collection of music. But in this country, when MCA re-released the records, they issued them without the double gatefold album covers. Did you have any control over or input into the series of re-releases?*

No. As far as the re-releasing of the Impulse series, I was completely out of the picture. Undoubtedly someone in the company had a feeling for the Impulse catalog, and they decided, from an economic or financial standpoint, it would make sense to re-release them at a lower price. So the packaging certainly wasn't up to the original.

*But I understand in Britain . . .*

Yeah. MCA has licensed to Warner Bros., in England, the rights to the entire Impulse catalog. And it's their intention to use the double gatefold and the original art, and to redo all the masters from the original tapes. So the sound should be better, and of course the jackets will be to the same standard as the original records.

*How would they go about remastering the original tapes?*

There are two ways of going when you reissue an album. You can use the original metal parts, which should still be at the factory and available to press records. Or you can take the original

master tape and cut new lacquer masters for plating. You can always, with the advent of new equipment and the various technological advances, improve upon the original transfer from the tape to the lacquer disc. So in very simplistic terms, you might be able to brighten the recording, add more bottom to it, add more top to it, add more middle range. Whatever you feel would improve it, you do.

*I heard that you are moving into digital recording for the first time.*

We're going to do it. We haven't done any digital recording as yet. Personally, I'm really at the learning stage. I have engineers at CBS and RCA—I don't mean that I'm taking a course—but we sort of hang out together, and they're educating me as to the proper procedures for digital recording.

*Why did you decide to go digital? And on what records will you use digital?*

I will start, probably, on some of the new recordings that I make. At the moment I think the basic glory of digital recording is that there is a quieter surface and you don't get as much extraneous sound from the actual disc.

*Is digital recording something you think everyone is going to have to do from now on?*

I think it's fine to do if you can enhance

the quality of the music, and if the price is the same as the price of a normal phonograph record. It seems to me that when digital first came into being, the price was higher. But if the price is right, I think there is no reason why it shouldn't be done in digital. I love to have great quality, and I try my damndest to make good-sounding records. I probably, through the years, developed less as an audiophile than as a music person. I mean, I still have equipment that can play 78s, and the scratch doesn't bother me as long as the music's there.

*That's what John Hammond was telling me—that he and his wife never really got used to buying LPs. They still like to listen to 78s.*

I don't go that far. When I say I still listen to 78s, I would add that the only 78s I listen to are recordings that are not available on LP. I prefer to listen to an LP. I'd rather listen to Benny Goodman's "King Porter Stomp" on LP than the original 78.

*Yeah, I think Hammond would too. It's more of a sentimental attachment.*

That's right. And he's older than I am [laughter].

*Do you share his philosophy in the studio, favoring simplicity over fancier, more advanced techniques?*

I think that we really have to separate the music. In terms of jazz, when one strives to enhance the music already there—what's being played—I think that you're defeating the purpose of what jazz is all about. You want to capture jazz music as it actually happens. Whereas when we go in and record in England and in various "rock" studios, it's an altogether different approach. I would never take a jazz band into a studio that specializes in R&B and rock because there, the concept is just completely different. You're recording separate tracks for your rhythm section. You may bring in voices for a day and just use them against the rhythm tracks. Bring in horns on another day. Bring in your star vocalist, and put that track on at the end. And all of that can be reversed, too. I've even used electronic drums. I've used all that, but 90% of what I do is jazz, and all of the things I've just mentioned have no relationship to jazz music at all. It just doesn't make any sense.

**Louis Armstrong, Thiele, and Count Basie**



Photograph: Frank Driggs Collection



*When you look for a jazz studio, are you looking for a place that specializes in more of an ensemble sound?*

Well, there are no jazz studios, but there are. . . . Well, for example, RCA has two tremendous studios here in New York. There's 24-track tape . . . all the latest technical advances available. We recorded jazz at RCA because we're recording something as it happens. We're trying not to do anything to it later on, except mix it and make sure the balance is right. If I was recording at the Power Station—not that there's anything wrong with it; I enjoy making rock records, I enjoy R&B records—but there the whole concept is different. You're laying down separate tracks constantly, and I just don't see that as far as jazz is concerned.

*Let's talk about Impulse. How did you come to Impulse, and what was the concept at its inception?*

I went to Impulse probably around 1960. The company was ABC Paramount. I went to work there as Director of Artists and Repertoire, which encompassed all popular music, including jazz. Impulse had actually started by then. I think they had released six or seven albums. Creed Taylor was the producer who made those first records. I don't know the arrangement he had with ABC, but after he made the first six or seven, I came in and they asked me to continue the Impulse catalog. I know I was *living* in the studio. Over a period of three to five years, maybe, I must have made literally 200 albums.

*There was such an incredible roster at Impulse.*

I think the roster . . . . This may sound corny to say, but I started in the record business when I was about 17 and I'm still in it, and, either fortunately or unfortunately, I really have never made a record anticipating how it would sell. I think almost every record I've made has been made because I personally liked the music. It's as though I was making records for my own record collection.

*When I look at my record collection, I see huge hunks of it with orange and black spines with little white dots. That's Impulse, and a lot of it is John Coltrane albums.*

That spine was not just a fluke; some



John Coltrane

Photograph: Frank Driggs Collection



Count Basie with Thiele and Duke Ellington

Photograph: Courtesy of Bob Thiele



Albert Ayler

Photograph: Frank Driggs Collection



Coleman Hawkins



Erroll Garner

careful thought went into that. We felt that there were no records—and to this day there aren't any—where the spine is always the same no matter what the music is or what the cover is. We did those spines for two reasons. One, the consumer would always be able to spot them in his collection. And two, which is more important, the dealers would know where to look for Impulse when they had them filed on their shelves. So that was by design. With my new label [Dr. Jazz], if you look at it you'll find that the bottom half is always yellow. I'm always surprised that nobody else does it. I hate to give away my secrets, but that's one of them.

*It's a great idea, and I get a kick out of seeing the spines expand in my record collection.*

I remember I was at a Newport Jazz Festival. A guy walked up to me and said, "You're Bob Thiele." I said, "Yeah." He said, "I want to thank you for making those spines orange and black." I thought he was going to say, "Gee, those recordings are great." [Laughter.]

*Let's talk about the Impulse roster. There was Coltrane, Albert Ayler, Archie Shepp, Pharoah Sanders, Charlie Haden's band, and of course Duke Ellington, Coleman Hawkins, Quincy Jones . . . so many great people. When you came to Impulse, were many of these artists already signed, or did you go out as talent scout and A&R man and sign them up?*

I actually went out and signed 99% of the people. The only individual who had signed a contract with ABC Impulse before I arrived was Coltrane. I believe his first album was *Africa/Brass*. It was number A-6, right in that

first group of six or seven albums to come out on the Impulse label.

*You've said that Coltrane really taught you things about music. In what way? You've also said he kept you involved in jazz.*

It wasn't that he kept me involved in jazz. He brought me to what, in that period, was the "new jazz" or "new black jazz." The critics were giving it all sorts of names. Another classification at the time was "avant-garde." For his second album for Impulse, we decided to record live at the Village Vanguard. I was apprehensive, a little nervous about doing it. I had not known Coltrane before then. I had heard some of his records. He was turning jazz music around. So I met him. You know, there was no reason to have meetings before making the recordings because we were merely recording whatever he played; it wasn't a question of selecting certain tunes to be played. We decided to record, I believe, all three nights of his [stand at the Vanguard]. But it was just at that initial stage, during those three nights, that I got to know him. He happened to be very warm, very friendly and very quiet. He certainly wasn't outgoing. He was, as I recall it, reticent to talk about anything. But we hit it off. I mean, sometimes these things happen. I've grown up with musicians. I deal with musicians. I relate to them, I guess. And we got along fine, as I began to spend more and more time with him, and we had our various meetings as to what should be used for an album, and where we should record, and what musicians to use.

It was during this period that he was explaining to me what he was trying to

do musically. Initially, all I knew when I heard some of the music, being an old-time swinger, was that it sounded as though he was literally leaving the chords. When he was improvising, it just didn't hit me right. But I have a hunch that part of it was that he felt he could go further. I mean, I've really thought about it quite a bit; he explained everything to me, why he was playing the way he played, and how he felt music could go. He always felt restricted playing within the chord, staying within the chords of, say, a Cole Porter song. He was the first guy who really took vamps, and played endlessly on three chords. But those vamps were just devastating. They were truly exciting. I think what I'm trying to lead up to is that it happened naturally. You know, you can go to school and have someone explain a subject to two students, and one bombs out while the other just goes, bam, right along with it. Because I know other producers my age who, to this day, look at me like I'm nuts. They can't understand how I can listen to that music or why people buy it. Yet some of these fellows made some of the finest recordings in the history of classic jazz. And then the curtain came down [on traditional jazz] and it never went any further.

*What did Coltrane say to you to convince you, other than just playing?*

He explained it technically, as to why one could leave the chords. "Who says there has to be a restriction on what you play?" And the more I listened, the more it sounded natural to me.

*When I was just getting into jazz, I picked up Coltrane's *Ascension*. I just couldn't listen to it. I parked it for about*



**Thiele with Earl "Fatha" Hines**



**Lester Young**

*a year and listened to earlier Coltrane. Then one day I put Ascension back on, and it just clicked. It was there. I heard it. It was an amazing experience to hear this masterpiece for the first time, and understand it.*

What you're saying is what I'm saying. You can be technical until you throw up, but how many people ask you, "What is jazz?" or "How do you know when you're listening to jazz?" or "How do you learn to like jazz?" I'm sure you've heard it before. Some of those classic jazz producers know Fats Waller's line, "If you have to explain it, then you don't know what it is." There's no way to explain it. I believe that somehow it's inbred in America, in the people as they grow up. All popular music stems from jazz. Gershwin and composers like that wrote because they heard jazz musicians. They went to Harlem and heard jazz bands. The songwriters of our day were really writing rhythmic popular songs. The song "Margie" swings if Coltrane or Coleman Hawkins plays it. They were writing a form of popular music that definitely had roots in jazz. What can you say? Either you feel it or you don't feel it.

**Did Ascension really cause a furor?**

It did. I did things with Coltrane that other producers probably wouldn't have done, and couldn't have been able to do; I let him record whenever he wanted to record. He had the idea to record *Ascension*. My role, as opposed to working with Duke Ellington or Coleman Hawkins or Count Basie, where I had a tremendous input as far as selection of material, as far as what takes we should accept . . . .

**But not with Trane?**

Not with Trane. I think that my contribu-

tion with Trane, as I said, was to let him record whenever he wanted to—even in opposition to the power structure in the company. To the best of my recollection, Coltrane had a contract that called for two albums a year to be recorded and released. Well, hell, we recorded six albums a year. And I was always brought on the carpet because they couldn't understand why I was spending the money to record John Coltrane. We couldn't possibly put out all the records that we were making. It even reached a point where I would record late at night so that no one in the company would know where I was, because if I was out during the day they'd say, "Where's Bob Thiele?" Someone would answer, "Well, he's recording John Coltrane in New Jersey." I'd do it at night so at least we'd have peace then.

*Ascension* was all his. I had nothing to do with the creation of the music. I was surprised when all these musicians showed up. Very quickly he told them what he wanted them to do and where we were going, and it was just going to be continuous. He did a take. Coltrane always had a tendency to want to do something again, so we made a second take. When I had everything transferred to cassette, I sent it to him to listen to. I don't remember which take he liked, but I, by accident, put out the other one. That's the record that came out first. So I decided, with his approval, to play a little game. After we went through the initial pressing run, I changed the masters to the other take. I inscribed "Edition Two" on the inside of the runout circle on the lacquer. It took several months before collectors and musicians start-

ed to pick up on it and say, "Hey, what's going on?" So, really, there are two versions of it out there.

**You were usually involved with jazz musicians who stayed closer to the melody and within the song structure. Was it a problem as a producer to record a very long piece like "Ascension" or "A Love Supreme," which each took up two record sides?**

It wasn't a problem because at that stage I had actually joined in the movement. It was invigorating. I probably became more excited and more creative because of those recordings. It really helped me continue my career. I just became more and more excited about making records—all kinds of records. But most of the guys who were producing jazz sort of came to that curtain. They didn't, in my way of thinking, really progress with the music. I listen to Coltrane, and I still listen to Bix Beiderbecke, and I listen to Louis Armstrong's Hot Five, I listen to everything. One of my greatest kicks is hearing a great Dixieland band. I love all kinds of jazz music. Coltrane just opened it up, and helped me appreciate the jazz that was unfamiliar to me until I met him.

**Tell me something about the critical reaction at the time to Ascension and, earlier, to A Love Supreme.**

I remember most of the critics and the various music magazines were putting Coltrane down. And here's one time when I did suggest to him. I said, "Why don't we just go in and show these guys?" I suggested that we do an album of popular songs, all ballads. We went in and did *Ballads*, which I think is a beautiful album, and he loved it. And that started to turn the critics around.



Thiele with Johnny Hodges



Eddie Heywood



Thiele and McCoy Tyner

Then, as time passed, I think people started to reevaluate things like *A Love Supreme* and *Ascension*. They recognized the greatness.

*I've heard all kinds of stories about Mingus. What was he really like to work with?*

Charlie was an all-right guy. He was always after me to make records. He always wanted to record. But I was budgeted, and I was trying to make as many records as I could . . . In the studio and musically, there were never any problems. There were [other] problems that existed that I really wouldn't want to get into. In those days things were pretty hot and heavy. I know I used to have meetings with Leroi Jones, now Amiri Baraka. I got pretty friendly with him. There was a white critic around named Frank Kofsky who I got close to. What happened was that, for the literary fraternity, the music of Coltrane and others, like Mingus and all of the modern group, really represented black militancy. Most of the musicians, including Coltrane, really weren't thinking the way their [militant] brothers were. I mean, Leroi Jones could feel the music was militant, but Coltrane didn't feel that it was. But he didn't go out of his way to tell Leroi Jones that.

*Mingus, though, was different.*

Well, Mingus was a little different; in that period I think he was on the militant side. I remember Stanley Crouch, who is a very dear friend of mine, who writes to this day for the *Village Voice* . . . Stanley and I used to argue for hours and hours about the music and the black movement. I asked him to write liner notes for a Duke Ellington album. Duke had put together a show called *My People* which was basically a short history of blacks in the United States. When I sent the record down to him to write the liner notes, I said, "Stanley, before you start this, Duke Ellington is not a militant. Take it from there." And the liner notes opened with: "Bob Thiele says that Duke Ellington is not a militant." And then he went on to write his notes. See, Stanley was very subtle. He pointed out something to me that I really hadn't thought about until then, which was about 15 years ago. When you think of his titles, Ellington was, in his own quiet way, really trying to show the greatness of black

**I remember exactly when I became interested in jazz. As a kid, I got a phonograph for my birthday. I was bitten by the jazz bug, and began to appreciate and understand the music.**

people in America—"Black and Tan Fantasy," "Black, Brown and Beige." There was a record Duke made in 1929 that I picked up later, a thing called "Black Beauty." Now, I was still a kid when I found the record, 16 or 17 years old, and I thought it was named after the horse. Because there was nothing going on then about various social problems, and Stanley pointed that out to me. He said, "Hey, he means what he says, black is beautiful." Duke, in a way, was the first person to say that.

**You've had quite an association with Duke Ellington over the years, and you've also been responsible for some unusual pairings with him: Duke and Coltrane, Duke and Louis Armstrong.**

I think that Duke has probably made the deepest impression upon me. It's different than Coltrane. Duke was a musician whom I idolized as a kid, when I first started to listen to music. I'd go out many nights alone, all by myself, and listen to music. Somewhere along the line I was listening to Ellington night after night, and he spotted me and we got talking. Here again, it was a natural thing. It developed into a terrific friendship. I was always flattered. As the years went by, we did an awful lot of things together. I got to know his family; we all became friends. When we did the pairings, I just told Duke my idea. Anything I ever wanted to do with Duke, he'd say, "Let's do it, let's go."

**You did the Armstrong/Ellington session when you were with Roulette?**

Yes. I had always wanted to record Louis. I had only met him a few times. Louis was amenable. Duke said okay. We did all Ellington songs, as I recall.

**This was the first time they had played a session together. It was 1961?**

Yeah. I'm sure they knew one another ever since the early days, but this was the first time they ever made a record together.

**Did you sit down with the two of them and decide which songs were going to be recorded?**

Yeah. It's always difficult, especially with extremely popular musicians who were always on the road. They were always touring, so I had to meet with each of them separately. Duke's attitude was, any songs you want to play, we'll play. So I really had to discuss the

songs with Louis so that he felt comfortable with them and knew what was coming. But there were no arrangements. We just picked keys and did it. **How about the Ellington/Coltrane pairing? That is certainly a much more discordant mix, on the face of it.**

Discordant on the face of it, but it worked out beautifully. There again, I think that's one of the great recordings. Duke was from a different era. He could make *anybody* feel comfortable, and he could make anyone think they were his dearest friend. He and Coltrane got along famously. Two points I'd make about the album. Johnny Hodges told me that "In a Sentimental Mood" was one of the best readings he'd ever heard. I think the way this recording affected Coltrane was that, while Ellington's style was to capture music as quickly as possible on recordings, Coltrane could stay there in the studio all day playing the same piece over and over again. I remember hearing him do things where it just kept going downhill, and he would become depressed and throw his hands up and say, "We'll try this again some other time." Probably the first or second playing was a gem, but by the time he did it 20 times, it wasn't a gem anymore. Duke knew that. Duke knew from experience: If you get it, save it. Don't try to destroy it by playing it over again. I really don't remember which tune, it might have been "In a Sentimental Mood," but I was in the booth and they played a song. After the first take, I looked up and Duke was smiling and Coltrane wasn't smiling. I knew just what was going to happen. I knew Coltrane was going to say, "Let's do it again," and Duke was going to say, "That's beautiful." I sort of felt good about it, so I ran over to Coltrane and said, "John, that was it," and Duke said, "Bob, you're absolutely right. John, don't ever do it again here." Then we talked about it. I think I got Coltrane out of that rut of trying to make things perfect. You do lose the spontaneity and the excitement by doing it over and over again. So I think he learned something from that album.

**Did Ellington know about Coltrane and appreciate him?**

Oh, yeah, yeah. Duke had big ears. He knew. I didn't realize it until years later that Oliver Nelson played saxophone



**Pee Wee Russell**

with Ellington. Duke hired some great players, not just players from the '20s. **Let's go back and talk about your earlier days with Signature in the '30s and '40s. You were the first to record Erroll Garner. You did Earl Hines, Coleman Hawkins, Lester Young, so many people. How did Signature come about?**

I was a kid. In the middle to late '30s, I was bitten by the jazz bug. I began to appreciate and understand jazz. I remember exactly when I became interested—I received a phonograph for a birthday present. But, you know, I heard literally all of the dance bands . . . everyone from Benny Goodman to Hal Kemp to Will Osborne. Somewhere along the line I began to hear some Fats Waller records. I think Fats Waller's records were the ones that sort of turned me into a jazz fan. I heard some Paul Whiteman and some Frankie Trumbauer. Through those recordings, I learned of Bix Beiderbecke. About four or five musicians—I just wanted to hear every single note that they played.

I began to find that I was listening to records and to live music in all of my free time. It was almost an obsession. I would come home from school and go right into a room and listen to records until dinner time. My mother thought I was freaking out. My father wasn't sure what was going on. He was the buffer. He said, "He likes music, so let him listen to music." I can see where, in those days, it would seem strange. Other kids were doing the baseball thing and what have you, and I'm up there listening to records. Over a period of a few years, I probably heard every jazz record ever made, whether it was Jelly Roll Morton or Johnny Dodds. I can practically hear all of those records today. I know them like I know the palm of my hand.

Photograph: Frank Driggs Collection

# I enjoyed making the album with Pat Boone. He was a nice guy, no problem. We recorded him with a large orchestra, 26 or 30 guys, here in New York, doing standard tunes.

## *How do you get from that to being a producer?*

I guess I had some drive in that direction, like some kids want to be a lawyer or doctor. I was so involved with records and I was hearing so much music, so many musicians, that at some point I said, "I've got to record some of the musicians who are not being recorded." There were a lot of little labels around in the late '30s. Everybody was pressing records, all kinds of records. I was in my last year of high school, probably taking all lightweight courses. I had an art class and the final exam was to do a design. I designed two record labels—one was Capitol and one Signature—because I was going to make some records. Shortly after high school, I went to a club called the Ideal Spot on the outskirts of Forest Hills [New York], where I lived. Of all people to wind up playing there—it was such a strange thing—was a guy from Chicago who played blues and boogie-woogie, Art Hodes. So, I'd go over there every night and listen. He had a bass and drums with him. I suggested that we cut four sides, and those were the first sides I did.

## *You just went up and introduced yourself to him?*

That's right. You know, I don't mean I'm on an ego trip or anything, but there was such a deep love of what I was into, the musicians and the music. It wasn't just walking up. Maybe over a period of a few nights of hanging out with the guy. . . . Somehow, they liked me. I always get along very well with musicians.

## *What did you know about making a record?*

All I knew was that you hire a studio and get an engineer, and you put up three mikes, and that was it. It went from microphone to lacquer disc; there was no tape. So we recorded Hodes first, and I remember flipping a coin to see which label I'd use, because I had the two designs, Capitol and Signature. That was the beginning of Signature Records. I had the records pressed in Pennsylvania, at the Scranton Record Company. Anybody could get records pressed. They shipped the records to my father's house. I didn't have distribution. I really don't remember how I advertised; I must have taken a couple of little ads in *Downbeat* or

something. I would sell directly to dealers. In those days there were some great ones. I'd have one or two dealers in each of the major cities. There was Schirmer here in New York, and there was an outfit called Marconi's on Madison Avenue. In those days, those buyers would buy one or two of almost every record that came out, especially for their collector customers. I would get orders, wrap the records in the bathroom, run the gum tape through the sink, wrap up my cartons, mail them out at the local post office, and bill the customer. In New York, I'd deliver the records myself. I sold every store on Broadway. In those days, 1938 or '39, there must have been 15 record shops along Broadway from 42nd to 57th Street. Loaded with record shops. I'd go in and deliver my records and get paid for them.

## *You went on to record top people at Signature.*

I recorded Yank Lawson, Pee Wee Russell and Eddie Condon; I did some things with James P. Johnson, and he's a perfect example of how I worked. I heard some of his records. About the same time, 1936 or '37, a dear friend of mine named Dan Priest became as much interested in jazz as I was, so at least there were two buddies who could go out and hear the music together. We decided to put out a jazz magazine, called *Jazz*. There was no outlet for jazz writing then, and I remember some of the critics at the time, Charles Edward Smith and Charles Paine Rogers. These guys were really intellectual, and they were deeply interested in the history of the music. They wound up sending us articles because nobody else would print them. In fact, the first book on jazz—which I think was the greatest—was written by them, along with two others. It was called *Jazzmen*, a great book. Anyway, the first issue of this magazine had a feature story on Scott Joplin. The author had dug up the famous picture—you know, whenever you see a picture of Scott Joplin, it's the only picture anyone has. But here were these kids, and we come out with a magazine, and we're bringing the world the music of Scott Joplin. I said, "Who the hell was Scott Joplin?" The author said, "He's the greatest ragtime piano player, the greatest composer of ragtime."

But he referred an awful lot in the article to James P. Johnson and other rag players, Willie the Lion Smith, people like that.

I listened to a few James P. Johnson records, and found out that he lived on Long Island, near Forest Hills. I said, "I'm going over to see James P. Johnson." I had his address and I didn't call; I just went up to the door and knocked. This little, gray-haired lady answered the door. I said, "You don't know me, I'm Bob Thiele, I just wanted to meet James P. Johnson." And she said, "Well, come on in, son." He was a hulk of a man. I don't want to say he was ugly, but he certainly wasn't handsome. He had a very big head. He came down the stairs, and he wound up playing piano for me for about an hour. He sat there playing all his compositions. And I became a friend of his. I recorded him with Yank Lawson and Pee Wee Russell and people like that.

Then, when the War came, I ended up in the Coast Guard. I was stationed at Manhattan Beach, Brooklyn for practically the whole war. I guess I can consider myself lucky that I was stationed at a base in the United States, but in a way, it was bad because I was too close to home, so I wasn't in or out of the service. Near the end I remember Shelly Manne was in the band down there, in the Coast Guard. That's where we met. Shelly and I became good friends, and we'd go into town every night and listen to jazz. It was at that point that I got to know Coleman Hawkins, and we recorded him. And I got to know Dicky Wells and the fellows in the Basie band. We did a thing with Dicky Wells and Lester Young.

## *Signature folded right after the war, didn't it?*

What actually happened is, my father sort of kept that going. He had had nothing to do with the music business. He happened to like music, and he was proud of the fact that I had a little business going and was selling records. A normal parent reaction. So he said, "When you go in the service, don't worry about the records you have. If we get orders, I'll ship the records for you, and I'll order records as we need them." We had 10 or 12 records, all 78s, and when Coleman Hawkins' "The Man I Love" came out we had my father's office listed as the

address. It really became almost a popular recording. The dealers in Harlem were coming down to his office to buy the record, and they'd pay cash. That really impressed him. He said, "He's not only got a business going, but they're paying cash for the records. This kid's got something on the ball." After the War we got the bright idea to expand and make it a real record company. Through his help, and various friends, we actually sold stock in the company, we started to build a record company. Then it became such a big business, it was too big for me to handle. I had no business experience. Psychologically, I wasn't ready to be in an office at 9:00 and run a business. I started to, like, fall apart. I was listening to jazz at 4:00 in the morning and boozing it up; then I was supposed to go in and run a record company. It finally went out of business, bankrupt, in 1948 or '49.

*After Signature, you were independent for a while, and then in the early '50s you became head of Coral Records.*

In those days, really, there was no such thing as an independent producer. Either you worked for a company or you had your own company. I wasn't doing anything at the time. I had a couple of jobs that really didn't mean anything, just working to make a few bucks. I was hired at Decca as an assistant producer to work on the new Coral label that was formed by Jack Kapp, who was president of Decca. He felt that the independent record companies were getting too much activity, selling too many records, and he wanted to get in on it. Rather than use Decca, he formed Coral Records and put Coral through independent distributors, not Decca distributors. So Coral was in direct competition with all the little fellows that were trying to make it in the record business.

*This was in pop music, and rhythm and blues?*

Yeah. It was an all-purpose record label. Pop, rhythm and blues, jazz. So I guess I went to work there in the early '50s, and I started out as an assistant producer. Certainly by '53 or '54 I wound up as head of A&R. Those were sort of my glory days, from a pop standpoint. For a period of eight or nine years, I had hits flying out of there. It was unreal.



Jackie Wilson



Lawrence Welk



Pat Boone

Photographs: Frank Driggs Collection

## When I first heard Buddy Holly, I was so excited, I wound up playing the record for everyone at Coral. And they all said, "Forget it! You can't put that out."

*Tell me about Buddy Holly. He was your biggest smash there.*

Murray Deutsch, who was the General Manager of a music publishing house called Southern Music, came to me with some dubs of a group called The Crickets. You know, Coral certainly wasn't as important as Columbia, RCA, Decca. Murray had received these dubs from Norman Petty, who produced them in Clovis, New Mexico. You sent them to a music publisher in those days and said, "Look, you can publish the music, but will you please try to have these records released by some record company?" Murray came to me and played "That'll Be the Day." I flipped. I said, "Hey, this is terrific. We're going to put it out." I found out later, by the way, that he had gone all over the place, and everybody said, "dumb sound." It's true.

In those days at Coral, I had a recording budget, so much money per quarter. It's different than the record business today. If a record is being presented to Columbia, for example, the first person to hear it might be a

lawyer or an accountant, or it might be a guy in the music department. Then that record is played at a meeting that involves maybe nine people; sales, marketing, lawyers, accountants, everybody gets involved. How they actually get records out, I don't know, but they do. Columbia and all the companies seem to be doing the right thing. But in those days it rested with one man. Every record that was made, every song, every artist all came under the jurisdiction of one guy, the head of A&R. You were the one guy in that company. The president of the company didn't care who you recorded or what songs you did, as long as there was a profit, as long as you were selling records. So when there was something new, you always had to get approval—not approval of the amount of money you were going to spend, but that it would fit within your overall budget. But [with Holly], I was so excited, I wound up playing the record for a lot of people in the company, and everybody said, "Forget it! You just don't put this kind of a record out." I remember

the president telling me, "You can't put it on Coral. It'll hurt the image of the label. We have some great artists on Coral, and here you're coming out with this horrible thing by The Crickets." I believe, now, that they let me put it out for two quite simple reasons: One was that I was of value to them, and they didn't want to really upset me. I was sort of an emotional guy at the time, and I would quit at the drop of a hat. I'd walk in and say, "I quit." Then I'd regret it, but I'd go through the motions, I guess. What really solved the problem was that they owned the Brunswick label. I told them, "If you're so concerned about the image of Coral, put it on the Brunswick label." And they said, "Go enjoy yourself." Well, I remember we were at a convention in the Midwest somewhere. We used to check with the office every day. The sales manager said, "Bob, I don't know what happened, but we got an order for 16,000 records from Philadelphia on 'That'll Be the Day.'"

*Had you had a chance to meet Buddy Holly at that point?*

No, at that point I hadn't met him. Murray Deutsch and I were invited to Clovis, New Mexico to receive whatever—a Western hat and a key to the city [laughter]. So we flew down and that's when we met Buddy Holly. We stayed there about two or three days, and got to know everybody. I suggested we record and keep The Crickets going, but put Buddy Holly on Coral, even if it's with The Crickets. Buddy Holly on Coral and The Crickets on Brunswick.

*What for?*

I guess I was really thinking commercially. Buddy was the personality, and we didn't really want to bust up The Crickets and Buddy Holly. So I felt we'd get more exposure, more of a run for our money, by having it get out there two ways.

*How did they decide which records would be credited to Buddy Holly and which to The Crickets?*

The main guy who was doing the producing at the time was Norman Petty. He lived in Clovis. He really found these kids. He really decided. We'd say, "Look, we want a Buddy Holly record for the next release, and then we'd like a Crickets record." And he'd go in the studio there, and he'd make the records. That's how that was done.



Photograph: Frank Driggs Collection



**Did you get involved with Buddy as a producer?**

Only once. Buddy and I got to know one another pretty well. He was a terrific kid. Very unassuming, and a real gentleman—he always had a suit and tie on. So opposite of what it is today. He always wanted to record in New York. As I've said before, Norman Petty was jealous of the fact that Buddy wanted to get to New York and make some records there and that he wanted to work with me. Anyway, he did get to New York, but we wound up with only two sides. We did a thing called "Rave On" and a standard, "That's My Desire," which didn't come out until about three years ago, when Steve Hoffman at MCA found it. "Rave On" was tremendous. We did that on Eighth Avenue in a hot studio at the time. I didn't want to use the Decca studio, so we used Bell Sound. At least at Bell, unlike at Decca, we could isolate musicians. It was a dead-sounding studio, the sound wasn't travelling all over the place. I knew that's where I should record him.

**Were you in the movie, *The Buddy Holly Story*?**

No. The interesting thing is that the A&R producer in the movie turned out to be a black guy. I didn't quite understand where all these facts came from, but it was based on John Goldrosen's book. Maybe a year or two ago I got a call from Goldrosen. He said he had to see me, and that he was writing a revised edition of the book. Well, he was amazed at the story of how things happened. If you read the revised edition, you'll read exactly what I'm telling you, and more. I mean, there were all sorts of shady deals down there in Clovis, and I don't want to say it.

**I'm surprised that Brunswick was considered the "B" label. For me, Jackie Wilson was the great Brunswick star. How did he come to your attention?**

There was a manager of artists, Al Green; I think he was out of Detroit. He'd been around for years managing black artists. In those days what would happen is, you'd get a call from Al Green, and he'd say, "I'd like to come by and play you some music, and introduce you to some of my acts." And that was our job. We saw the people who had reputations and could present some new talent for us. So he



**Thiele with Buddy Holly**

*Photograph: Courtesy of Bob Thiele*

came in and he had a vocal group he wanted to sell me, The Dominoes. So I went to the Apollo Theatre one night to hear them. I saw Jackie Wilson with The Dominoes and I said to myself, "To hell with The Dominoes, let's take Jackie Wilson." In those days there were a lot of cut-throat approaches to things, I admit. I said to Al Green, "I don't want to sign a vocal group, but I'd like to sign the kid." Well, you know, all he saw were the dollar signs, and he said, "I don't care about the vocal group either. Take Jackie Wilson, you got him." So, I'll never forget, Al Green was staying at the Taft Hotel in New York, and I wanted to get the contract signed. He had had it a couple of days, and I was to pick it up at his hotel one morning. So I rang the room and a young man gets on, a kid 18 or 19 years old, and he says, "Mr. Green died last night." I said, "Oh, my God, that's terrible!" He said, "But I have a contract here that I was supposed to give you this morning." So he came down and gave me the contract. And that kid was a fellow named Nat Tarnapol, who later became Jackie Wilson's manager. He even wound up at Brunswick because Decca—after I had left the company—in an attempt to keep Jackie Wilson, gave him the label. They gave him Brunswick; that was part of the deal.

**Berry Gordy wrote his first songs. Did you ever deal with Gordy?**

No, I didn't know who he was. But we wound up with these songs and we went in and recorded. The thing that was different was that Jackie was an R&B artist, but we didn't record him as

an R&B artist. Rhythmically we did. It was an R&B sound. Little Richard or Fats Domino had four or five guys and a couple of saxes, and boom, that was it. But we used a regular 16-piece orchestra. We had a big band for him. Somehow—and his acceptance proved it—somehow that overall sound not only appealed to the black market, which was a specific market in those days, but it also got into the white market quicker than if we had made out-and-out R&B records.

**On the other hand, some people have said, "He's from Detroit, he was involved with Berry Gordy. If he had signed on at Motown, he might have had a much greater career . . ."**

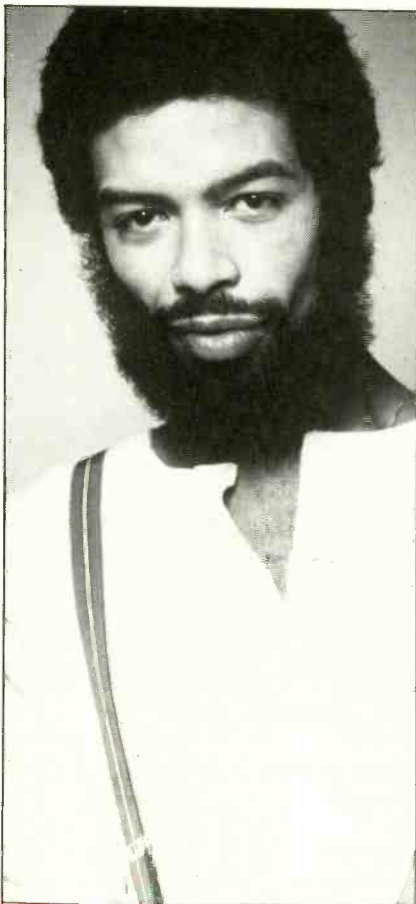
He might have had a greater career if there was the proper control exercised over his personal life. I think that had a lot to do with it. That's a subject you can't really go into.

**Sure, you can.**

Well, we know he got involved with drugs. I don't say that he had the best guidance in all areas. I'm not talking about recording, because I'm not going to say we were making lousy records. We were making good records. But I would say, in all other aspects of his career, I think he was misguided. I don't think he was treated properly. From a financial aspect, I can't even talk about it. But knowing the business as I do, I'm sure he wasn't seeing all the dollars he made, even though he got some new clothes and a new car and things like that. But he was also getting drugs. So maybe Motown would have been better . . . I don't think in the strict recording sense . . .



John Lee Hooker



Gil Scott-Heron



B. B. King

I think it would have been better in a guidance sense. Because as I know the story, and you do too, Berry Gordy and people like that, they really controlled the lives of those artists, which was a new approach at the time.

*After Brunswick you went to Dot, around '59 or '60. Now you were producing Pat Boone, the Mills Brothers, all kinds of middle-of-the-road people. Then, from that, you went to producing a Jack Kerouac album that Dot president Randy Wood recalled for being obscene. Was the Kerouac album a reaction on your part to doing all this middle-of-the-road music?*

No. I've said this before: I enjoy the recording business, the recording industry. I love to record. I love to make records by all kinds of artists. I always say this jokingly, if you called me tomorrow and said you had the greatest polka band in the United States and would I record them, I'd say yes. I enjoy working with performers and artists. Jazz is certainly my true love. It's my main thing. But in those days, when I had a hit record with the McGuire Sisters, that was pretty exciting. That was great. Buddy Holly records. I enjoyed making the album with Pat Boone. After all, Pat Boone was a nice guy. There was no problem. It was up to me to assemble a large orchestra. I think we recorded him with about 26 or 30 guys, here in New York. We did standard tunes. Pat Boone was discovered by Randy Wood. Here again, it's something I can't understand, but I guess it applies to any business—jealousy is always rearing its ugly head. Here I am, recording Randy's boy in New York, and Randy is out in L.A. And at the end of the session we called Randy, and Pat got on the phone and said, "Boy, I'm so happy here. We're having a great time and the record sounds great." The next morning, Randy Wood was in the recording studio. He flew in. He probably said, "This is all I need. Bob Thiele will leave some day, and take Pat Boone with him." *Did that affect the session, after he showed up?*

Oh, no. He let us go on. And the Mills Brothers, they're great guys. [Their music] may not be as deep as some great jazz, but boy, it's fun, and it's a pleasure. You know, making records can be a good time.

## All I knew about recording, when I first started, was that you hired a studio, got an engineer, put up three mikes, and that was it—from mike to lacquer disc.

*If my analysis was wrong, then how did the record with Jack Kerouac come about?*

Well, the same thing would happen as what happened at Coral. Because of my luck or ability to make pop records, I was able to do my labor of love, make jazz records. If I was unsuccessful making pop records, then I wouldn't be permitted, you might say, to spend money making jazz records. When I went to Roulette, it was basically the same approach. Even when you think back to the days at Impulse—I mean, I had a few hit records there. I remember they brought in Frankie Laine, who hadn't had a hit in years, and we had a hit. So I kept the jazz thing going. But at Dot Records, Randy Wood and I didn't get along. Outwardly it looked like we were very friendly, but I don't think we really appreciated or respected one another. Here was a guy from Gallatin, Tennessee, a producer, who could go in and make records. He did all these Little Richard hits with Pat Boone. He produced all these things. I'm sure he wanted me around to produce the Mills Brothers and people like that. I don't think he felt that comfortable with the black performers. But there are white record companies and black record companies, and then there are the companies who produce it all. I'd hate to think I was going to go through life only being permitted to record white artists or black artists. So I got involved in the soundtrack of that Red Nichols life-story picture, *The Five Pennies*. I got to know Danny Kaye, and got Wood involved. I had had a big hit with Debbie Reynolds at Coral, "Tammy." So I brought Debbie Reynolds to Dot. And the crowning achievement, for Randy Wood, was that I was able to get Lawrence Welk to leave Decca and come to Dot. Of course, they got along great. Lawrence Welk doesn't drink and he doesn't smoke and he doesn't swear, and neither did Randy Wood. So they got along famously, and I sort of just slipped by. I was losing my friendship with Welk, because I drink and smoke and curse.

So I made a few jazz things at Dot. Wood said, "Okay with me." We did some albums with Manny Albam, a terrific arranger. I did some things with Yank Lawson and Bob Haggart. We made a great album, with Steve Allen,

of the music of *Porgy and Bess*. Steve met Jack Kerouac, and I knew who Kerouac was, and he said, "Why don't we record him reading his poetry, and I'll noodle on the piano?" So we did. I put the album on release, and Randy heard it and said he's recalling it, that he wouldn't let his 10-year-old son listen to this album. I said, "It wasn't made for your 10-year-old son." So I quit. Steve and I took the album back and formed a little company called Hanover Signature Records. Steve would record on the Coast, and I'd record here in New York, and we put that album out again. We had a fair amount of success. We did a thing with Don Elliott and a fellow named Sasha Berland. I don't know whether you remember it or ever even heard of it, but we sold close to a million copies of this record, "The Nutty Squirrels." A dynamite record. I'll tell you, it's terrific. It was bop done like The Chipmunks [laughter]. Don Elliott, who passed away recently, a great mellophone, fluegelhorn and vibes player, and Sasha, who worked in an advertising agency, created The Nutty Squirrels. It was like scat, but speeded up. Then Steve and I recorded Les Brown and we did Ray Bryant, the piano player. We had a great session with the clarinetist Tony Scott, and Bill Evans on piano, but unfortunately the tapes have been lost forever. The company only lasted about a year and a half.

*Then you went to Impulse?*

Yeah, then to ABC.

*Okay. After Impulse, while you were still at ABC, you started Blues Way. You recorded B. B. King there, John Lee Hooker, T-Bone Walker. Were you always a blues fan? Or was this a response to the rediscovery of the blues in the '60s?*

Well, it might have been. I can't really say. I have to go back to my early days of collecting records, back to the '30s and '40s. I used to have certain dealers in New York City who would order records for me, and in those days they were race records. But I was listening to—as most of the classic [jazz] producers were—Roosevelt Sykes, Leroy Carr, Kokomo Arnold. I've always had a love and appreciation for the blues. I guess there was that revival happening. I remember going to see Eric Clapton at the Fillmore East. Before he

started to play, he made a speech to the audience, saying, "Before we play and before you start listening to us, all you people have to go out and buy records by people like B. B. King and Muddy Waters, because these are the guys that really started it for all of us." I felt, why not record all these great blues artists? But let's put it on a special label. And I still feel, today, that one of the best ways to get jazz music out there, or to get blues out there, is restrict the label to a certain kind of music so that John Coltrane wouldn't be coming out on ABC in a release with Johnny Mathis and Peggy Lee or whoever. So I came up with a name, Blues Way. ABC approved it, and then I proceeded to go out and record T-Bone, Joe Turner, Eddie "Cleanhead" Vinson. In fact, some of those records . . . I've listened to them recently, and I think they really surpass a lot of the records that those same people have made since then. You know, Norman Granz did some things with Joe Turner and Cleanhead. But boy, these records that we made, I think, are truly great records. Again, I was doing something that I loved to do.

*Why did you leave ABC and go out on your own again with your company Flying Dutchman?*

Well, to be short and sweet, I quit ABC. I had written a song with George Weiss specifically for Louis Armstrong. And Louis had just had a big hit, "Hello Dolly." At that time things were very crappy throughout the world. Vietnam was going on; there was a lot of turmoil all over, including right here in the States. I wanted Louis Armstrong to say what a wonderful world, it really is great. I mean, you look around and people are really shaking hands, and saying I love you, you know? So we finally wrote the song. I went down to Washington, D.C. and played it for Louis. And, in his inimitable style, he said, "Pops, I dig it. Let's do it." We took him into the studio. We used about 16 strings and a rhythm section; this was a ballad. Then the president of ABC came into the studio just to say hello and have his picture taken with Louis Armstrong. He was sort of a crude individual, and he said, "What the hell are you doing? Louis just had a hit with 'Hello Dolly,' a Dixieland tune, and you're doing a ballad!" He says,



**Teresa Brewer**



**Charles Mingus**



**Gato Barbieri**

"I'm ending the session." He threatened to throw Louis out and me out, and I was screaming. I remember one of my friends in the publishing business was in tears, holding the studio door and saying, "Please don't go in and keep disturbing Bob, let him finish the record." So we got the session finished; the next day I quit. As emphatic as that sounds, a couple of the vice presidents there said, "You know, stick around." They called me at home. So I lasted a bit longer; I stayed on and then finally did leave the company.

Now, I had to stay in the record business, so I formed Flying Dutchman and was able to get back to recording and doing just what I pleased. Flying Dutchman was a jazz label. I formed a lot of little labels. I knew I'd like to make pop records, so I had a subsidiary called Amsterdam. And I think I had another one. Then I wanted to do a blues label again, so I came up with another name and called it Blues Time. I received a letter from ABC threatening to sue me because it's too close to Blues Way. I didn't even have to call my attorney. I just wrote a letter back, and I said, "You know I only graduated high school, but blues is a generic term. I'm sure you can't sue me for using blues in a title." And that was the end of that.

*Let's talk about Flying Dutchman a little bit. You had some great, important jazz people there, Gil Scott-Heron, Oliver Nelson, Gato Barbieri. Did they achieve a substantial amount of commercial success with the records they did for Flying Dutchman?*

Yeah. I think that Flying Dutchman did very well in the initial stages. We sold quite a few records. The records and the label's general activity certainly helped Gato Barbieri and Oliver Nelson. It certainly helped Gil Scott-Heron, as well.

*This was really a new breed of guys. Were they people that you were familiar with as a fan and wanted to record? Some were and some weren't. Oliver Nelson was probably one of my closest friends, so I was certainly familiar with him. Gato I first heard when I did Charlie Haden's Liberation Music Orchestra. Gil Scott-Heron actually walked into the office, and somehow we were able to see one another. He wanted to give me a book of poetry that he had*

written. He knew that we had recorded Jack Kerouac, and he asked if I'd be interested in putting out an album of him reading his poetry. So I read the book and I said, "Let's do it, I think the poetry is great." Later I found out that he could sing, and he could write some songs.

*Why did Flying Dutchman fold?*

The record industry is a very, very tough business. Major companies handle their own distribution, while the small labels go through independent distributors, who are not basically music people. The old gag was that these distributors were so great they could sell shoes as well as records. Unfortunately, what would happen is we would ship records in response to orders, but the cash flow situation always was a problem. There was always a reason why you couldn't be paid. I'm sure many musicians think, "That guy up there is having a ball spending my money." If they only knew, or if they tried to do it themselves, they would learn why record companies come and go. I have a label right now called Dr. Jazz. If that label was not distributed by CBS, I would not be in the record business.

*You're that discouraged by independent distributing?*

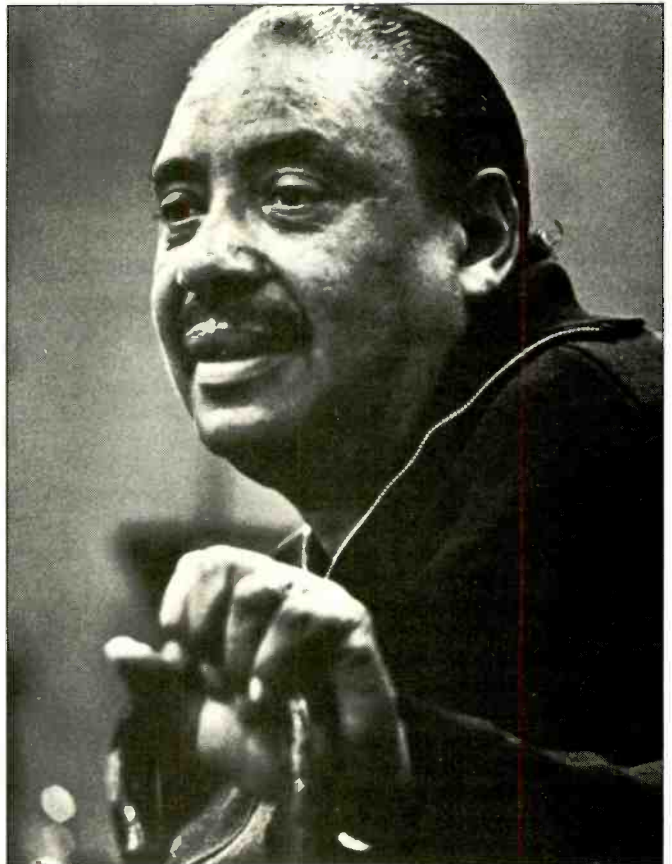
Oh, yeah, I'm completely discouraged by it. I just heard about Herb Wong's Palo Alto Records. They went bankrupt recently, and they have a catalog of 50 or 100 records. There is no way that I can think of for a small record company to make it, unless it's operated by an entrepreneur such as Norman Granz or Carl Jefferson, with Concord Records, who can bankroll it.

*You're trying to circumvent this now with Dr. Jazz's distribution deal with CBS. It seems also that you're into a different kind of product, releasing records by more traditional jazz artists than you did at Flying Dutchman. Why are you doing this?*

Actually, the Dr. Jazz catalog is made up of a few reissues; the *Classic Tenors* album with Coleman Hawkins, the Ellington, the Lester Young were originally done on Signature, which I still own, fortunately, so I can make them available again. But as far as new recordings are concerned, the financial aspects enter into it. I could give you a list of nine LPs I'd like to make right



**Oliver Nelson**



**Joe Turner**

now, of players out there that I would love to record. If I was working for Impulse or if I was working for Columbia directly, I'd bring in these artists and record them. A perfect example is that I brought Arthur Blythe to Columbia Records, and then I went on to do other things.

*He seems to be doing a much more traditional kind of thing than when he first came out or when he was on the India Navigation label.*

I have to be honest, I haven't heard his latest records, but I know the things that we did were far-out. But maybe now they're not as avant-garde. Maybe everyone is changing musically. I don't think it's by direction. He's playing what he wants to play.

*You're married to Teresa Brewer and you're recording her again. You recorded her at her early stage at Coral. What's it like working in the studio with your wife?*

It's terrific.

*You're getting her into more of a jazz thing, too.*

Yeah. That was certainly by design. As you said, I made practically all her hits in the '50s. Since we've been working together again, I really tried to study the situation. She's what's classified as a pop singer, from the era of people like Pat Boone, Patti Page, Rosemary Clooney, Perry Como, you name them.

But she always thought the songs themselves were stupid songs. She got locked into what she calls "itsy-bitsy-poo" songs like "Chewing Gum" and even "Put Another Nickel In"—which is really her claim to fame; people still want to hear it. See, Teresa can swing—that's natural. I'm getting into what Fats Waller said again; if you have to explain it, then don't even attempt to, because the person asking will never understand. If you said to Teresa, "You know, you can sing jazz," she would say, "I don't really know what you are talking about, why do you say I'm a jazz singer?" Mel Torme swings, Frankie Laine swings. Frank Sinatra doesn't swing, Tony Bennett doesn't swing, [yet] they attempt to make what I call swinging records. I knew she could swing. When we did the album, the first jazz album with Count Basie, if Count Basie wasn't happy, and if the band wasn't happy and didn't feel she was swinging, that would have been the last jazz album she ever made. Duke heard it, and we were at the Rainbow Grill one night, and he came over and we were kidding around. He said, "You recorded with Count Basie, when are you going to record with me?" I said, "Tomorrow!" And Duke was standing there, and it's all so easy to say because it happened, but I can't explain it much

further. He said, "Teresa, you're blessed. You swing, and that's what it's all about." She can and she does.

When we record with Stephane Grappelli, she'll go in and we'll do eight sides, eight songs in two or three 3-hour sessions. All live, two or three takes, and she's out. Well, you know those things don't happen unless you sing jazz. As Duke says: It don't mean a thing if it ain't got that swing. And Teresa swings.

*And that's the reason why you married her [laughter].*

You know, the funny thing is, Teresa and I were somewhere, and you know how friends sit around and get arguing about which is a better record and who is a better singer. So we were discussing one of the current popular singers. I was saying, "This guy sounds awkward to me." Somebody asked, "How can you really tell if somebody swings?" And Teresa said, "Watch him when he walks across the stage or when he moves his body." Then I thought for a minute, and all the motions of a lot of the singers who are supposedly singing jazz are stiff, awkward movements. Their arm movements, their legs, everything about them. There's nothing graceful about their bodies. To me, she made a hell of a point. The grace has got to be there, and that loose, swinging feel. ▲

# 1

## ROBERTSON SIXTY TEN AMPLIFIER

### Manufacturer's Specifications

**Power Output:** From 20 Hz to 20 kHz, both channels driven, 200 watts into 8-ohm loads, 400 watts into 4-ohm loads; at 1 kHz, one channel driven, 800 watts into 2-ohm load, 1,600 watts into 1-ohm load.

**Frequency Response:** 0.5 Hz to 250 kHz, +0, -3 dB, at rated power level.

**THD:** 0.1%, 20 Hz to 20 kHz, at 200 watts.

**IM Distortion:** 0.005%.

**Transient IM Distortion:** 0.001%.

**Rise and Fall Time:** 1.2  $\mu$ S.

**Slew Rate:** 256 V/ $\mu$ S.

**S/N Ratio:** 90 dB, unweighted, wide-band.

**Input Impedance:** 51 kilohms.

**Input Sensitivity:** 2 V.

**Damping Factor:** 800, at 50 Hz.

**Channel Separation:** 90 dB.

**Phase:** Noninverting.

**Power Requirements:** 110 to 220 V a.c. or 220 to 240 V a.c., 50 to 60 Hz.

**Maximum Power Consumption:** 1,300 watts.

**Dimensions:** 19 in. W  $\times$  14 $\frac{1}{4}$  in. D  $\times$  7 in. H (48.3 cm  $\times$  36.2 cm  $\times$  17.8 cm); rack-mountable.

**Weight:** 65 lbs. (29.5 kg).

**Price:** \$2,550.

**Company Address:** P.O. Box 8449, Van Nuys, Cal. 91409.

For literature, circle No. 90



The Sixty Ten is the larger of two power amplifiers in the Robertson line of audio electronics. Rated at 200 watts per channel, it is a very well-made, attractive hunk of amplifier.

In its physical construction, the amp uses the front panel as a foundation on which to build. A lip extends about 3/4 inch back from all sides of the front panel, and the panels and sub-assemblies that make up the top, bottom and sides of the amplifier bolt to that lip. The design is modular, with each amplifier channel and its heat-sink making up one side of the amplifier and wrapping around to the rear. The amplifier modules can be removed by simply unbolting them and disconnecting four wires—not even a soldering iron is required. These four wires (+V<sub>CC</sub>, -V<sub>CC</sub>, common and amp output) are extremely short and go directly to the filter-capacitor assembly, thereby avoiding the losses incurred in the long runs between capacitors and amp circuitry found in some other amplifiers.

The rear panel is divided equally between the amplifier channels and the central power-supply section. Each channel has its own signal-input jack, speaker fuse, and pair of

five-way binding posts for output. Externally, the center section holds a three-pin female line-cord connector and a line fuse. Inside, the central section is bolted to a plate which holds the four filter capacitors; the other end of this plate bolts to the power transformer which, in turn, bolts to the rear panel. Quarter-inch sections of bar stock are attached to the amplifier modules and rear panels, top and bottom; the top and bottom covers are screwed to these sections and to the front panel's top and bottom lips. The front panel's sole control is a single, illuminated power on/off rocker switch.

The amplifier modules appear to have been designed for the shortest possible signal paths from input to output. In each module, 10 large, plastic Sanken output transistors and two TO-220-cased driver transistors surround a double-sided p.c. board. The board is a rectangle with its four corners cut off at 45° angles; input and output connections are near the center of the board.

In the power-supply section, the common terminals of the four 33,000- $\mu$ F/100-V filter capacitors are connected by a gold-plated plate. Two full-wave bridge rectifiers, one per channel, are mounted on this plate. A 50-watt resistor in series with the power transformer primary reduces in-rush current at turn-on. After about 2 or 3 S, a time-delay relay (mounted, like the resistor, just inside the front panel) shorts the resistor out.

Robertson makes a point of claiming that the circuits of the Sixty Ten and its little brother, the Forty Ten, are essentially identical; the amplifiers' schematics bear this out. Robertson also says that, while most manufacturers' smaller solid-state amps sound better than their bigger ones, the Sixty Ten outperforms the Forty Ten in sonic attributes as well as in power.

Circuit-wise, the Sixty Ten starts out with a complementary differential input stage using matched NPN and PNP bipolar transistors. The signal input is direct-coupled to the noninverting input of this stage. The differential outputs of this input stage are direct-coupled to a complementary second stage, which consists of two potted modules. Since these modules are potted and no schematics are supplied for them, I do not know their exact circuits. However, I can

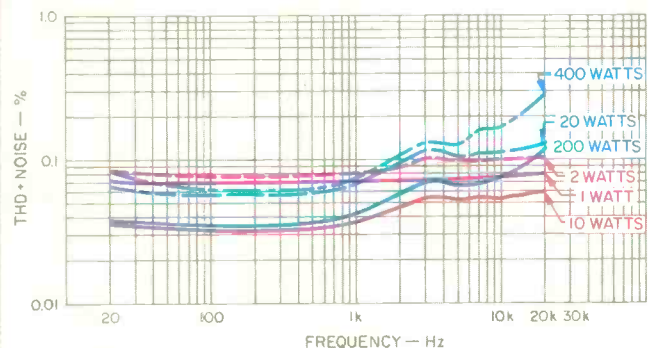
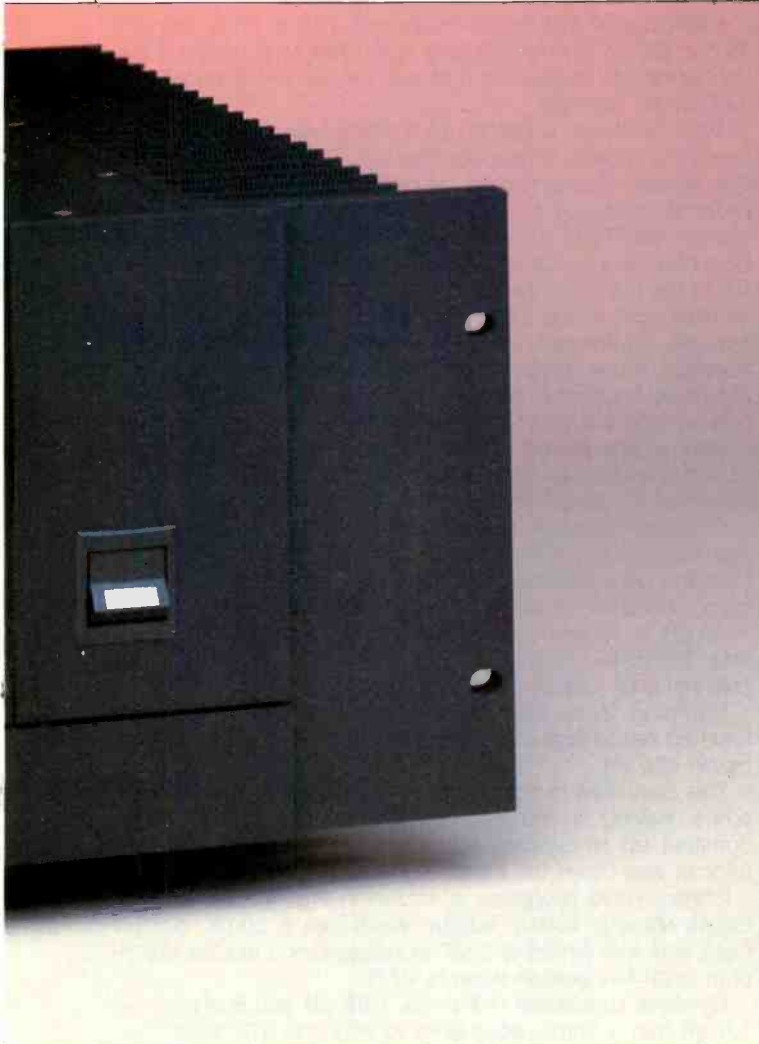
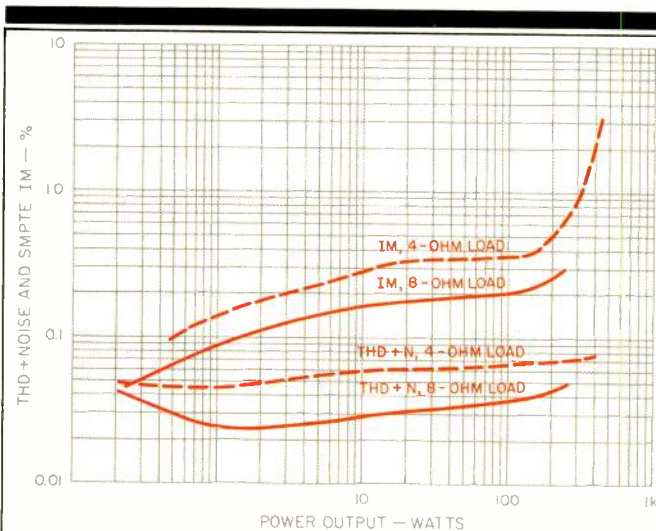


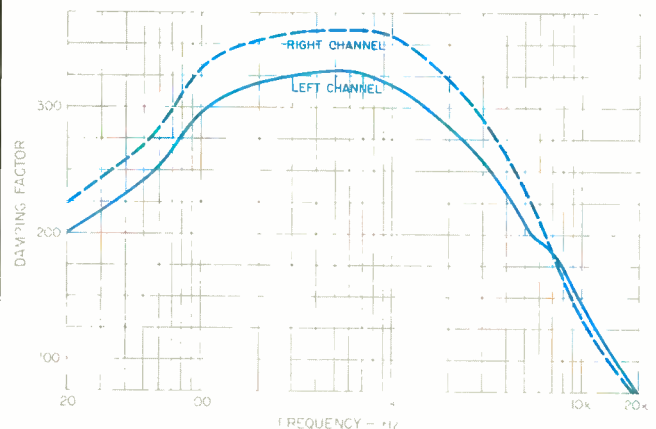
Fig. 1—THD + N vs. frequency for power levels of 1, 10 and

200 watts into 8 ohms, and 2, 20 and 400 watts into 4 ohms.

The Sixty Ten is somewhat faster than many other solid-state amps, with a rise and fall time of 1.2  $\mu\text{s}$  that stays constant up to clipping into 8 ohms.



**Fig. 2—Distortion vs. power output, showing THD + N at 1 kHz (measurement bandwidth is 400 Hz to 80 kHz) and SMPTE IM, for 8-ohm and 4-ohm loads.**



**Fig. 3—Damping factor vs. frequency.**

infer from my measurements that they are topologically equivalent to an NPN and a PNP device with emitters tied to the supply rails (possibly with some emitter feedback) and with collectors tied together through a bias regulator. The circuits contained within are probably more complicated, as they utilize the differential outputs of the first stage and feed current to the opposite-input differential-stage emitters. The modules constitute the last voltage amplification stage of the circuit and swing the full output voltage.

These modules' outputs are connected to the inputs of the driver stages, which are complementary emitter-followers. These emitters drive five NPN and five PNP output transistors, which are also emitter-followers. This is a very beefy output stage, as the output devices are high-frequency transistors with the largest safe-operating areas in the Sanken line. Consequently, there is no VI limiting in the circuit; protection is via the speaker fuse in the output line.

Overall negative feedback is applied around the amplifier to the inverting input of the input stage, via a 3-kilohm series resistor and a 150-ohm shunt in series with a 470- $\mu\text{F}$  capacitor bypassed by a 1- $\mu\text{F}$  film capacitor. Since the signal input is direct-coupled, the overall circuit has a first-order, shelf-type low-frequency roll-off, which reduces in-band a.c. gain to 0 dB (1 $\times$ ) at 0 Hz; the -3 dB point is about 2.3 Hz. On the Forty Ten, the feedback resistor is 10.2 kilohms shunted by 470 ohms; since the capacitance is the same, the -3 dB point then becomes 0.7 Hz. This is the only real difference in circuit constants between the two models.

### Measurements

The Sixty Ten was first run at one-third of rated power (67 watts per channel) into 8-ohm loads, for one hour. Temperature rise was minimal, with the heat-sinks getting only warm to the touch. With one-third power into 4 ohms, the sinks got very hot after about 30 minutes, so I decided not to run the amp for the full hour with this load. The heat-sinks on this amp are very efficient; their temperature drops quite rapidly after removal of input signal.

Voltage gain into 8-ohm loads was 19.5 $\times$  (25.8 dB) and 19.6 $\times$  (25.85 dB) for left and right channels, respectively. IHF sensitivity measured 144 mV for the left channel and 143 mV for the right.

Total harmonic distortion plus noise was measured as a function of power, frequency and load (Fig. 1). The supplied 6-A speaker fuses had to be replaced with 10-A fuses in order to measure full power into 4-ohm loads. Figure 2 shows SMPTE-IM distortion and THD + N at 1 kHz; when both channels are driven, there is more distortion, especially IM, in the right channel than in the left. I measured another sample and it too had more IM in the right channel—caused, it turns out, by the way internal ground paths are handled. If one drives the channels individually, the results are more equal; the IM of the left channel measures about one-half the value obtained for the right channel when both channels are driven. The nature of the IM distortion is essentially all even harmonic, indicating that the dominant nature of the Sixty Ten's nonlinearity is even harmonic.

Crosstalk between channels was found to be quite symmetrical, virtually the same whether leakage was measured from the right channel into the left or vice versa. It ranged from -56 dB at 10 Hz to a low of -82 dB at 1 kHz, rising to -79 dB at 10 kHz, -70 dB at 30 kHz, and -67 dB at 50 kHz. Signal-to-noise ratio (IHF) was -83.6 dB for the left channel and -85.6 dB for the right.

Damping factor versus frequency is shown in Fig. 3. I have no ready explanation for the fall-off in damping factor below 400 Hz.

The Sixty Ten is somewhat faster than many solid-state amps, having a rise and fall time of 1.2  $\mu\text{s}$  that stays constant up to clipping into 8-ohm loads. Frequency response was down 0.5 dB at 10 Hz and 100 kHz.

Square-wave response is shown in Fig. 4. The top two traces show a 10-kHz square wave into 8 ohms, without (top) and with (middle) 2  $\mu\text{F}$  of capacitance across the 8-ohm load. The bottom trace is 40 Hz.

Dynamic headroom (IHF) was 1.85 dB into 8 ohms and 1.6 dB into 4 ohms, equivalent to 306 and 578 watts rms,





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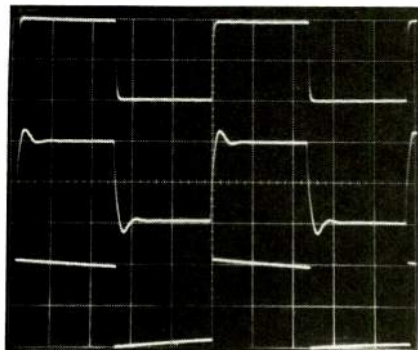
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All in all, I like the Robertson Sixty Ten, and must add it to my small list of very listenable solid-state units.



**Fig. 4—Square-wave response.** Top trace, 10 kHz into 8-ohm resistive load; middle trace, same as top, with 2- $\mu$ F capacitor across load; bottom trace, 40 Hz. Scales: Vertical, 5 V/cm; horizontal, 20  $\mu$ S/cm for 10-kHz traces, 5 mS/cm for 40-Hz trace.

respectively. Clipping headroom was 1.14 dB into 8 ohms and 0.61 dB into 4 ohms, equivalent to 260 and 460 watts.

For peak current-delivery measurements, I used the same IHF tone-burst signal used for the dynamic-headroom tests. The amplifier channel under test was loaded with 0.1 ohm. Under these conditions, I was able to push the amp, with one channel driven, to a voltage swing of  $\pm 10$  V before visible distortion occurred. This translated to  $\pm 100$  amperes peak! No slouch at current delivery, the Sixty Ten.

#### Use and Listening Tests

Equipment used to evaluate the sonic aspects of the Sixty Ten included an Infinity air-bearing turntable and arm; Koetsu Black (EMC-1B) cartridge; Dyna PAS-2, conrad-johnson PV5 and GC/BHK preamps; conrad-johnson Premier 5, Robertson Forty Ten and Mark Levinson ML-9 power amps; Infinity RS IIB and Snell Type A-III speakers, and Stax SR-X/Mk3 headphones.

For my first listening checks, I used the Sixty Ten with the Dyna PAS-2 and the Infinity speakers while playing tapes; I felt that the sound was quite good. The amp was then used to drive the woofers of a friend's Snell Type A-III speakers (he uses non-feedback tube power amps of 100 watts per channel, designed by Gordon Mercer, to drive the Snells' mids and tops). Over a period of time, we tried various other solid-state amps on the woofers too. The Sixty Ten emerged as the best-sounding bass amp in his setup; its sound blended the most homogeneously and musically with the rest of the range, especially in the crossover region. The smaller Forty Ten had about the same qualities when used as a bass amp in this system, but with less power.

Next I listened to the Sixty Ten with the GC/BHK preamp and the Infinity RS IIB speakers. It delivers excellent dynamics and dynamic contrast, and has enormous power and punch. Spectral balance is good, with a smooth and non-irritating high end. Spatial replication and the feeling of air and space around instruments is not as good as with the best tube power amps, but is still good, as solid-state amps go. In comparison with the Forty Ten, the Sixty Ten's bass is a little rounder and its high end is a little softer sounding, with a little more upper-midrange prominence. In contrast to the Robertson amps, the conrad-johnson Premier 5s had a greater feeling of space and in-the-room "thereness."

All in all, I like the Robertson amps, and must add them to my small list of very listenable solid-state power amplifiers.

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## 2

## FRIED STUDIO IV SPEAKER

### Manufacturer's Specifications

**System Type:** Floor-standing, two-way, line-tunnel woofer enclosure.

**Drivers:** 8-in. (20.3-cm) woofer; ¾-in. (1.9-cm) dome tweeter.

**Crossover:** 2.7 kHz, series "quasi second-order."

**Frequency Response:** 26 Hz to 22 kHz,  $\pm 3$  dB.

**Sensitivity:** 90 dB SPL for 2.83 V at 1 meter.

**Nominal Impedance:** 8 ohms, resistive.

**Recommended Amplifier Power:** 20 to 200 watts.

**Input Facilities:** Five-way binding posts, 2-ampere fuse protection.

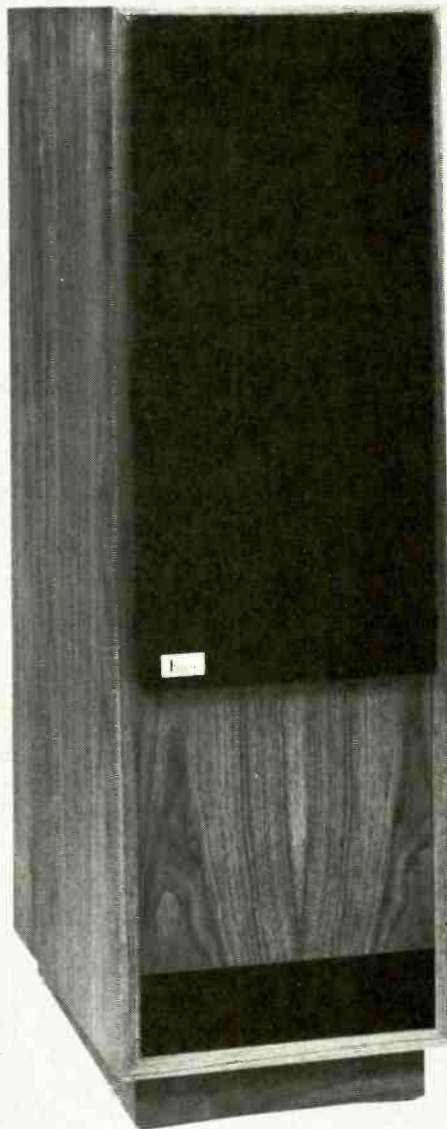
**Dimensions:** 39 in. H  $\times$  12 in. W  $\times$  18 in. D (99 cm  $\times$  30.5 cm  $\times$  45.7 cm).

**Weight:** 80 lbs. (36.3 kg).

**Price:** \$1,150 per pair.

**Company Address:** 7616 City Line Ave., Philadelphia, Pa. 19151.

For literature, circle No. 91



The Fried Studio IV is a true audiophile speaker system. To the uninitiated, it may lack the bass "whump" and other attention-grabbing qualities that move masses of speakers from the appliance store to the living room. Instead, the purist who selects a pair of Irving M. (Bud) Fried's "monitors" enjoys a design approach in which warmth or air is considered distortion if it is not in the recording. Fried claims that there are many less-than-perfect recordings out there, and that speakers should reflect this; for instance, he says the reproduced sound of woodwinds miked too closely should be loud and screechy, just as it is "heard" by the microphone.

Bud Fried, a 40-year veteran of the speaker business, says that all of his speakers are designed primarily for

reproduction of classical music, his favorite. He thinks it is the most challenging to reproduce. He feels that the Studio IV sounds excellent on rock or jazz as well, but that the speaker's finer points may go unnoticed in those uses. If the true, nonresonant bass seems light for rock or jazz, he says, a mild equalization boost down to 20 Hz is okay. If classical music seems lacking in bass when heard over the Studio IV loudspeakers, Fried suggests you attend a concert to calibrate your ears.

The price, \$1,150 per pair, may seem a bit high, at first, for a two-way system using an 8-inch woofer and a ¾-inch dome tweeter. Systems with drivers this size in bookshelf enclosures commonly go for \$300 per pair (or less, if you luck into an appliance-store "Midnight Madness" sale).

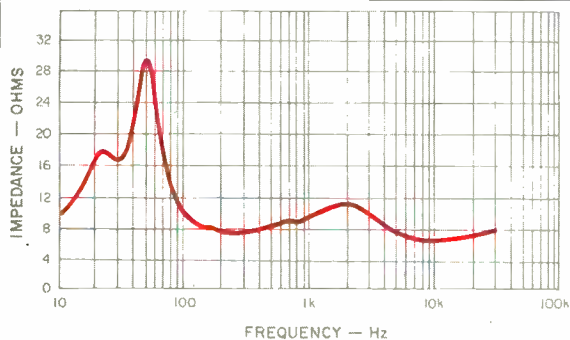
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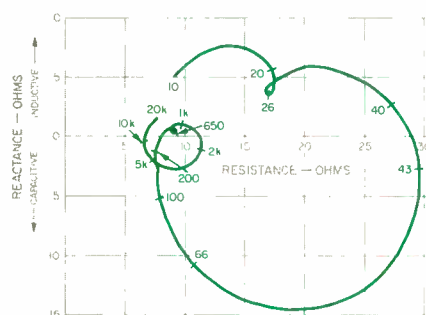
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The best live up to it.



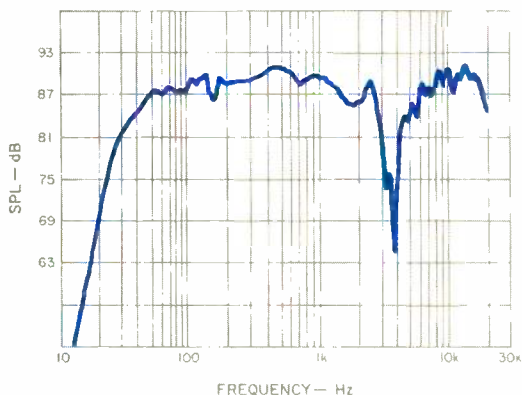
The price may seem high for a two-way system, until you consider what the Studio IVs offer in quality, engineering and size.



**Fig. 1—Input impedance vs. frequency.**



**Fig. 2—Complex impedance. Maximum phase angle (45°) occurs at 66 Hz.**



**Fig. 3—Anechoic frequency response measured at 1 meter on axis.**

However, the value of the Studio IVs may become a bit more apparent when you consider the difference in quality, their engineering, and their large physical size.

This size is a result of the aperiodic (nonresonant) design philosophy. The "line tunnel" designation of the woofer enclosure is a bit misleading, because it is not the transmission-line design favored by Fried for his larger systems. It is simply a large, vented cabinet with foam damping panels inside and a flow resistance to control box-vent resonance. The more common types of "Thiele-aligned" vented cabinet rely on driver damping alone to control this resonance; this results in the smallest possible size for a given low-frequency cutoff, but also produces, says Fried, ringing at the bass cutoff frequency. The line tunnel's more gradual cutoff is designed to eliminate the ringing, but the design pays for it in greater size for the same bass extension. The Studio IV's large cabinet also requires heavier panels and internal bracing to achieve adequate rigidity. All of this means higher manufacturing, shipping, and storage costs. Compared to some other limited-production systems, the Studio IVs offer both a name with a respected heritage of successful designs and a price that turns out to be downright reasonable.

The 39-inch-tall cabinet is finished in oiled walnut veneer and has slightly bevelled edges to help control diffraction. The front of the base has backward-tilt adjustment screws for precisely aiming the speaker at the listening position. The grille is a simple block of open-cell foam which sticks to six Velcro-style hook patches on the front panel. This grille doesn't match the quality of finish of the cabinet, and there is an adequate reason to leave it off: The woofer cone can strike the grille on forward excursions, as in high-level bass, causing a tick or buzz. With the grille off, you see a delicate soft-dome tweeter, the six Velcro patches, and the woofer's cone and stamped frame. All of my listening and measurements were made with the grille removed.

The Studio IVs come in mirror-image pairs with woofer and tweeter mounted near the inside edges. This encourages diffraction toward the center line between the speakers. Instructions state that the speakers are to be placed away from side and rear walls, to minimize reflections. Experiments with speaker locations and room acoustics are reported in more depth after the measurement results.

### Measurements

The Studio IV's input impedance is plotted in Fig. 1. While not purely "resistive," as claimed in the specs, it is quite uniform above 100 Hz and never drops below 6.5 ohms in the audio band. The damped vent tunes the enclosure to 26 Hz, as shown by the slight dip near that frequency. In the more usual undamped vented design, this dip would descend to a very low value, such as 6 ohms. The maximum impedance phase angle, 45°, occurs at 66 Hz; complex impedance is shown in Fig. 2. The Studio IV should not present a difficult load, even to bridged amps rated at 8 ohms minimum.

Frequency response measurements of most speakers are very sensitive to the location of the measuring microphone. When "on-axis" is called for, one must ask, "On the axis of what?" The manufacturer may want the axis of the tweeter,

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The 3-meter or room test shows the effects of early reflections on the measurement; adding a thick rug would help.

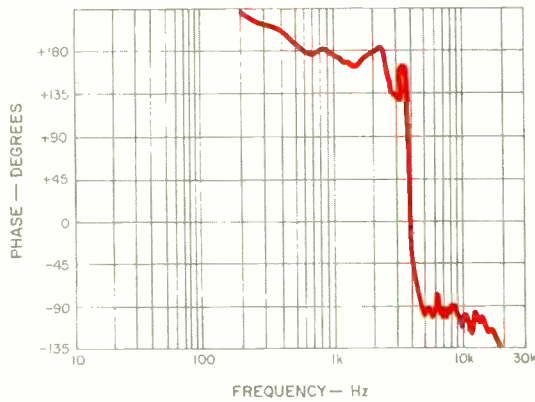


Fig. 4—One-meter, on-axis phase measurement.

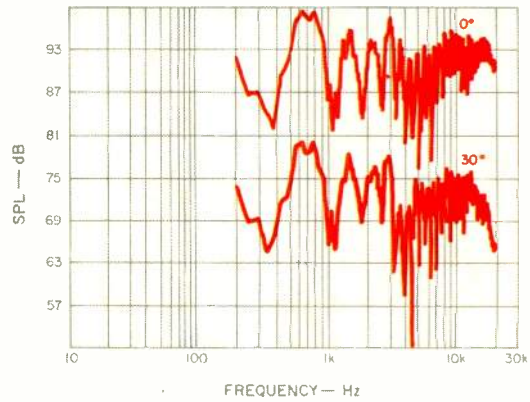


Fig. 5—Three-meter room test plots, on axis (0°) and off axis (30°), including initial wall, ceiling and floor reflections. Output

(SPL) scale is for the 0° curve; 30° curve has been lowered by 18 dB for clarity.

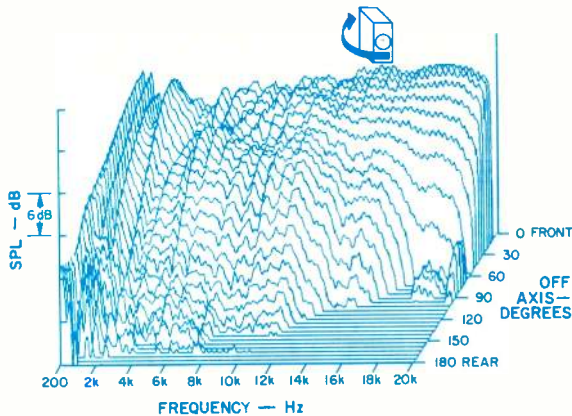


Fig. 6—Horizontal off-axis frequency response plots from front to rear of system. No sharp directivity changes are exhibited in this two-way system.

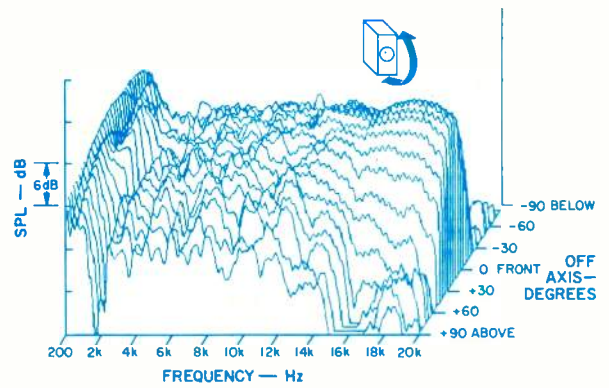


Fig. 7—Vertical off-axis frequency response plots from below to above system. Considerable energy is radiated straight up.

or the axis of the front panel's center, or, in the case of the Studio IVs, the axis of the woofer. *Audio* has a policy of using the axis normal to the front panel's geometric center, so as to ensure repeatability from speaker to speaker.

Figure 3 is a plot of frequency response on our standard measuring axis. Unequal path lengths to woofer and tweeter cause a cancellation just above the crossover frequency, at 3 kHz. The low-frequency portion of the plot shows the beneficial results of using a large, highly damped, tuned cabinet. Note that instead of the usual abrupt drop in output as frequency goes down, response falls only 6 dB in the octave between 60 and 30 Hz. Below 30 Hz, the response falls at 24 dB per octave, as is common in vented designs.

The most popular Thiele-aligned designs change suddenly, with decreasing frequency, from flat to 24-dB-per-octave roll-off. Sealed systems usually change rapidly from flat to 12-dB-per-octave roll-off.

Ringings on transients is the major audible effect of a fast transition from flat to a fast cutoff. Much fuss has been made about this same effect, at 20 kHz, in CD players that use steep anti-imaging filters. The audibility of ringing at a near-supersonic frequency is debatable, but low-frequency ringing in the range of 40 to 100 Hz is easily heard. In a woofer, this is audible as a timbre (the "whump" frequency) that accompanies or accentuates any low-frequency transient. The Studio IV's low-frequency cutoff is rounded over more



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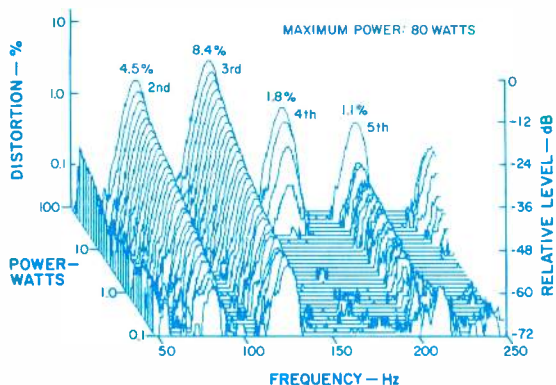
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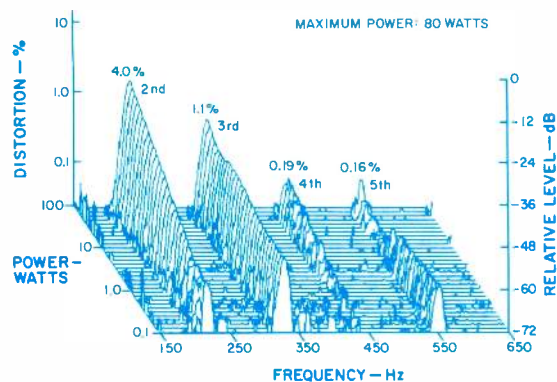
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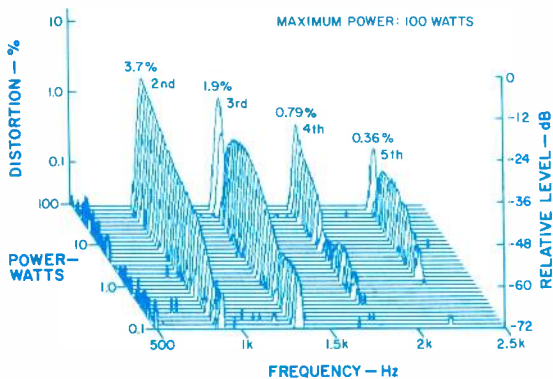
Directivity of these speakers is exceptionally wide, a good reason to keep them away from walls and furniture.



**Fig. 8—Harmonic-distortion products of the tone  $E_1$  (41.2 Hz).**



**Fig. 9—Harmonic-distortion products of the tone  $A_2$  (110 Hz).**



**Fig. 10—Harmonic-distortion products of the tone  $A_4$  (440 Hz) are acceptably low.**

than an octave, so it is quite free from this effect. Don't expect to immediately hear a big difference. The removal of undesired low-frequency energy may make some people, ones more used to listening to speakers than live sound, ask, "Where's the bass?" Also, room resonances activated by poor speaker placement or acoustics may cause much more disturbance. In the best of all possible worlds, speakers would operate down to subsonic frequencies, in which case the cutoff-produced ringing would be subsonic. Until then, the Studio IV approach has merit.

System phase response is shown in Fig. 4. Although the amplitude response is flat, the phase response is not. However, it is my belief that this amount of phase shift is inaudible on music.

The 3-meter room test (Fig. 5) shows the effect of early reflections on the frequency response at my listening location. The 10-mS time window of the measurement includes only the first floor, ceiling, and wall reflections that would be typical of most rooms with the speakers placed as I had them. The carpeting on my floor is rather thin; with a more absorptive floor covering, the floor-bounce interference notch at 400 Hz would probably be less prominent.

Frequency plots taken every 6° from the front, around the side, to the rear of the speaker are shown in the three-dimensional plot of Fig. 6. The measurements are made from 200 Hz to 20 kHz and are plotted on a linear frequency scale. Exceptionally wide directivity is seen through the entire range, a good reason to keep the Studio IVs away from walls and massive furniture. The commonly seen directivity change, from narrow to wide through the crossover range, does not exist for this two-way system. The Studio IV woofer uses a hollow pole-piece in its magnetic structure, so a porous dust cap is not required to relieve pressure. The rigid, inverted-dome cap attached directly to the voice-coil former of the woofer is claimed to act as a midrange radiator. This 2-inch cap could well be responsible for the excellent performance of this driver from 1 to 3 kHz.

I also made 31 plots vertically from below the speaker, up the front, to directly above it (Fig. 7). Wide-angle directivity is again shown, with considerable energy radiating straight up. So, one must be on the lookout for a floor-ceiling flutter echo (a hollow "room tone" excited by transients) when positioning these speakers. A vaulted ceiling is a nice way to handle this problem, but a thick rug or carpet under the speakers works well too. Close inspection of Fig. 7 reveals amplitude irregularities around the crossover frequency at angles above the geometric axis. It is wise to make use of the adjustable front feet to tilt the cabinet back, as recommended by Fried. Overall, the Studio IVs deliver a reasonably balanced direct-sound spectrum to any normal listening location. The only positioning requirement is to keep them away from surfaces that can produce early reflections.

Nonlinearity of the woofer was measured as harmonic distortion components for fundamental frequencies of 41.2, 110, and 440 Hz at power levels from 0.1 to 100 watts, where possible (Figs. 8, 9, and 10). For 41.2 and 110 Hz, a sharp buzzing began at about 80 watts, so testing was terminated at that power. The third-harmonic component was greater than the second in the 41.2-Hz measurement, but at 25 watts, fourth and fifth harmonics also began to rise.

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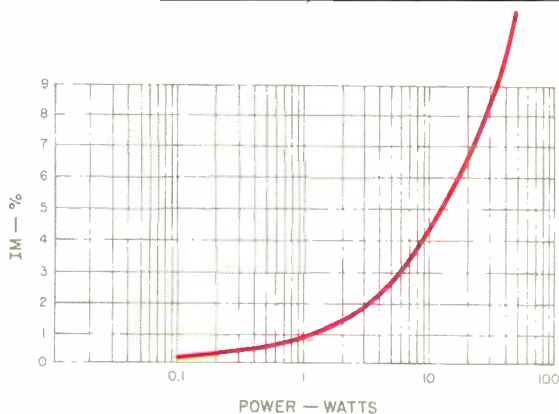


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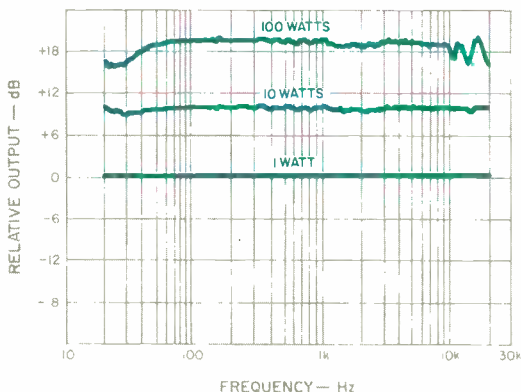
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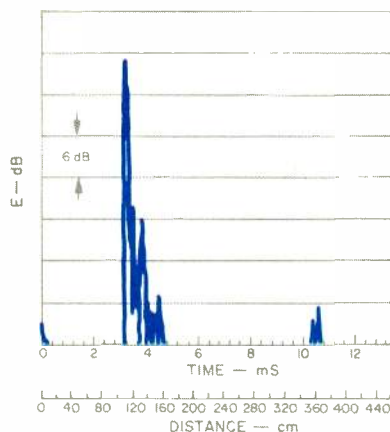
The speakers sounded best when placed 6 feet apart, angled inward slightly. I preferred listening from 12 to 14 feet away.



**Fig. 11—IM distortion on A<sub>4</sub> (440 Hz) caused by E<sub>1</sub> (41.2 Hz), mixed 1:1.**



**Fig. 12—Power linearity. Plot shows response at 10 and 100 watts relative to 1.0 watt. Compression is evident at high power and at low frequencies.**



**Fig. 13—Energy-time response.**

The 8.4% maximum of the third harmonic at 80 watts is very respectable for an 8-inch driver of medium efficiency. At 110 and 440 Hz, second harmonic dominates, with maximums in the 4% range—again, very good performance.

Woofer nonlinearities were also measured by the inter-modulation products method, using test signals of 440 and 41.2 Hz mixed in a 1:1 ratio (Fig. 11). This measurement gives an indication of how, in music, a midrange instrument (440 Hz) might be blurred by a bass instrument (41.2 Hz). At about 40 watts input, IM distortion rises to 10%, an annoying amount. While the harmonic components generated by 41.2 Hz at input powers above 40 watts may be acceptable, the effect of the IM on midrange instruments is not.

Power linearity is shown in Fig. 12. In this test, frequency response is first measured at 1.0 watt and stored in computer memory. Input to the speaker is increased, to measure additional responses at 10 and 100 watts. These measurements are then compared to the 1.0-watt response. A perfect speaker would simply be 10 and then 20 dB louder for all frequencies at the two higher powers. The computer plots the deviations at each frequency from the expected higher levels. The Studio IV performs very well at 10 watts over its entire frequency range. Clearly, 100 watts is over its capacity at frequencies below 50 Hz, but above that, minimal compression is indicated.

The time response (Fig. 13) is measured at 1 meter on the axis of the woofer. The curve is compact and tall, indicating that all frequencies are radiated at nearly the same time and that internal resonances and reflections are minimal. I have found from experience that a good time response indicates a speaker's ability to reproduce a range of recorded ambience, from a dry nightclub to a spacious cathedral. Room or source-material defects can either flatten spaciousness or artificially create it, but a clean time response direct from the speaker indicates potential. Surprisingly, I am seldom aware of measured time dispersion being audible as a "time smear," even when listening to loudspeakers whose measurements are poor.

### Use and Listening Tests

My primary listening room is a dedicated facility, and is somewhat unusual in that its acoustics can be easily modified. Its size and shape were recommended in a study by the International Electrotechnical Commission (IEC) as appropriate to simulate an "average" living room. It is a rectangular room with dimensions of 18 by 25 by 10 feet. Shelves on all walls hold 2-foot-square, movable, acoustically absorbent blocks. Reflectors or absorbent panels can also be hung from a grid of attachment points on the ceiling. With a little work, the room can be made live, dead, in-between or live-end/dead-end. I generally leave it set for average acoustics but arrange the acoustical blocks to discourage flutter echoes.

The Studio IVs sounded best when placed only 6 feet apart along the short wall and angled inward slightly. This close spacing removed the "hole in the middle" encountered when listening slightly off the center line. Live lower-side walls smoothed out the sound and gave a sense of space. I preferred to listen well back, at about 12 to 14 feet; this necessitated deadening the rear wall to compensate for

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the live sides. The foam absorber on the floor midway to each speaker seemed to help, but the effect was subtle.

I found that the Studio IVs could also be used with their backs against the wall behind them without causing mid-bass response irregularities. (When this was done I moved my listening position forward to maintain the same distance to the speaker.) I recommend sitting several feet away from a wall behind you or covering it with effective absorption such as Sonex foam or very heavy drapes. (All speakers have an optimum acoustic environment, but this interface is often ignored by home installers.)

Be prepared to rearrange your listening room if you buy these speakers. They radiate sound over a wide angle but, like most speakers, sound best when that radiation does not reflect off nearby objects or surfaces. The speakers should be kept at least 3 feet away from side walls, and heavily padded furniture or drapes along those walls should be avoided since they will absorb helpful delayed reflections. If the room is narrow, it is best to angle the speakers further inward to aim the sound away from the adjacent side wall and into the opposite one.

Although the acoustics were optimized for the Studio IVs, my three-way reference speakers were also used. One's ears often accept many speaker aberrations after a time. Listening to a different speaker for a short time allows one to again be critical on returning to the original.

With the speakers placed as directed, the sound was analytically clear and up-front. On jazz and orchestral recordings, the Studio IVs delivered superb definition, ambience reproduction, and lateral and depth imaging (though the stage was a bit small). With a mild bass tilt-up (of the kind okayed by Mr. Fried), the sound was nicely balanced; without the tilt, it was a bit thin. Natural timbre and low coloration of voice and solo instruments were all excellent. Bass was extended but a bit lean; the Studio IVs seemed to cleanly reach the lowest organ pedal notes, provided the volume was kept to a moderate level. Only in maximum undistorted output, particularly at low frequencies, were the reference speakers superior.

As I listened, I gradually began to prefer a reduced bass boost on the Studio IVs and I eventually lowered it to only +3 dB, below 100 Hz. With the speakers backed up against the wall, the balance was acceptable without any EQ. Playback level setting was found to be critical: If it was too high, the sound of massed voices or strings would become harsh and give a sense of pressure on the ears, like sonic glare.

Enjoyment of the Fried Studio IVs is a matter of expectations. If you seek easy listening, an always-lush string sound or high energy for rock, you might as well look elsewhere. If the goal is an analytical sound that is "musical" only when the recording and performance are first-rate, the Studio IVs can deliver superior detail and natural timbre. *David L. Clark*

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## ALPINE 5900 CAR STEREO COMPACT DISC PLAYER

### Manufacturer's Specifications

**Frequency Response:** 5 Hz to 20 kHz,  $\pm 1.0$  dB.

**THD:** 0.005% at 1 kHz.

**Dynamic Range:** 90 dB.

**S/N Ratio:** 90 dB, A-weighted.

**Channel Separation:** 85 dB at 1 kHz.

**Tone Control Range:** Bass,  $\pm 10$  dB at 100 Hz; treble,  $\pm 10$  dB at 10 kHz.

**Line Output Level:** 500 mV at volume-control center.

**Power Requirements:** 14.0 V d.c. (11 to 16 V allowable).

**Dimensions:** Chassis, 7 in. W  $\times$  2 in. H  $\times$  5½ in. D (17.8  $\times$  5  $\times$  14 cm); nose piece, 6¾ in. W  $\times$  1¾ in. H  $\times$  9/16 in. D (17.1  $\times$  4.8  $\times$  1.5 cm).

**Weight:** 3 lbs., 15 oz. (1.8 kg).

**Price:** \$600.

**Company Address:** 19145 Gramercy Pl., Torrance, Cal. 90501.

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The Alpine 5900 CD player is designed to connect between a car's radio/tape player ("head unit") and an amplifier. It can also be used without a head unit, if CD is all you want to hear in your car. The 5900 will probably be used most often with external amplifiers, though it can also be used with the amplifiers built into some Alpine head units.

When the 5900 is not playing, the head unit's signal passes through it and appears at the player's outputs. When it is in play mode, the signal from the CD appears at its outputs, and the player's volume, bass and treble controls take effect. When the player is used with some Alpine head units (such as the 7273 and 7374), the head unit's display

shows when a CD is playing, and, if a tape had been running, the unit goes into tape pause mode. If the 5900 is used with head units that lack this pause feature, Alpine recommends ejecting any tape that might be playing before switching over to CD play, so the tape will not keep running.

As I soon discovered during my tests of this trim little unit, it is easiest to connect to Alpine head units and amplifiers, which have matching DIN connectors that latch securely. Alpine makes DIN-to-RCA adaptors available for connections to other brands of head units (part number 4308) and amplifiers (4853). For connection to components which do not have RCA connections, you may have to cut off the DIN



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Considering its small size, the Alpine 5900's features come close to matching those on home CD players.

plugs supplied on the 5900 and figure out which wires in the cable end go where.

Considering its small size, the Alpine 5900's features come pretty close to matching those found on home CD players. There's no random direct access, but it's easy enough to push one of the music sensor buttons (marked with upward- and downward-pointing arrows) several times in succession to move ahead or back by several tracks. You can move ahead or backward on individual tracks, and also have the unit repeat a single selection or an entire disc. "Power Loading" gently takes a disc from your hand as you insert it in the narrow slot on the front of the player, completing the disc-loading operation smoothly and correctly so you can concentrate on driving. To further aid you in keeping your eyes on the road, the 5900 responds to all commands or buttons pressed by sounding a beep. If this becomes annoying, there are easy ways to turn the acknowledgment beep off—and back on, if you decide you want it after all.

#### Control Layout

At the extreme left of the player's front panel are concentrically mounted, detented volume and balance controls. Just beneath them are smaller, detented bass and treble controls. The incorporation of these four controls makes it possible to use the CD player as a "stand-alone," with its output signals fed directly to a power amplifier if you choose to do so. Once set, both of the tone controls can be pushed in so that the knobs are flush with the panel, and their settings will not accidentally be changed. Pushing them a second time causes the knobs to protrude again when you need to reset them.

The rest of the front panel contains the narrow CD slot and, below it, the digital display and the remaining pushbuttons. These include a "Repeat" button (push it once to repeat the current track, twice to repeat the entire disc), the two "M. Sensor" (Music Sensor) buttons, the fast-forward ("Fwd") and fast-backward ("Bwd") buttons, a disc "Eject" button, a "Play/Pause" button that is toggled between these two modes by successive pressing, and a "Display" button which changes the numeric display from track number to elapsed time of the currently playing track. A button labelled "ADI" (for Auto Disc Initializer) performs the function that I normally associate with the word "reset"; it returns the pickup to the beginning of the disc and either re-initiates play (if you are in that mode) or remains in the pause mode. "Play," "Pause," and "Repeat" appear as illuminated words in the display area.

#### Measurements

My tests of the Alpine CD player were conducted entirely on the test bench, where I powered the unit with a constant, regulated d.c. supply voltage of 14.0 V, as specified. (Technical Editor Ivan Berger, who has operated an identical unit in his car, will follow with some comments concerning this unit's actual performance on the road.) When I concluded my tests, I did vary the supply voltage to see what would happen: During stationary listening tests, the player performed perfectly so long as the supply voltage did not go below 11.5 V.

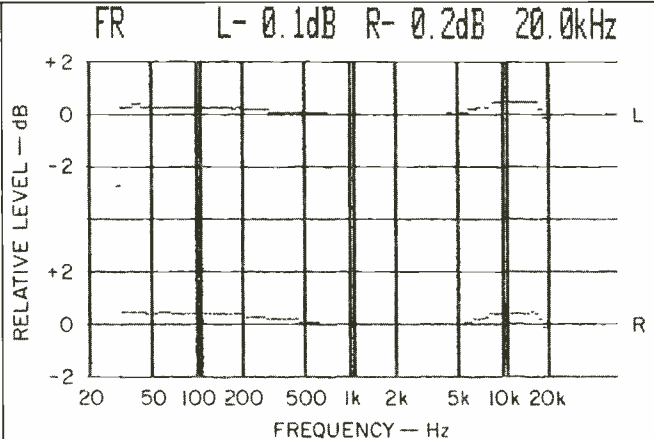


Fig. 1—Frequency response, left (top) and right channels.

Frequency response of the 5900, shown in Fig. 1, was flatter than claimed, with a maximum deviation of only  $\pm 0.3$  dB over the entire audio range. A slight rise in response near the high end was typical of the response I have found in CD players that employ steep analog filters after D/A conversion. The rise amounted to no more than 0.5 dB in one channel and 0.4 dB in the other. Bear in mind that the vertical scale in Fig. 1 is only 2 dB per division.

As with many a.c.-operated home players, the apparent "high" harmonic distortion readings observed when checking THD of high-frequency signals (19 and 20 kHz) on my test disc are not really the result of harmonic distortion components. Rather, these high readings are the result of out-of-band "beats" which, though inaudible, cause the distortion analyzer to yield the figures which I recorded. Figure 2 shows harmonic distortion versus frequency for three different recorded levels, but the curves are valid only to around 16 kHz. The short-dash lines above this frequency show the sudden rise in THD caused by the out-of-band beats.

Unweighted signal-to-noise ratio, shown in Fig. 3A, measured 88.2 dB. With an A-weighting network, S/N measured 92.7 dB (see Fig. 3B), greater than Alpine's claimed 90 dB. SMPTE IM was 0.003% at maximum recorded level, increasing to 0.02% at  $-20$  dB recorded level. CCIF IM (twin-tone, using 19- and 20-kHz tones at the equivalent of highest recorded level) measured a very low 0.0042% at maximum recorded level and 0.003% at  $-10$  dB recorded level. Stereo separation, plotted in Fig. 4 as a function of frequency, ranged from 70.1 dB at the high-frequency extreme to 81.4 dB at mid-frequencies. I detected that some crosstalk was being caused by the proximity of the left and right conductors of the output cable, but certainly the separation figures obtained are far more than anyone would need—especially in the environment of an automobile!

Reproduction of a 1-kHz square wave by this player is shown in Fig. 5. It is obvious from this photo that Alpine is still using sharp-cutoff, "brick-wall" analog filters at the out-

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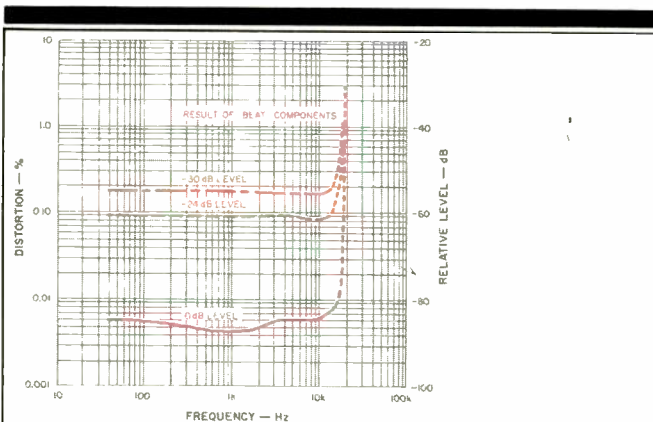


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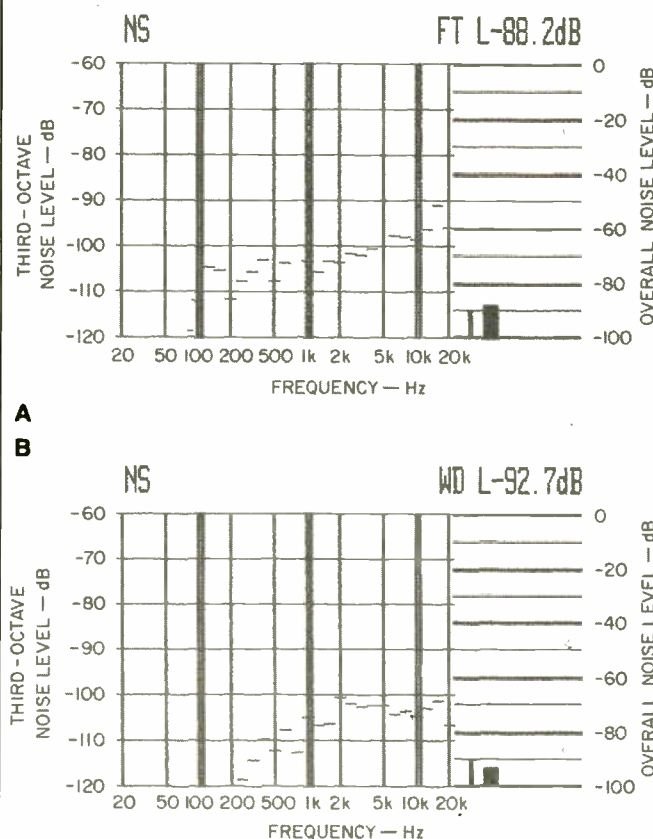
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**Fig. 2—THD vs. frequency, at three output levels. Dashed portions of curves (beyond about 16 kHz) are "beat" components rather than distortion (see text).**



**Fig. 3—S/N analysis, both unweighted (A) and A-weighted (B).**

put of the player's D/A converters, whereas most other second- and third-generation CD players have gone over to digital filtering and oversampling. The appearance of the unit pulse in Fig. 6 further confirms the fact that analog filtering is being used.

The balance, bass and treble controls, though not really key to the CD player's basic functions, behaved pretty much the way you would expect them to work on any car-stereo head end. Maximum bass and treble cut and boost amounted to approximately  $\pm 10$  dB, as specified by Alpine. With the balance control set at its detented midpoint, output levels from opposite channels were within 0.2 dB of each other. Tracking of the volume control was accurate to within 1 dB, down to a -50 dB level.

The 5900 had no trouble tracking through my simulated-defects disc, totally ignoring all three specially implanted defects. It was able to track through 900-micron-wide portions of a simulated opaque scratch, through 800-micron-diameter dust particles, and through a defined area of semi-opaque fingerprint smudge inscribed on the test disc. I also subjected the unit to mild tapping and vibration, but I would not equate my tests with the kind of vibration and bumping to which such a unit will be subjected when it is installed in an automobile.

### Listening Tests

Such additional tests as I performed were not very relevant to use in a car. I hooked up the outputs of the CD player to the high-level inputs of my reference system—including my reference home speakers, which are obviously superior to any car speaker in their ability to reproduce bass. I did notice that, with the volume control turned up fully, maximum output at the left and right terminals was considerably higher than the usual 2.0 V I've been measuring for most CD players—it was nearly 3.5 V for a test signal recorded at maximum level on a CD. However, the player's volume control is so tapered that at its mid-setting, output is a more reasonable 0.5 V, as specified. This level is undoubtedly consistent with the levels obtained from Alpine's AM/FM cassette units.

Alpine has done a nice job in designing their first car CD player to match their other car units, aesthetically and in terms of compatibility and operating features. While the sound of the player was quite good in my home reference system, I was able to distinguish between the characteristic steep filtering used in this player and the digital filtering used in my reference home player, when comparing the sounds of some of my more recently acquired discs. I suspect this subtle difference will all but vanish in an automobile, but I'll let Ivan Berger be the judge of that.

*Leonard Feldman*

### Behind the Wheel

About the only main control feature Len missed is the 5900's night illumination. You can't see it by day, but soft glows outline the loading slot and main controls, and even the volume-control setting. If you're using the player with an Alpine head unit, these lights go on as soon as you turn the head unit on; otherwise, only the loading-slot light (the most important light) glows, until a new disc is inserted.

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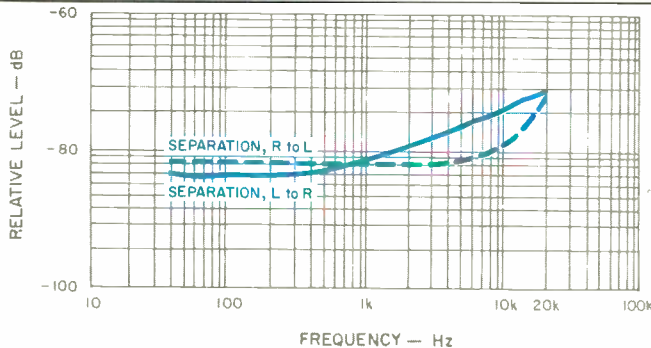


Fig. 4—Separation vs. frequency.

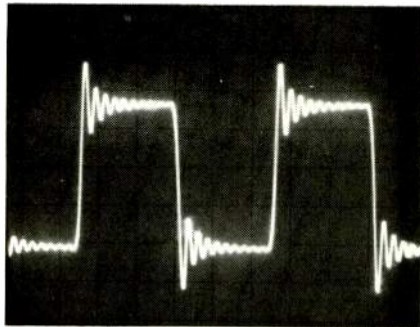


Fig. 5—Reproduction of a 1-kHz square wave.

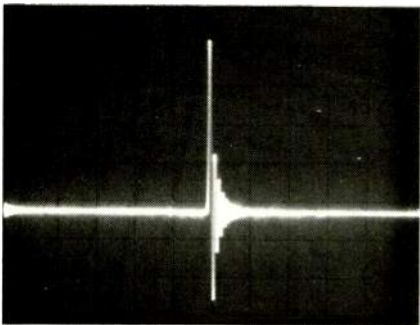


Fig. 6—Single-pulse test.

The small, thin legends on the eight identically shaped controls at the panel's lower right are almost impossible to read when the buttons are illuminated, but they're also too small to read while you're driving in daylight.

Both fast-forward and fast-backward searches are audible, so you can find the passage you want without taking your eyes off the road (save for a moment, perhaps, to find the proper button). If you can look, you'll find that the display shows elapsed time within the track while the search functions are operating, even if it was in the track-number mode beforehand—a useful touch. Another nice touch is the provision of a threaded hole to hold the transit screw when the unit is in use, keeping it handy in case the player must be shipped somewhere at a later date.

One control, the reset button, is unmarked and all but invisible. (It's just to the right of the disc loading slot.) If the player fails to work, pressing this button with a ballpoint pen or similarly pointed object will usually correct the problem. I only needed to press it once, when the player was just installed—and that wasn't the player's fault so much as the photographer's. (He had left a disc inside the player when he disconnected its power.) Still, it would have been good to have this button prominently mentioned in the instructions, rather than buried in a list of controls on page 14 of the 24-page manual.

Once working, the 5900 worked well. It slurped each disc in, played it, then diffidently ejected it halfway, pulling it back into the transport for safekeeping if you didn't take it out within 15 S. Play begins as soon as you insert a disc, a great convenience; but it goes into pause mode when it's only re-ingesting a previously ejected disc.

All controls worked as they should. I did find the beep tone annoying after a while, and shut it off. It's not needed, as the effect of each control becomes audible soon enough. It would be great, though, if each of the eight buttons sounded a different tone so that you could tell by tone which one you'd pushed.

Len's guess about the 0.5-V output level is correct. In my system (currently set up for a reference Alpine 7347 head unit), I found the volume control's mid-setting just about right, most of the time.

I couldn't check Len's conjecture about the importance or unimportance of digital filtering in the car, as my first-generation home player also uses analog filtration, and because my car's system is currently in transition to something new and therefore doesn't sound exactly like what I'm used to. My installer thought the player lacked highs, and he turned the treble control up to the 3 o'clock position. I felt it was slightly shrill, and backed the treble off to 11 o'clock or so. My wife felt it sounded flat and undynamic. Nonetheless, we all agreed that it sounded better than tape or FM—by a long sight.

A critical question, for a mobile CD player, is how well it handles bumps. I did not have time to seek out speed bumps and other thank-you-ma'ams, but I did play the 5900 while driving over a reasonable range of roads, including concrete with heat-swollen expansion joints, Belgian-block paving (with occasional blocks missing) and slightly ragged blacktop. The Alpine 5900 handled them all, without a glitch.

*Ivan Berger*

# AN AMERICAN HERO

## America's new LeBaron GTS outperforms Germany's BMW 528e and Mercedes 190E.

For a long time, the legendary BMW and Mercedes had no competition in America.

Now they've got more than they can handle:

	0 TO 50	SLALOM	CORNERING	BRAKING
LEBARON GTS	5.71 secs.	6.34 secs.	.320 G's	138.54 ft.
MERCEDES 190E	7.08 secs.	6.59 secs.	.309 G's	143.05 ft.
BMW 528e	7.15 secs.	6.68 secs.	.790 G's	151.79 ft.

Chrysler LeBaron GTS. The GTS overwhelms the German cars when you equip it with turbo, sports handling suspension and 15" wheels.\*

The GTS accelerates faster, corners better and handles the slalom quicker than the BMW and

Mercedes. And to wrap it all up, GTS stops a crucial 13 feet shorter than the BMW, 4.5 feet shorter than the Mercedes. (Results of U.S. Auto Club tests.)

There's one more event the GTS dominates: the bottom line. GTS is priced under \$12,000.\*\* And for good measure, it's backed by the Chrysler's 5-year or 50,000-mile Protection Plan.™

If you've been holding out for an American hero, it's here.

Buy or lease at your Chrysler-Plymouth dealer.

Buckle up for safety.

LEBARON **GTS**



Chrysler

Division of  
Chrysler Corporation

THE COMPETITION IS GOOD. WE HAD TO BE BETTER.



# 4

## PIONEER PD-9010X COMPACT DISC PLAYER

### Manufacturer's Specifications

**Frequency Response:** 2 Hz to 20 kHz,  $\pm 0.3$  dB.

**THD:** 0.001% at 1 kHz.

**THD + Noise:** 0.0022% at 1 kHz.

**Dynamic Range:** 96 dB.

**S/N Ratio:** 98 dB, A-weighted.

**Number of Program Selections:**

32, for tracks numbered up to 99.

**Channel Separation:** 95 dB at 1 kHz.

**Line Output Level:** 2.0 V.

**Power Consumption:** 120 V, 60 Hz, 18 watts.

**Dimensions:** 18 in. W x 3.7 in. H x 12.2 in. D (45.6 cm x 9.5 cm x 31 cm).

**Weight:** 12 lbs., 8 oz. (5.7 kg).

**Price:** \$539.95.

**Company Address:** P.O. Box 1760, Long Beach, Cal. 90801.  
For literature, circle No. 93





Pioneer's top CD player is also its most versatile and feature-laden. Supplied with a wireless, 13-function remote control, the PD-9010X can be programmed from the comfort of your armchair for up to 32 randomly accessed tracks on a disc—and the track numbers programmed can extend up to 99! In addition to the usual line output, this player is equipped with a stereo headphone jack and a headphone level control, both conveniently located on the front panel. To keep the panel simple and uncluttered, Pioneer has elected to place the programming number keys on the remote control only. In other words, you cannot program the unit from the front panel. You can, however, play discs in the normal fashion using front-panel buttons and controls. Fast search and fast advance or reverse of the pickup from track to track is possible, and you can access a given point on a disc by its index number—if the disc is so coded—from both the front panel and the remote-control unit. Index numbers cannot be included in any random programming, however.

#### Control Layout

The "Power" on/off switch, headphone level control, and stereo phone jack are located at the left of the front panel. The slide-out disc tray to their right can be opened and closed using the "Open/Close" pushbutton just to its right; the compartment can also be closed by gently pushing the front of the tray when a disc is in place. Two small indicator lights below the drawer show when a disc has been loaded and when a remote-control command has been received by the remote sensor on the front panel.

The elaborate fluorescent display area is immediately to the right of the disc tray and its "Open/Close" switch; it provides no fewer than 11 separate status indications. These include track and index numbers; minutes and seconds of total time, time remaining or elapsed time; play, pause, and repeat-play modes; indication of whether a disc has been properly loaded, and acknowledgment of commands from the remote control.

In addition to the large numerals that display the current track being played, there are 15 small numerals arranged in a row below the main display. These illuminate to show total number of tracks on the disc. If a disc contains more than 15 tracks, an arrow pointing to the right illuminates to indicate that fact.

Near the right-hand end of the panel are "Play" and "Pause" buttons. Along the panel's lower edge are a "Time" key (which toggles the time display), a "Repeat" key, forward and reverse "Index Search" keys, forward and reverse "Manual Search" keys, a pair of track-advance and track-reverse keys, and a "Stop/Clear" key to discontinue play as well as to clear the memory of programmed instructions.

The hand-held remote-control unit supplied with the PD-9010X duplicates most of the function keys described above. It is also equipped with the "0" to "9" number keys and the "Program" key needed for random-access programming.

#### Measurements

Frequency response of the PD-9010X is shown in Fig. 1. Response was very slightly attenuated at 20 kHz, measuring

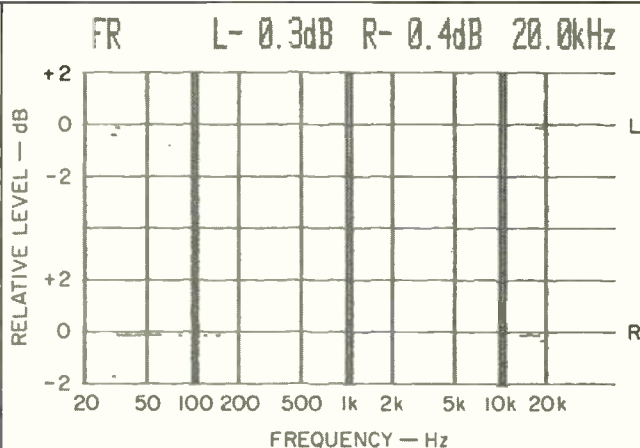


Fig. 1—Frequency response, left (top) and right channels.

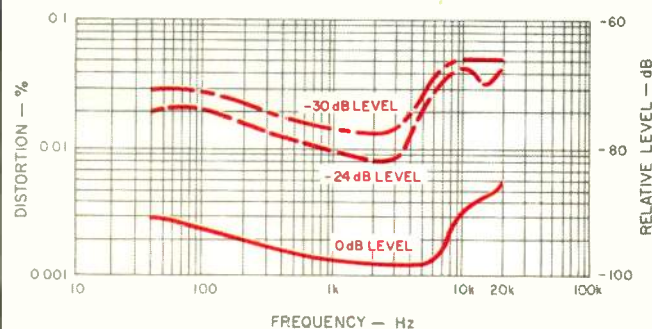


Fig. 2—THD vs. frequency at three signal levels.

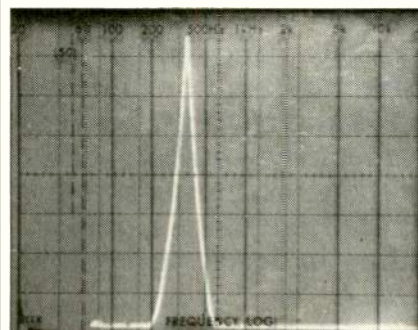


Fig. 3—Spectrum analysis of 20-kHz test signal; output was 20 kHz, and nothing else!



## 60 CDs at the touch of a button.

When Frank Serafine sampled our NCD-600, he instantly realized he could cut his research time by 75%.

Without doubt the most sophisticated player/changer on the market, the NCD-600 is a research/editing system unto itself. Accesses 5 selections, in any order, from 60 stored compact discs. Or add 3 units, expanding storage to 240 CDs. And, it'll interface any computer, to extend programmability infinitely.

Best of all, it has pitch and tempo controls. Music selections can be digitally edited to match keys and rhythms between selections simultaneously... unlike with tapes or records, where modifying speed to change the key will also change rhythm. Makes programming in deejay situations an absolute dream.

**NIKKO AUDIO**  
The power of technology.

5830 South Triangle Drive, Commerce, CA 90040

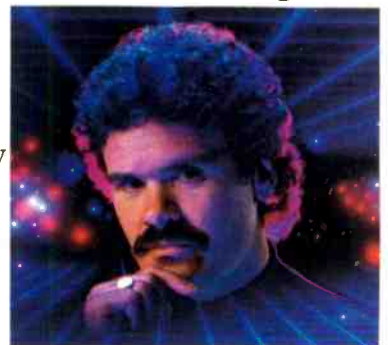
Nikko Audio systems and components are available exclusively through Authorized Nikko Audio dealers.

Enter No. 19 on Reader Service Card

But, when you create sound effects like Frank, your problem is time. Research time: Thumb through the files, pull a disc, load it up to listen, over and over again. So Frank converted his massive sound effects library to compact discs, storing it all in our NCD-600.

Now, Frank just touches-in index numbers, listening to one selection while loading up others. We made his life a lot simpler, allowing him to focus energies on the one thing he likes best: Creating.

Imagine what Nikko technology will do for your audio system.



Frank Serafine—Motion Picture Sound Designer/Musician  
Credits: *Tron*, *Star Trek I and III*, *Brainstorm*, *Ice Pirates*

The harmonic distortion produced by this unit was truly negligible, and its output at 20 kHz was totally clean.

-0.3 dB for the left channel and -0.4 dB for the right channel. As usual, in order to plot frequency response deviations in greater detail, the vertical scale in Fig. 1 is only 2 dB per division.

The harmonic distortion produced by this well-designed unit was truly negligible. Unlike almost every other CD player I have tested in the past two years, this one did not produce any significant "beats" at out-of-band frequencies. As a result, it was not necessary to introduce a band-pass filter when making the measurements. The values plotted in Fig. 2 are the actual values read by my distortion analyzer in its wide-band mode, and the three curves are valid all the way up to 20 kHz. Cutoff of the analyzer, when used in the wide-band mode, is at 80 kHz, so if there were any out-of-band components of significance, they would have contributed to and increased the readings. Under these test conditions, THD at 1 kHz was an incredibly low 0.0015%, well below Pioneer's claimed 0.0022% for THD + noise.

Figure 3 confirms the fact that no out-of-band beats were present when the PD-9010X reproduced high frequencies. The tall spike in this spectrum analysis represents a 20-kHz test signal; as you can see, there are no other components visible. The only other CD player I ever tested that exhibited such totally clean output at 20 kHz was Sony's top-of-the-line CDP-650ESD, which has a suggested price more than twice that of the Pioneer PD-9010X.

Unweighted signal-to-noise ratio measured 98.1 dB; the A-weighted measurement was a very high 102 dB, 4.0 dB higher than claimed by Pioneer (see Figs. 4A and 4B). SMPTE IM measured 0.003% at maximum recorded level, increasing to 0.025% at -20 dB recorded level. CCIF IM (twin-tone, using 19- and 20-kHz tones at the equivalent of highest recorded level) was an extremely low 0.0037% at maximum recorded level and an even lower 0.0028% at -10 dB recorded level.

Stereo separation, plotted in Fig. 5 as a function of frequency, ranged from 73.0 dB at the high-frequency extreme to 90.0 dB at mid-frequencies.

Reproduction of a 1-kHz square wave is shown in Fig. 6. The reproduced wave shape is typical of that produced by CD players which employ oversampling and digital filtering. The unit pulse in Fig. 7, as reproduced from a Philips test disc, is also consistent with what I have obtained with other players that employ this type of filtering and oversampling. The apparent inversion of the waveform is not our photo editor's mistake. Evidently, phase inversion occurs somewhere in this player's signal chain, as it has in a few other units I have tested. So long as this inversion is the same in both left and right channels, there is no problem.

In checking for phase error, I detected no difference in the positioning of a pair of low- and mid-frequency test tones (200 Hz and 2 kHz) on opposite channels compared with the positioning of a pair of mid- and high-frequency signals (2 and 20 kHz). I concluded, therefore, that in addition to its many other sonic virtues, the Pioneer PD-9010X is virtually free of any phase or time-delay errors commonly associated with analog output filters.

As I expected, the Philips defects disc was unable to trip up the excellent tracking and error-correction capabilities of this CD player. As has been true of nearly all of the third-

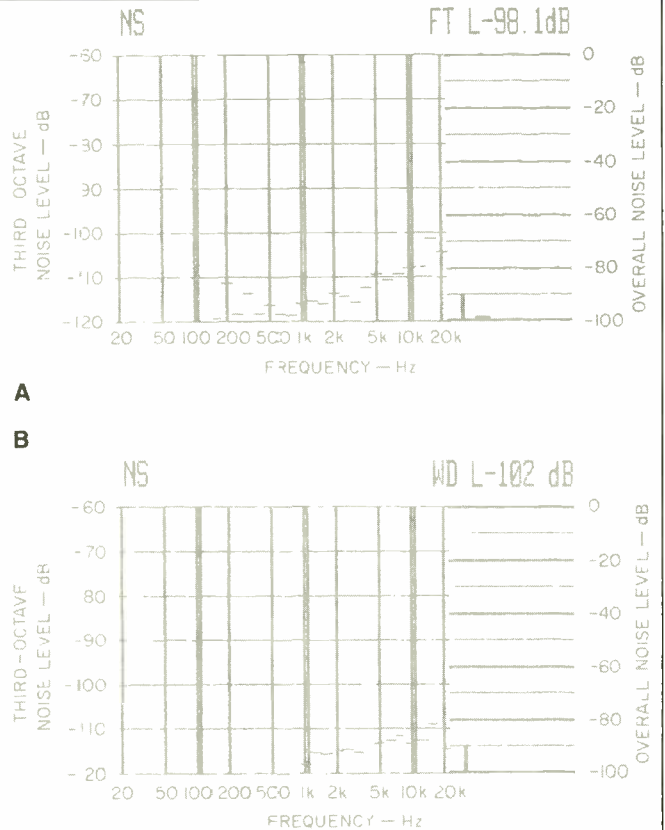


Fig. 4—S/N analysis, unweighted (A) and A-weighted (B).

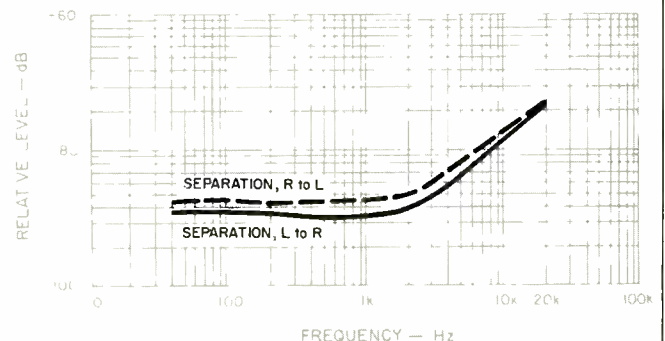


Fig. 5—Separation vs. frequency.

I can't think of any programming or display features that have not been included on this superb-sounding player.

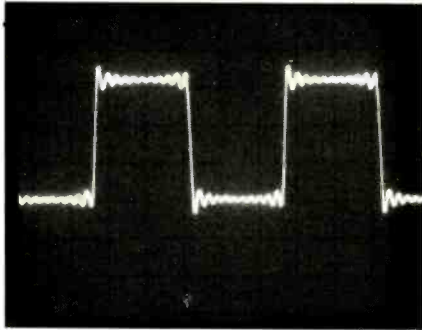


Fig. 6—  
Reproduction of  
a 1-kHz square  
wave.

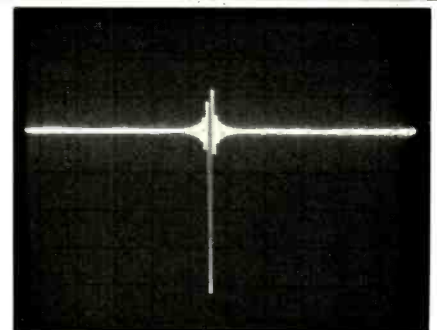


Fig. 7—  
Unit-pulse test.

generation units I have been evaluating lately, this one had no trouble playing right through the simulated scratch (up to 900 microns in width), the simulated dust circles (up to 800 microns in diameter) and the simulated fingerprint smudge which extends over two complete musical tracks of the test disc. Resistance to mild vibration and external shock was especially good. The PD-9010X continued to play with no audible interruptions, skipping, or disc rejection while I repeatedly subjected it to less-than-gentle tapping along its top and sides. The folks at Pioneer have advised me that part of this stability comes from the player's unique internal suspension system. Pioneer has apparently gone to great pains to make certain that the PD-9010X will play through discs under a variety of difficult conditions.

Another example of the care Pioneer has taken is the special disc-retaining surface which engages CDs when the machine is in the play mode. Most disc-retaining surfaces simply grab the disc near its center hole. In the PD-9010X, nearly three-quarters of the surface of a disc is supported while being played. You can imagine how much this will help when trying to track moderately warped CDs!

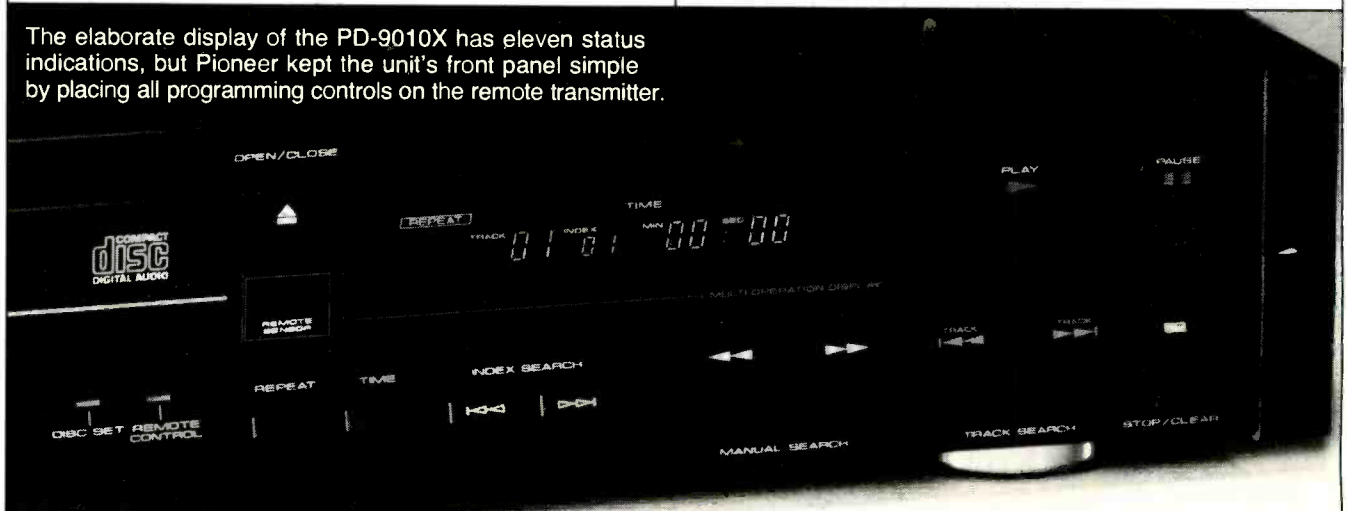
#### Use and Listening Tests

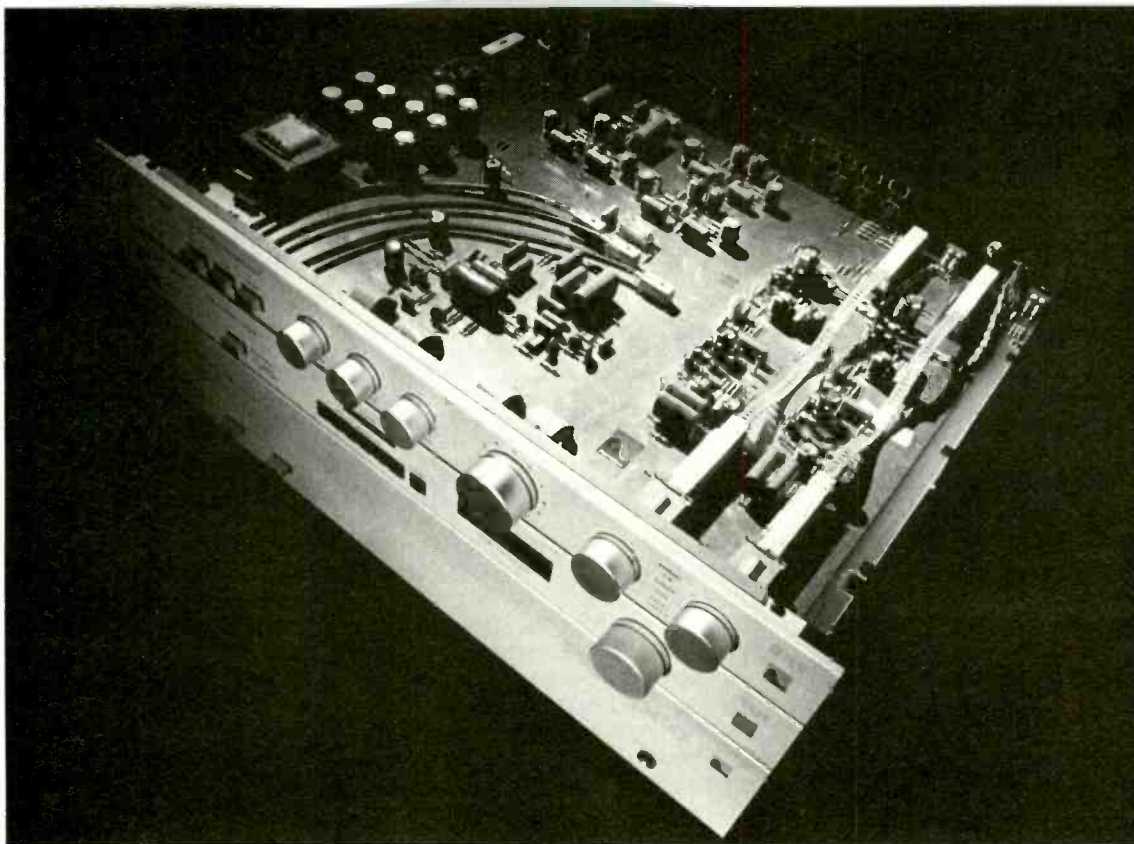
My initial reaction to the PD-9010X was to object to the fact that I could not program the player at its front panel but had to use the remote control. I felt this way even though I

realized that Pioneer achieved two worthwhile objectives with this approach: Lower cost (since they didn't have to duplicate the number keypad and its associated circuitry on the panel) and a less cluttered appearance. After using the player for a few days, my initial objections simply disappeared. More often than not, I found myself loading a disc and then, with the remote in hand, sitting down across the room to program what I wanted to hear—with the disc's "jewel box" package and album booklet alongside my chair. I realized, too, that if I desired to program the machine at its front panel, there would be nothing to stop me from simply keeping the full-function remote control alongside or on top of the player.

Such minor considerations aside, let me get to the important things. In a word, the Pioneer PD-9010X is one of the most value-laden CD players it has been my pleasure to evaluate so far. I can't think of any programming or display features which have been omitted that a user might require. All of those convenience features wouldn't be worth much, however, if the player lacked good sound-reproduction capability. Not only is this player a superb-sounding instrument, but Pioneer has somehow managed to put all of these desirable qualities together in a unit that sells for a price that more music lovers than ever will be able to afford. I'll bet the competition is tearing apart several PD-9010Xs right now trying to find out how Pioneer did it! *Leonard Feldman*

The elaborate display of the PD-9010X has eleven status indications, but Pioneer kept the unit's front panel simple by placing all programming controls on the remote transmitter.





## PERREAUX'S NEW SERIES 1

Alan Shebroe of GNP Showcase interviews Anthony Federici of Perreaux Int.

ALAN: When I heard the new Perreaux Series 1, I was extremely skeptical that a product at this price would live up to Perreaux's reputation of quality and performance.

ANTHONY: I think many people would be. The same way that people questioned whether the Mercedes 190 was a real Mercedes. The answer is yes. It's made in the same facility, by the same craftsmen who create the Series 2 and 3. The knobs are machined from solid aluminum, the front panels still have hand cut beveled edges and the metal is bead blasted, etched and anodized for that unique smoothness of finish.

---

**The Series 1 Perreaux makes us happy because it represents a superb value.**

---

As for performance, all transistors are tested, calibrated and matched. Perreaux's Series 1 amplifier uses the same circuitry from input to output as the Series 2. The pre amplifier is completely discreet in the phono and line stages with highgrade poly-type capacitors used throughout. The tuner has an FET front end and audio section.

ALAN: Well, now that I've listened I'm convinced that the performance is outstanding, especially at the price. What I would like to know is how was Perreaux able to create handcrafted, high performance components at the cost of mass produced products. To put it bluntly, there must have been compromises. What were they?

ANTHONY: Due to the very high quality and laborious nature of the metal work we can

For Perreaux dealer nearest you  
call 1-800-TECPORT

---

**Quality must take into account performance, craftsmanship and reliability.**

---

lower the component cost by reducing the amount of metalwork. The Perreaux Series 2 and 3 is 19" wide versus Series 1's 17" panels. The amplifier is 100 watts per channel with internal heat sinks. The complex Perreaux heat sinks used for the Series 2 and 3, with over 60-ribs per inch, are not inexpensive. The SX-1 pre amps circuit board is plated with copper rather than gold, although all connectors are still 24 karat. The Series 1's cabinet construction is extremely rigid, but of more conventional design. These factors, when combined, help us to be price competitive with mass produced product.

ALAN: That's an interesting answer because every good businessman must ask himself how do I reduce costs, without effecting quality? In a retail store the definition of quality means customer service and product value. It's our responsibility to find the best values, properly present them to our



Alan Shebroe

**GNP**  
Showcase

customers while providing them after sale assistance.

I like to think GNP does it better than anyone else, that's why we've been successful for so long. The formula sounds simple, but it's difficult. The Series 1 Perreaux makes us happy because it represents a superb value. The Perreaux products more than fit into the formula. It's not another mass produced product that they put some lights and meters on so they can call it the top of the line and charge more money. And you help me with the after sale assistance by giving our customer a 5-year parts and labor service contract free of charge.

---

**Perreaux's new product represents new technology.**

---

ANTHONY: We both rely on the customer to be mature enough to understand quality and value. Quality must take into account performance, craftsmanship and reliability. The customer can hear the performance and see the craftsmanship. Perreaux accepts the burden of reliability with the longest parts and labor service contract in the industry. Those who prefer flash over substance will need to look elsewhere.

ALAN: It's certainly nice to see a manufacturer come out with new product when there's a reason other than marketing says it's time. Perreaux's new product represents new technology. As a lover of music I thank you folks. Nice talking to you.

1244 East Colorado, Pasadena CA 91106  
818-577-7767

# RECOG

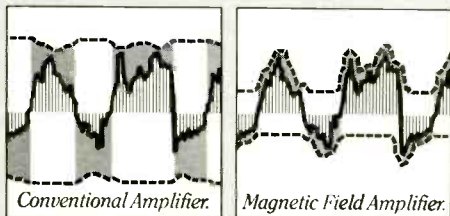
## Why the Carver M-500t Magnetic Field Power Amplifier has helped begin an industry trend and how it has stayed ahead of its inspired imitators.



Twice in the last decade, Bob Carver has taught the high fidelity industry how to make amplifiers that give you better performance and value. Both times his bold lead has attracted followers. Still, as evidenced by the current release of the M-500t, Carver sets standards yet unequalled in the audio community.

With its astonishingly high voltage/high output current and exclusive operation features, it is a prime example of why Carver remains the designer to emulate:

- Continuous FTC sine-wave output conservatively rated at 250 watts per channel.
- Produces 600 to 1000 watts per channel of dynamic power for music (depending on impedance).
- Bridging mode delivers 700 watts continuous sine-wave output at 8 ohms.
- High current Magnetic Field power supply provides peak currents up to  $\pm 100$  amps for precise control of voice-coil motion.
- Designed to handle unintended 1 ohm speaker loads without shutting down.
- Equipped with infinite resolution VU meters.



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

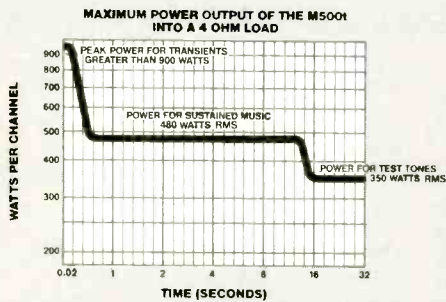
### POWER EXPRESSED BY THE DEMANDS OF MUSIC.

The Carver M-500t Power Amplifier responds to musical transients with better than 600 watts per channel of instantaneous peak power through 8 ohm speakers. Well over 900 watts per channel into 4 ohm speakers.

And yet its Federal Trade Commission Continuous Average Power Rating is 250 watts per channel into 8 ohms.

The gulf between the two power ratings represents Bob Carver's insistence that amplifier design should fit the problem at hand. That problem is reproducing music with stunning impact, not simply satisfying a sine-wave test which doesn't even include speakers or sound sources. Hence the seeming gulf between the two ratings.

Bob reasoned that since music is composed of three basic types of power waveforms, those types of waveforms are what an amplifier should be designed to satisfy.



The Carver M-500t delivers massive power at three important output levels.

First there are instantaneous peak transients—the sudden smash of cymbals, drums, or the individual leading edge attack of each musical note. While these waveforms last less than 1/100 of a second, they form the keen edge of musical reality which must be present if you are to realize high fidelity. Though momentary, they also demand a tremendous amount of amplifier power.

Directly following instantaneous transients are combinant musical crests of demand that come from multiple instruments and their harmonics. These long term power demands may last up to several seconds but usually come and go in less than a second. And yet they can tax anything but an exceptionally powerful amplifier.

The third type of power demand is represented by the average power contained in the music, and is approximately one third to one half of the FTC continuous power rating.

At extremely high output current levels, the Carver M-500t not only delivers over 700 watts of instantaneous peak power for instantaneous transients, but can deliver over 600 watts

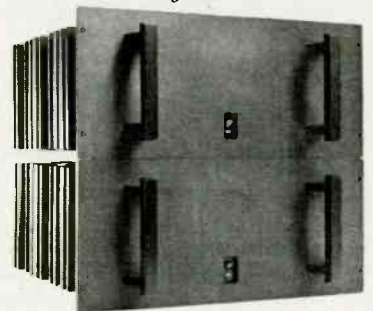
RMS of long term power for demands lasting up to several seconds. The M-500t provides more power, more current and more voltage than any comparably priced amplifier ever offered.

### THE MAGNETIC FIELD AMPLIFIER VS. CONVENTION.

Audiophiles, critics and ultimately other manufacturers have each accepted the wisdom of Bob Carver's fresh approach to delivering power in musical terms. Yet only Carver has so elegantly translated theory into practice.

Rather than increase cost, size and heat output with huge storage circuits, Magnetic Field Amplification delivers instantaneous high peak and longterm power from a small but powerful Magnetic Field Coil. The result is an amplifier capable of simultaneous high current and high voltage that can do sonic justice to the dynamics of Compact Discs and audiophile records in a compact, cool-running design. An amplifier costing considerably less than the ultra-esoteric models which figured significantly into the genesis of its circuitry. For a reprint of the full story of its development as well as a catalog of Carver high fidelity audio components please call or write to us.

Figure 1



This \$7,000 pair of esoteric amplifiers figure significantly into the heritage of the M-500t version circuitry.

Figure 1 above shows a \$7,000 pair of ultra-esoteric mono amplifiers. No expense was spared on their admittedly magnificent but still conventional design and construction.

Figure 2 shows the massive toroid output transformers contained in these prestigious audiophile designs. At 10% regulation, their output current is  $\pm 50$  amperes.

All conventional amplifiers are condemned to using this type of design.

# ATION.

Figure 2 also shows the patented Magnetic Field Coil employed in the Carver M-500t. Its output current is  $\pm 100$  amps at 10% regulation!!!!

Figure 2



Over 40 pounds of toroid coils put out half the current of a single six pound, four ounce Magnetic Field Coil.

## DISTINGUISHING FEATURES OF THE CARVER M-500t.

Power is mandatory for dynamic impact and musical realism. And yet power requires control and finesse. While the Carver M-500t isn't the only amplifier to deliver adequate output, it is one of the few that tempers force with protection circuits beneficial to both the amplifier and your loudspeaker system.

◆ These include DC offset, short circuit power interrupt as well as two special computer-controlled speaker monitor circuits which protect against excessive high frequency tweeter input and an overall thermal overload.

◆ The Carver M-500t continuously displays power output through dual, lighted infinite resolution VU-ballistic meters. Meters which can react to musical transients as brief as 1 millisecond.

◆ The M-500t is quiet. Inside and out. Its circuitry has the best signal-to-noise ratio of any production amplifier. Better than  $-120$ dB. And, in spite of its massive output capability, the M-500t does not require a noisy fan to dissipate heat. Thanks to the cool running Magnetic Field Amplifier circuitry.

◆ No other amplifier in the M-500t's price or power ranges is capable of handling problematic speaker loads as low as 1 ohm. Whether required by certain brands of speakers, or inadvertently derived by pairing too many low impedance speakers at one set of output terminals, all conventional amplifiers simply shut down or blow their fuses when faced with this condition.

◆ In stereo use, both channels of the M-500t can actually borrow from each other during unequal output demands. In addition, Carver amplifiers have pioneered phase inversion circuitry which takes advantage of the in-phase (mono) characteristics of bass to essentially double available power supply current at low frequencies.

◆ Finally, the Carver M-500t can be used in a bridged mode as a 700 watt RMS per channel mono amplifier without any switching or modification.

## MUSIC IS THE FINAL PROOF.

Were you to buy a power amplifier solely on features and performance specifications, painstaking comparison would inevitably lead you to the Carver M-500t.

But we are sure that your final judgment will be based on musicality. It is here that the M-500t again distinguishes itself.

Bob Carver has carefully designed the M-500t to have a completely neutral signal path that is utterly transparent in sonic character. The result is more than just musical accuracy. It means a total lack of listener fatigue caused by subtle colorations sometimes exhibited by conventional amplifier designs, regardless of their power rating.

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**SPECIFICATIONS:** Power, 251 watts per channel into 8 ohms 20Hz to 20kHz, both channels driven with no more than 0.15% THD. Instantaneous Peak Power, 1000 watts into 2 ohms, 950 watts into 4 ohms, 600 watts into 8 ohms. Longterm RMS Power for Music, 500 into 2 ohms, 450 into 4 ohms, 300 into 8 ohms, 1000 watts bridged mono into 4 ohms, 900 watts bridged mono into 8 ohms. Bridged Mono RMS Continuous Power, 700 watts continuous into 8 ohms. Noise  $-120$ dB IHF Weighted. Frequency Response,  $\pm 0-3$ dB 1Hz-100kHz. Slew Factor, 200. Weight, 25 lb. Finish, light brushed anthracite, baked enamel, black anodized.



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**ADCOM XC-MR II**  
**GRADO SIGNATURE 8MR**  
**TALISMAN ALCHEMIST IIIS**  
**GARROTT DECCA**  
**DECCA SUPER GOLD**

### Company Addresses

Adcom, 11 Elkins Rd., East Brunswick, N.J. 08816.

For literature, circle No. 100

Grado Labs, 4614 Seventh Ave., Brooklyn, N.Y. 11220.

For literature, circle No. 101

Talisman, c/o Sumiko, P.O. Box 5046, Berkeley, Cal. 94705.

For literature, circle No. 102

Garrott Decca, c/o Analogue Imports, P.O. Box 780151, Dallas, Tex. 75378.

For literature, circle No. 103

Decca Super Gold, c/o Rocelco, 24 Viceroy Rd., Unit 1, Concord, Ont., Canada L4K 2L9.

For literature, circle No. 104



Any choice of phono cartridge is very much a matter of personal taste. A cartridge can measure almost perfectly and never acquire any real popularity among audiophiles. Conversely, a cartridge can have only mediocre tracking, or a sharp rise in the upper octave, and still be a cult item for years. You can get a very good cartridge—such as the Grado GTE + 1—for less than \$20, or you can get an excellent cartridge for \$3,500 and find it suits your taste enough to be worth the cost. You can also pay well over \$1,000 and get nothing more than a reviewer's "pet of the month," with a sound character that does not match your taste or system.

Well, here are several of my "pets of the month." I have to fall back on my taste as the reason for selecting them out of the hundred or so good cartridges on the market—which means you should listen to them before buying on my say-so. I did, however, make my selections after listening to about 30 cartridges, as part of a broad survey of moderate to high-output models.

I also picked these cartridges with a deliberate criterion in mind for each. First, I wanted a cartridge that would approach the sound of a master tape. Second, I wanted one that was an affordable "best buy" yet still clearly qualified as a high-end product. Third, I wanted a high-output moving-coil cartridge that would have all the merits of the best low-output moving-coil models. Finally, I wanted a cartridge so exotic that any reader of *Audio* could partake of the esoteric heights of the high end.

### Adcom XC-MR II

Let me begin with my candidate for a cartridge with master-tape sound. This is the XC-MR II, retailing for \$325, one of a series of new Adcom cartridges. I've had the opportunity to listen to all of the new Adcoms and to try them out on a wide range of test records. All have extremely smooth, flat frequency response and exceptional separation. This level of separation, incidentally, requires careful attention to speaker placement. If you don't posi-

tion your speakers to get a smooth spread of imaging from left to right, a cartridge with outstanding upper-octave separation will tend to produce a "hole in the middle" or "dual mono" effect, particularly in the higher frequencies where other cartridges tend to blend the image.

The XC-MR II is not romantic and does not sound like a conventional moving coil. There is no rising high end to emphasize the imaging or high-frequency detail. There is no special exaggeration or romance to the mid-range or bass, and no feeling that the music is especially dynamic. There is no tendency to move the image forward or put the performance in your lap, nor any extension of sound to the right or left of the speakers, nor any illusion of holographic depth—all of which you can get with some of the more romantic moving coils. The sound really is very much like a clean 15-ips tape. In fact, some brief comparisons involving my small stock of records for which I also own dubs of the master tapes indicated that the Ad-



com XC-MR II does an excellent job of reproducing what was recorded on the original tape.

The XC-MR II also proved relatively tonearm and electronics tolerant. It is a very good to excellent tracker and will work with any medium-mass tonearm I know of. The MicroRidge stylus on the XC-MR II also seemed better able to recover musically natural detail than the Adcoms with the van den Hul stylus, and I preferred the natural warmth of the midrange on this metal-cantilever cartridge to the added detail and illusion of speed on its more expensive, jewelled-cantilever version.

The lack of a high-end rise also makes the XC-MR II compatible with most mid-fi electronics, while its high output eliminates the need to use the often grainy and hard high-gain stages of such components. At the same time, the Adcom provides sufficient sound quality to take advantage of top-quality gear like the Audio Research SP10 preamp. The smooth, natural response also makes the Adcom a good match for speakers with a fast upper-octave response and lots of detail, such as those from SPICA, Thiel and Quad, whose sound can become wearing when used with cartridges having upper-octave peaks.

The Argent MC-500HR Ruby and AudioQuest T-7 (this last is now discontinued) are good competition for the XC-MR II, and well worth auditioning. However, I still would give the Adcom the edge in this particular sound category. The competition is either a little leaner (albeit with more impression of life) or less extended and detailed. The Adcom XC-MR II provides an outstanding example of neutral sound characteristics. It takes extended listening to realize how good a job it does, but I keep coming back to it when I want to hear exactly what is on a record.

### **Grado Signature 8MR**

My selection of a "best-buy" cartridge that will give you the smoothness of the best moving magnet with the detail and excitement of the best moving coil is the Grado Signature 8MR, a moving-iron model. I have had a long and friendly debate with Joe Grado over the amount of upper-octave information on his Signature se-

ries. He has always explained to me exactly why his most recent design was right, and later has gone off and improved it.

Well, the Signature 8MR still has a sound balance that is more mid-hall than front row, but it competes directly with the most expensive moving coils in terms of overall sound quality. The treble, slightly soft by the standards of most competing moving coils, extends fully into the upper octaves and has excellent resolving power without a trace of grain or hardness. The midrange has always been the strong point of the Grado line, and on the Signature 8MR it has all the traditional sweetness of the best Grados—along with much more air, harmonic detail, and ability to resolve the finer details of imaging. The bass goes very deep, but it is better controlled than on any previous Grado. The bass is also more natural than any moving-magnet cartridge I have yet heard.

Whether the Grado is accurate or romanticizes the sound is an issue that I could debate endlessly, but the Signature 8MR does have a very special character. It extracts detailed information in a musically natural way, from the lowest level passages to the most dynamic. Unlike moving coils, which tend to provide more low-level detail in the upper octaves than in the midrange, the Grado provides full detail throughout the midrange, with no trace of upper-midrange hardness or resonance. This makes the Grado exceptionally compatible with virtually any electronics and speaker.

The Grado is, however, somewhat less tonearm tolerant. It does best with a low to medium-mass arm (the new Grado arm is ideal), and with a nonresonant headshell and the special mounting bracket supplied. Unlike previous Grado cartridges, the Signature 8MR will not provide its very best sound unless careful attention is paid to azimuth and to what is variously called stylus rake or vertical tracking angle (SRA/VTA). The cartridge also does not work well if the turntable is subject to floor movement or vibration—but this is true of virtually every cartridge.

As is the case with all cartridges, you should listen to the Grado Signature 8MR to see if its sound is the

sound you prefer. You should also pay special attention to the upper octaves and the apparent sound staging, which provide a perspective which is musically natural yet different from that of any other cartridge I can think of. To my ears, however, the Signature 8MR is probably the best buy in high-end audio. I admit that a \$200 list price is not cheap, but it is affordable. Further, while any more expensive cartridge will provide a sound *different* from that of the Signature 8MR, it will not be a definitively *better* one. This is true, incidentally, even of the \$400 Signature 10MR, which offers significantly more detail, sweetness and imaging, but is essentially a purist's 8MR. Tell your accountant that you didn't really spend \$200 or \$400, you just saved several thousand dollars that you could have spent on the most expensive cartridge.

### **Talisman Alchemist IIIS**

Opinion differs as to just how much you still have to pay for the kind of gain needed for a moving-coil cartridge. The Conrad-Johnson and Zeligman tube head amps and Audio Research SP10 preamp allow you to get awfully close to a neutral step-up device with tubes. The Krell, Klyne, and Spectral preamps and Klyne head amp allow you to do the same thing with transistors. None of these items are cheap, however, and most of the world can benefit from higher gain in the cartridge as a substitute for a high-gain device or stage that hardens and slightly veils or colors the sound.

For a mere \$425, the Talisman Alchemist IIIS is a high-output, moving-coil cartridge that comes very close to having all the merits of the best low-output moving coils. It has the live, forward sound of the best moving coils, plus a great deal of dynamic impact and life, and a large and exciting sound stage. It also has good, stable imaging, although less natural and stable than the Grado or Adcom.

The Talisman also exhibits the apparent speed or attack of the better moving coils, from the bass to the upper octaves. It is perhaps not as confident a tracker in the top octaves as the very best low-output moving coils such as the Audio Note I-O Type II or Argent Diamond. Such competition, however, is close to three times as costly. The

## The Alchemist IIIS has the live, forward sound of the best moving coils, a lot of impact, and an exciting sound stage.

sonic value of this apparent speed or attack, incidentally, is likely to determine how much you like the cartridge. It is what makes the Alchemist outstanding in comparison with otherwise good, high-output competitors like the van den Hul Type III (which I reviewed for the July 1984 issue). You should audition it on recordings of top-grade solo guitar, percussion, and small string groups to hear the effect.

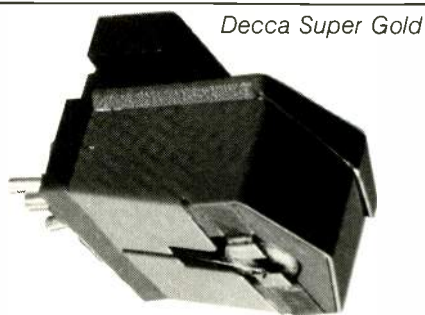
Bass is very good, although not outstanding. The midrange is flat and lacks the warmth of most Koetsus or Kisekis; it does, however, avoid the slight leanness typical of the Argents and most AudioQuests. All cartridges differ in timbre in the midrange regardless of how they measure, so this is a choice you will have to make by ear.

You also should listen to the treble. The Talisman has a rising high end that goes up from about 7 kHz and hits 4 dB before vanishing into the distance. This rise will be smooth and sweet if you mount the cartridge firmly to the headshell with the Allen-head screws provided with the cartridge, and if you pay attention to SRA/VRTA so that the arm slopes down about 3° to 5° towards the tonearm pivot. The treble does, however, bring the sound forward; the Alchemist is very much a front-of-the-house cartridge in terms of concert-hall position. This means you need electronics that are smooth and of high quality, as well as speakers whose tweeters do not have hot spots and which do not unusually overemphasize the upper octaves at the expense of overall balance. Martin Collops, of the British magazine *Hi-Fi News & Record Review*, recommends loading the Alchemist down with a 0.15- to 0.22- $\mu$ F capacitor to tame the high end. I did not find this necessary and felt it made the top octaves a bit slow. I suggest you listen to your particular sample before you buy.

### Garrott Decca and Decca Super Gold

Now let me close with my selection for audio exotica. The Decca cartridge has long been a favorite of cultists, although it scarcely has established a reputation for reliability or ease of operation. While various Deccas have come and gone, all have had a very fragile cartridge body and could be

rendered useless by a slight backwards pressure on the stylus. The quality control of past Deccas has generally been poor and their tracking mediocre, and they have only really worked well with tonearms with special mounting brackets and damped pivots. At the same time, past Deccas have provided extraordinary dynamics, a great deal of apparent detail, strong and powerful bass, and an exceptionally live upper end.



Decca Super Gold

Well, you now have two greatly improved versions to choose from and a number of ways to buy them. With luck and care, you can outpoint your friends on sheer exotica, get excellent sound, and stay halfway solvent.

Your two options are to buy a Decca Super Gold, which sells for \$450 in the U.S., or a Garrott Decca, which sells for about \$300 in the U.K. and a brutal \$950 in the U.S. Both have roughly the same merits. The tracking performance has improved to good—even at 2 grams—although tonearm compatibility is still uncertain. My trials of five different samples (two of the Garrott and three of the Super Gold) indicate that quality control is also much improved, although none measured exactly the same on separation or frequency response, and the Garrotts both had less separation than any of the three Super Golds.

As for the sound, it has improved to the point where the two versions of the Decca can sound as exciting as any cartridge I have ever heard. The Decca Super Gold and Garrott Decca may or may not be accurate, but they bring incredible life to music. They make records sound exciting and dynamic to an extent no other cartridge can touch.

I cannot easily describe the difference, but the Deccas have a magic in terms of musical vibrancy, throughout

their entire frequency range and regardless of the loudness of the passage, that may make you forget all technical issues and just listen to the music. Strings, for example, have all the life of the best moving coils without the occasional touches of hardness. Percussion seems fast to the point of being slightly more exciting than in live performance. Musical changes and complex passages seem to be clear in places where they would blur together with many other cartridges.

As for the differences between the Super Gold and the Garrott, the Super Gold provides a slightly stronger and more detailed set of upper octaves. It is slightly more forward than the Garrott and can sound a bit harder depending on setup. The Garrott can be exceptionally smooth and unflagging. These differences will be most apparent on speakers with ribbon or electrostatic drivers, however, and may not be apparent to many listeners using cone speakers with a slightly rolled off high end. I would vote for the Decca Super Gold if you feel your audio system needs more upper-octave information, and for the Garrott Decca if you want smoothness.

I'd also recommend you consider the Super Gold versus the Decca Garrott on a dollar basis. The Super Gold is imported into North America for \$450 (and is available from Rocelco). This isn't cheap, but it's fairly reasonable given today's cartridge prices and markups. It certainly is no inspiration to buy the Super Gold from Britain to save the difference.

The Garrott is a totally different story. When I first got involved with these two new versions of the Decca, I was not aware there was a U.S. importer. I bought my Garrott in England for £347 (about \$410 at the time) from The Parabolic Stylus Company (P.O. Box 38, Torquay, TQ1 1BW, England; the direct-dial phone number from the U.S. is 011-44-803-26791). This price included a special, heavy metal bracket sold only by the British distributor that allowed the cartridge to mount securely and perform well in arms like the Zeta and Alphason. Parabolic Stylus sold the Garrott with a guarantee of a full refund if I did not fall in love with the sound. The whole transaction took about two weeks.

The Decca Super Gold and Garrott may or may not be accurate, but they bring incredible life to music.

I have since learned that a U.S. importer sells the Decca Garrott through selected dealers for \$950, without the mounting bracket or the guarantee. I find this more than a bit difficult to take. I think even \$450 is a bit pricey for any version of the Decca, given its exceptional setup requirements and vulnerability, and given the fact that the regular Decca Golds and Maroons now discount in the U.K. for well under \$100. Granted, Garrott individually rebuilds Decca cartridges by hand in Australia, and tips them with a special micro-scanner stylus (a four-facet parabolic stylus). But even \$300 seems a pretty stiff markup for this kind of work.

Regardless of what you pay, the new Deccas will still require a complex setup ritual. First, you'll need a medium to high-mass tonearm with a flat headshell or cartridge-mounting surface. The Premier MMT (Improved) with damping works well, as does the new Grado. Other arms may need a bit of added mass at the headshell.

You will have to work with an absurd plastic mounting jig with only three output prongs, because the Decca was originally designed for a special arm that is no longer being made. This means wiring both tonearm or headshell grounds together. If you do not buy the mounting bracket from Parabolic Stylus, you will probably need to put a thin layer of plastic clay under the cartridge and glue it into another plastic mounting device that holds it in the headshell. (If you don't, it can easily fall out—and goodbye, cartridge.) If you do buy the bracket, you will need to be very careful not to tighten it too much, because the Decca's thin plastic body can shift.

All of the Decca cartridges, apparently, invert absolute phase. Because of their three-wire output, you cannot correct for this by reversing the normal polarity of the leads in the headshell. Therefore, unless your system includes a phase-inverting switch, you must reverse the normal polarity of each speaker's leads if you wish to maintain correct phasing. This will, however, throw every other input to your system out of phase, and the sonic benefits are a bit uncertain with most material. You will need to spend considerable time adjusting SRA/VTA until the sound "locks in" just right. In the Decca's

case, this is normally with the arm sloping slightly down from the pivot.

You will have to track at 2 grams with the Super Gold; with the Garrott Decca, you should track at precisely the weight recommended for your sample, since each is specially adjusted for its optimal compliance. Further, you may have to load down to 12 to 25 kilohms. (Analogue Imports supplies 15-kilohm metal resistors for this.) I did not think this was particularly necessary, and found the bass to be less satisfactory when I tried it, but virtually everyone else recommends doing so.

Most important of all, you must then follow an extremely careful purification ritual. Never use a conventional electric or hard-brush stylus cleaner. You must use a soft brush like the one in the Signet, Audio-Technica and LAST record cleaners, or use STYLAST. You must always be careful to brush back to front, and to keep the cartridge far away from dirt and iron filings. If you violate these rules, the stylus will lose its compliance and treat your records with all the style and grace of the average chisel.

After all of these rituals, neither the Decca Super Gold nor the Decca Garrott will be uncolored. There is a slight rise in the bass, and the highs rise by about 4 dB from 4 to 20 kHz. Channel balance is so-so. The Garrotts had only moderate separation right out of the box, regardless of whether I used the British importer's clamp or not. I also cannot promise you an easy life with the new Deccas, or that they will give you the world's absolute best high output for all these exotic rituals. The other cartridges I've singled out all compete directly with the improved Deccas and have their own particular sound characters. And yet, the new Deccas can be especially musical and exciting.

To sum up, I'm in no better position to select one of these cartridges for you than I would be to pick "the best" wine, sports car, or mate (or whatever else may suit your fancy). The point of this review is that you can scale the cartridge heights of the high end in different ways to match your personal taste. You can even do this at a half-way reasonable price, particularly if you do not already own a top-ranking pre-preamplifier. The rest is up to you.

*Anthony H. Cordesman*

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# HEAVENLY SEVENTH



**Mahler: Symphony No. 7.** The Chicago Symphony Orchestra, Claudio Abbado.

**Deutsche Grammophon 413 773-2,** two-disc set.

The music of Gustav Mahler seems to have a certain magnetism which attracts conductors and recording engineers alike. In a way, for the symphony conductor who finally challenges Mahler and gives a successful performance, it is a rite of passage or a coming of age. So it is with recording engineers. There is the fascination of the incredible scoring, the need for clarity in the internal balances, and above all the desire to preserve the tremendous range of dynamic expression which distinguishes the music of this composer.

As a long-time aficionado of Mahler, I am proud to have made the very first stereo recording of a Mahler symphony, in 1958—the First Symphony, conducted by Sir Adrian Boult, with the London Philharmonic Orchestra. Subsequently, I recorded his Fifth Symphony with Rudolph Schwarz conducting the London Symphony Orchestra,

and his Ninth Symphony conducted by Leopold Ludwig, also with the London Symphony Orchestra.

The advent of digital recording and the ascendancy of the Compact Disc have been a considerable boon to the recording of Mahler's music. Now, the most hushed pianissimos and heaven-storming fortissimos can be accommodated with equal facility. Thus Mahler has been particularly well served on Compact Disc, and this DG recording of his Seventh Symphony is a stunning achievement.

Claudio Abbado has become a premier interpreter of Mahler, and his performance here with the great Chicago Symphony Orchestra is altogether remarkable. Throughout the more than 78 minutes of this monumental symphony, Abbado displays masterful control of tempi, phrasing and dynamics. His inner balances are models of clarity. This is best exemplified in the first "Nachtmusik" (night music) passage, beginning on track 9 of the first disc. This is a great Mahler conductor at his best. He completely delineates every element in the complex scoring, while at the same time maintaining co-

hesive and well-balanced ensemble playing. The performance of the Chicago Symphony in this section is near-miraculous for its precision, ardor, panache, and sheer musicianship. Throughout the work, the playing is on the same high level of execution.

The DG engineers have provided a superbly well-balanced sound, with the typical attention to detail that characterizes their recording philosophy. As is their custom, high strings are sharply etched and a bit on the bright side, but they are not strident. There are some wonderfully articulate sounds in the first "Nachtmusik" section. Throughout, brass and percussion are very clean and well projected, especially so in the tumultuous finale.

If you are a Mahler devotee, you'll want to own this CD. This is magnificent music and a performance of Olympian grandeur. *Bert Whyte*

**Manitas de Plata and Friends. Manitas de Plata in Concert. Manitas de Plata in Arles. Juerga!**

**Connoisseur Society CDs 4091, 4093, 4099, and 4126.** (Available from In Sync Labs, 2211 Broadway, New York, N.Y. 10024).

Flamenco music evolved among the Gypsies as they travelled, assimilating styles from all the cultures with which they came into contact. Like American jazz, flamenco is highly emotional and improvisational.

The exoticisms become apparent as soon as you push your play button and begin to listen to any of these four CDs. Unfamiliar scales with unusual intervals and tunings, combined with strangely out-of-tune sounds, announce immediately that this is not "just" Spanish guitar music. The out-of-tune sounds turn out to be expressive microtonal embellishments similar to what we hear in Indian music. Melodic contours often suggest the North African influence the Moors brought to Spain.

Although these recordings were made over 20 years ago, they sound wonderful in their new CD versions. The recording team of E. Alan Silver and David B. Jones chose their equipment and techniques carefully, and they refrained from post-session sweetening such as compression and



Manitas de Plata

equalization. In those days before noise reduction, they used a modified Ampex 350 with half-inch tape running at 30 ips.

Silver describes the recording site as "a small medieval chapel adjoining the Julius Caesar Hotel" in Arles, France. Although he includes some room ambience in the sound, I would like to hear more of that room's character. On the other hand, close miking is part of the reason these recordings sound so good. They project the intimate, intensely emotional feeling of a live performance. But the remarkable clarity and detail are what set these discs apart from others of that vintage.

Transients have a crisp, sharply detailed quality. Often, Manitas de Plata uses his guitar as a percussion instrument, gently knocking the body to get a hollow, drum-like effect. On the strings, he creates a strikingly wide range of colors, which the CDs reproduce with beautiful clarity. Sometimes he plays with a richly resonant tone full of lower partials; at other times his tone is equally rich but sweeter, emphasizing upper partials. Elsewhere he uses damped strings to produce spiky percussive sounds.

A good example of de Plata's skill is "Tarantas" on the *In Arles* disc. Listen to his control on those rapid runs and arpeggios and you'll know why his name means "Silver Fingers" in Spanish. The haunting harmonic colorations of the opening resonate with burning emotion. The "Gypsy Taranto" from the *In Concert* album has a distinctly Indian flavor, especially in Jose Reyes' microtonal vocal slides. Later, in the "Poetic Fandangos," de Plata displays some intriguing rhythmic effects—sudden, brief interruptions in foreign tempos, and asymmetrical groupings of beats.

*Juerga!* is an album of outtakes

which Silver and Brown were alert enough to record. Between the "real" takes, de Plata and the Gypsies of St. Marie by the Sea improvised informally, just for fun. So the most exciting, flamboyant performances are on this album. Manero Ballardo's solo vocal improvisation, "Saeta," at the end of *Juerga!*, demonstrates with great clarity the main outlines of a flamenco melody and how it can be ornamented and extended. His performance is filled with heart-on-the-sleeve emotion.

Steve Birchall

**Prokofiev: Symphony No. 5.** The Saint Louis Symphony Orchestra, Leonard Slatkin. RCA RCD1-5035.

This CD of Prokofiev's monumental Fifth Symphony is clear vindication of the talents of Paul Goodman, recording engineer for RCA Records. As a matter of fact, it won this year's Grammy award for best engineering of a classical recording.

Paul used the Soundstream digital recorder, and his basic mike setup was three Schoeps omnis in a spaced array, with a few other Schoeps mikes as discreet sweeteners for various orchestral choirs. These fed into a Neve

console, and thence to the Soundstream recorder.

Paul has done a fine job in capturing the massive sonorities of this score, in a high-definition recording that is well-balanced in the warm ambience of Powell Symphony Hall in St. Louis. The sound is immaculately clean, which serves well in the delineation of this music, sections of which can be almost turgid in their great orchestral weight. This is an exciting sound, with huge bass-drum whacks and tam-tams that literally pulsate and explode with acoustic energy. Strings are generally smooth, as are woodwinds, and the weight of the brass is awesome. Dynamics are huge and uncompressed. To savor the full impact, only the most powerful audio systems will do.

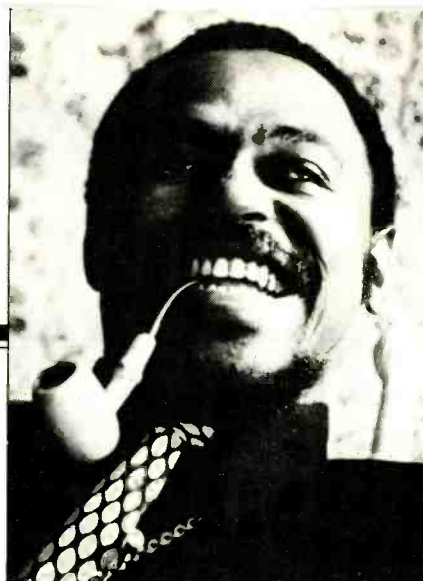
Slatkin continues to add luster to his reputation, and this splendid performance is a case in point. He has a particular affinity for the music of Prokofiev, and this is exciting music-making. The St. Louis Symphony Orchestra is playing extremely well, a legacy from their training under my dear friend, the late Walter Susskind, and their ongoing development with Slatkin is evident. Paul Goodman certainly deserves the plaudits that have been given to his splendid recording.

Bert Whyte





Oscar Peterson



Archie Shepp

**The Silver Collection: Oscar Peterson**  
**Verve 823 447-2.**

Nostalgia pervades this disc. Like a time capsule, the reissue provides a clear view of jazz styles from the late '50s and early '60s, and it also sheds light on audio production styles in the transition period between mono and stereo. This was a time when audio purists said that stereo was too gimmicky, complaining of ping-pong effects and a mysterious hole in the middle. Many added center-channel speakers to fill in that awful gap.

At the recording studios, the sophisticated solution to these problems was to record in three tracks, on 3/4-inch tape. That gave the producer control over the amount of center-channel blending. The telltale fingerprints of that production style are all over these recordings.

On nine of this disc's 13 selections, the Oscar Peterson Trio plays with the Nelson Riddle Orchestra. Logically, Jim Davis put the entire trio in the center channel, and split the orchestra between the left and right channels. That guaranteed him a solid center image for the soloists, and a nice stereo spread, when played back on the hi-fi equipment of the time.

But what really counts is the music. Nostalgic sounds fill Nelson Riddle's arrangement of Gordon Jenkins' "Goodbye." The Dorsey-tinged trombone solo has a rather languorous feeling. After a climax with contrasting choirs (saxes, brass, Ellington-style high trumpets), the entire trombone section enters softly, imitating the Dorsey style further with a sweet, singing vibrato and a liquid legato. Riddle uses a reedy solo sax under the trombones to emphasize their smoothness. Through it all, Peterson improvises around the melody with an unhurried, lacy delicateness.

Riddle's arrangement of "My Ship" (by Kurt Weill and Ira Gershwin) opens with beautiful flute, horn, and harp sounds, and then blossoms into an expansive statement of the melody by the trombones. When the trio gets its chance to play the melody, Peterson makes only slight changes (mostly in style and rhythm). After an orchestral interlude using the introductory ideas, the trio returns, still making only slight changes to Weill's fine-spun melody. Finally, on the third entrance, Peterson begins to stray much farther from the melody. Soon the cellos enter with the main melody, and Peterson decorates that rich string color with a light filigree of improvisation.

The last four tracks were recorded even earlier than the Nelson Riddle cuts; they were produced by Norman Granz in 1959. Again, they seem to be three-track stereo, not stereo synthesized from mono originals. Musically, they are more adventurous because the trio is performing alone and can improvise more freely than they could with the orchestra.

Ray Brown starts Dizzy Gillespie's "Con Alma" with imaginative, rapid bass work. Contrasts of dynamics, tempos, and timbres underline the generally laid-back style and delicate textures. Peterson really swings in the middle but never lets it get out of bounds.

The reissue is great for Oscar Peterson fans. But where are the jacket notes for those encountering his style for the first time? Jim Fishel and Ed Levine restored these wonderful old recordings with care, and the CD brings out their best qualities. Despite the dated sonics, the music shines through, making the entire disc a delightful experience.

I offer one word of caution: On my copy, track 12 would not play on any of three players. I don't know if this defect is common to all copies or unique to

the one I have, for Verve did not send a replacement copy before my deadline.

Steve Birchall

**On Green Dolphin Street: Archie Shepp**  
**Denon 38C38-7262.**

Sound: A- Performance: B+

This is one of Archie Shepp's revisionist recordings from the mid-'70s, in which he abandoned the *Sturm und Drang* of his acclaimed work in the '60s avant-garde and explored his bebop and blues roots. In the '60s and early '70s, Shepp was a screamer, burning his saxophone and blowing through changes with a passion that, no matter how far-out, was always informed by the blues. "In a Mellow Blues" finds him reinvestigating the roots of this form with rare nuance. Shepp slides into the slow dirge like smoke rising from the smoldering ash-tray of his tenor. This CD immediately reveals that Shepp was never a smooth player. His tone scrapes and breathes with the years of experience he's spent paying his dues in the trenches of avant-garde music and black politics. Sam Jones' walking bass line is relentlessly urgent.

If it's possible, "I Thought About You" is even darker. It's a black ballad, with Shepp's laconically introspective solo draping itself around the slowly rolling rhythms of Jones, pianist Walter Bishop, Jr., and drummer Joe Chambers. Shepp turns this romantic ballad into a doomsday study of the interior.

But *On Green Dolphin Street* isn't all melancholy. It opens with a sprightly reading of the title track. Shepp rides through the changes unbridled, his tenor weaving dips and spins around the rhythm. Tadd Dameron's "The Scene Is Clean" is given a lively run-through, with Shepp taking a lyrical tangent off Dameron's melody.

This is a straightforward CD recording, but it reveals a depth in Shepp's music that wasn't apparent on the LP. Once one of the angry young lions, Shepp now reveals the creases which were always there, but which were smeared in his high-energy playing. I still wouldn't mind him stepping out on disc as he does live, but his non-nostalgic return to older forms is a joy nonetheless.

John Diliberto

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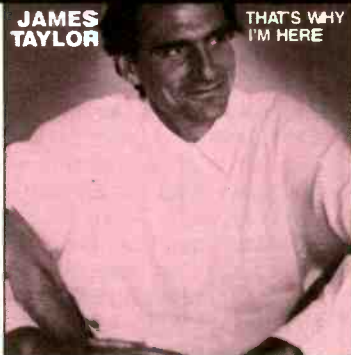


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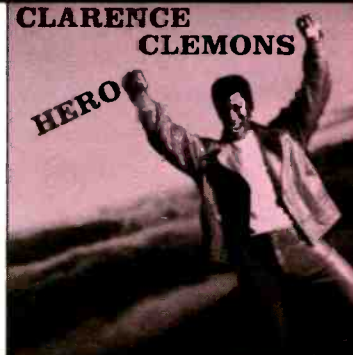
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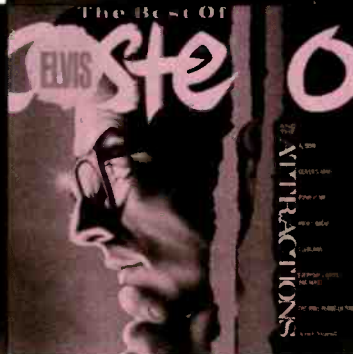
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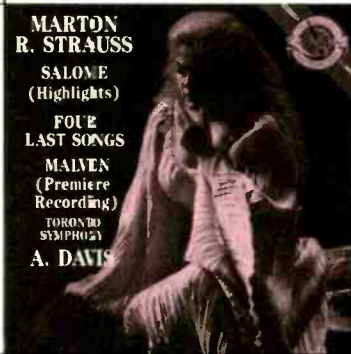
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MICHAEL TEARSON  
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## OFF THE LEASH



Photograph: Allen MacWeeney

**Rain Dogs:** Tom Waits  
Island 90299-1, \$8.98.

Sound: B- Performance: B+

A curious animal, *Rain Dogs*. Belongs to the same species as *Swordfishtrombones*, only it growls more. With *Swordfish...*, the album before this one, Waits stretched away from his image as romantic-underbelly balladeer. He still offered up the sweet 'n' dreamy, urban-populist character sketches of *Closing Time*, *The Heart of Saturday Night* and (to a lesser extent) his next several albums. But by *Swordfish...*, Waits was spending most of his time inside his characters' skins and roaming around their heads, picking up whatever words and phrases were bumping about in there and spewing them out in a stream of consciousness. The results were sometimes incoherent—but then, so were the characters in the songs.

He exorcises his Cole Porter demons even further on this new album.

Waits is still capable of dreamy lyricism—listen to "Gun Street Girl" and "Downtown Train"—yet most of *Rain Dogs* (the title refers to dogs that are disoriented when their territorial urine-markers have washed away) is a Kurt Weill opera without the book.

This is a sonic amalgam of swirls and colors, with Waits' mad session men sounding for all the world like an orchestra warming up to that moment when the conductor taps his baton for quiet. The show seems always about to begin, and Waits rides the tension like it's a wave. Yet the sound remains hard to pin down precisely, as does his compositional styles.

Waits' recitatives here can be mesmerizing, and his deliberately discordant arrangements challenging; he essays musical styles from the Keith Richards-abetted jump-blues of "Union Square" to the *Twilight Zone* meandering tootlings of "9th & Hennepin." He gives us the nursery-rhyme chorus of "Jockey Full of Bourbon,"

with Waits' persona spouting nonsense just to keep from passing out, and he gives us the plunk-clunk banjo of "Gun Street Girl," which sounds like a traditional folk song down to each stanza's repeated couplets. He also underreaches and overreaches, both compositionally and vocally; the arrogance of unedited self-indulgence keeps *Rain Dogs* from being a masterpiece. Yet for all these layers, there's no center. Waits does a neat job of conceptualizing his theme of dislocation; by the end of side one, you feel how his characters must feel. Even Lewis Carroll gave us roadsigns now and then.

Waits' career seems about to lunge from cult to clout, due largely to his charismatic film appearances and his place in the emerging school of New York multimedia performers such as John Lurie (who plays sax on "Walking Spanish"), Jim Jarmusch and Laurie Anderson. One current film project in which he stars, *There Ain't No Candy Mountain*, could be Waits' own *Purple Rain Dogs*. Yet ironically, his current string of creative successes is moving him farther from his audience and more and more into his own head. I hope he checks this trend. Waits' artistry ought to stay with the proles, not in some cold conservatory.

Frank Lovece

**Hounds of Love:** Kate Bush  
EMI America ST-17171, \$8.98.

Sound: B Performance: A+

*Hounds of Love* has given me the kind of thrill I always look for but too rarely find. It is Kate Bush's fifth album, her first since 1982, and it is the best work she has done to date. Kate has always been a challenging artist, absolutely fearless when it comes to taking risks or presenting something different. On *Hounds of Love* the challenge to the listener is as strong as ever, but what excites me is the new-found strength and confidence which infuse the album.

There is tremendous variety here, and it is dangerous to anticipate what will come next; it's better and far more satisfying to simply put the album on, strap yourself down and go along for the ride.

The first and third cuts on side one, "Running Up That Hill" and "Big Sky,"



are urgent, churning, unsatisfied songs about seeking personal peace, what Kate calls in the former "a deal with God." In between them is "Hounds of Love," which is even more desperate and harder-rocking. "Mother Stands for Comfort" is an unquiet, softer song about a soul ailing under the weight of lies told to mother. This one features Eberhard Weber's lyrical bass. "Cloudbursting," which closes the side, is a look back on childhood fears and joys, buttressed by a fierce optimism that "something good is going to happen." On this song, there is a beautiful string sextet arrangement of surprising power.

Side two opens with a lullaby, "And Dream of Sheep," before it descends into a frightful dreamscape. In the wispy "Under Ice," filtered vocal effects, the sound of thunder, and other background action heighten the sense of unreality. This segues into the nightmare of "Waking the Witch." Here Kate employs barely decipherable voices, topped with Pink Floyd's helicopter effect from *The Wall*, to create a spectacular, scary, stroboscopic vocal sound. In the aftermath of "Waking the Witch," "Watching You Without Me" is a quieter piece that might be a love song from a ghost to a former lover. In this song are backwards voices and more stroboscopy plus Danny Thomp-

son's elegant double bass. Set as an Irish dance piece, "Jig of Life" has traditional instruments—fiddles, whistles, bodhran, uilleann pipes—at its core. Next, voices of astronauts in orbit form the segue to "Hello Earth," which has the grand power of a big string and choral setting. "The Morning Fog" is a sprightly finale asserting anew the commitment to life after a long, troubled sleep.

Kate Bush produced *Hounds of Love* herself. It is an audacious effort, full of daring and danger. In lesser hands it would have been pretentious or precious. Instead, it is invigorating.

The recorded sound is really special, as the album keeps bubbling with surprise sounds that feel completely new, many deriving from what Kate does on the Fairlight synthesizer. As I mentioned earlier, the stereo effects are uncommonly vivid. *Hounds of Love* is especially fine for headphone listening. It stands up very well under that kind of scrutiny.

It is nice to see all of the lyrics included on the cassette release—even if the printing is somewhat smeary and the type itself is too small for most people to read easily.

*Hounds of Love* is an album to treasure. It is one on which an artist I've long admired comes of age and realizes her potential. *Michael Tearson*



**Starpeace:** Yoko Ono  
**Polydor 827 530-1 Y-1, \$8.98.**

Sound: C+      Performance: C

You would do well to remember, while listening to *Starpeace*, that Yoko is one of a handful of rock aristocrats who have ridden to prominence on someone else's coattails. Like Princess Di, she's royal by marriage, which isn't to say she doesn't deserve a fair hearing. It is unreasonable, perhaps, to expect her to measure up to the self-made stars.

Yoko's ability to perform and write pop music, as demonstrated on this album, is well below that of the average pop star. Although an unusual voice can be an asset in pop—just ask Bob Dylan and Leon Redbone, for example—Yoko's thin, airy, quavery alto is a liability. Her personality and spirit are delightful, but the timbre, strength and rhythm leave much to be desired. Coproducers Bill Laswell and Yoko herself have compensated for the weak lead vocals by pushing the background singers up front and letting them carry many of the choruses and bridges.

But this strategy is not enough to redeem Yoko's songwriting. She does nothing inventive or especially moving,





Performances throughout *Under a Raging Moon* have confidence and power, giving strong support to Roger Daltrey's voice.

**Under a Raging Moon:** Roger Daltrey Atlantic 81269-1, \$8.98.

Sound: B

Performance: B

This is as strong an album as Roger Daltrey has made apart from The Who. Where his solo albums have oftentimes sounded distracted, as if made by reflex rather than intent, *Under a Raging Moon* has the feel of conviction.

From the opening song, Pete Townshend's "After the Fire," to the closing, title track, Daltrey sings like a haunted man. The opener might refer to The Who's final farewell and it might refer back to the group's late drummer, Keith Moon, but the song establishes a brooding tension that dominates the album. A recurring theme of self-defensive introspection in the wake of personal crises emerges and builds over the course of side one, culminating in the frustration-driven "Move Better in the Night."

The theme continues through side two. Here some of the songs are by

either with chords or melodies, anywhere on the album.

Laswell and a fair number of his favorite session players make surprisingly much of Yoko's meagre compositions. Certain details, like the way-back-in-the-mix Eastern/Middle Eastern whinings of L. Shankar's violin and Eddie Martinez's guitar, and the tinklings and chimings of various bells, run through the album like threads of connective tissue. And Laswell provides variety too: An avant-garde, urban feel for "Hell in Paradise"; slick reggae for "I Love All of Me"; a heavy-metal, kid-

die-show theme song sound for "Children Power"; funk for "Cape Clear" and "Starpeace," and Bowie-ish space rock for "Sky People."

The best things about *Starpeace* are some of Yoko's ideas. Witness "I Love All of Me," an anthem for outcasts and misfits; "Cape Clear," a flash of spooky self-knowledge, and "Rainbow Revelation," which is generous and wise. While most of Yoko's lyrics fall far below the mark of poetry, and some of her concepts are hippy-dippy trite, others are just about as far-out as anything in rock.

Susan Borey

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John Waite's four-piece band, abetted by a dozen session men, throws around some nice licks. But this is still thin stuff.

notable current artists: Bryan Adams collaborated on a pair, and John Parr cowrote the title song, which is the key to unravelling the album. "Under a Raging Moon" opens with a synth figure borrowed wholesale from The Who anthem, "Baba O'Riley." The song describes a crazy, wild-man musician who can only be Keith Moon, and muses about the old times, the "better times." At the end, there is a procession of drummers taking turns doing wild, Moon-ish flourishes. They include Martin Chambers of The Pretenders, Queen's Roger Taylor, Cozy Powell, Stewart Copeland of The Police (the only American of the group), Zak Starkey (Ringo's kid), and Big Country's Mark Brzezicki.

Brzezicki holds the drum chair through the album. Other key players include A.W.B. alumnaus Robbie McIntosh on guitar, bassist John Siegler, Mark Feltham on harmonica, and keyboardist Nick Glennie-Smith. Performances throughout exude confidence and power, giving strong support to Daltrey's passionate, muscular voice. Alan Shacklock's production is at once straightforward, mainstream rock and very grand, with the biggest effect saved for the end. This is another album that sounds best loud.

*Under a Raging Moon* is thoughtful and well constructed, with more power and direction than I expected. It is proof conclusive that there can be life after The Who. *Michael Tearson*

**Mask of Smiles:** John Waite  
**EMI America ST-17164, \$8.98.**

Sound: B                      Performance: C+

Adolescence is half blooming youth and half blooming idiot—just like John Waite's second album.

It's no put-down, really, to call Waite's sophomore album sophomore. Adolescence does have shining moments of clarity, as when Waite sings, plainly and plaintively, "I'm lost and I'm crazy/Too much time on my own." Simple, direct. No matter how old you are, you need a dose of that every now and then to remind you that the wild years weren't all Technicolor football games.

Waite also continues to show a pained vocal timbre that usually manages to sound sincere. He's at his best on the single, "Every Step of the Way,"

a repetitive song he makes workable through the vocals' sheer weight of memory. He dredges stuff up, no doubt about it.

So does most of the rest of the album, though I think from beneath the East River. Waite's four-piece band, abetted by almost a dozen industrial-

strength session men, does throw around some nice licks, and guest tenor-sax Lenny Pickett has an anguished solo ("Just Like Lovers"). Still, this is pretty thin stuff. It's also a bit much when Waite's persona offers to turn water into wine; I don't care how infatuated he is. *Frank Lovece*

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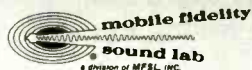
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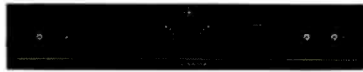
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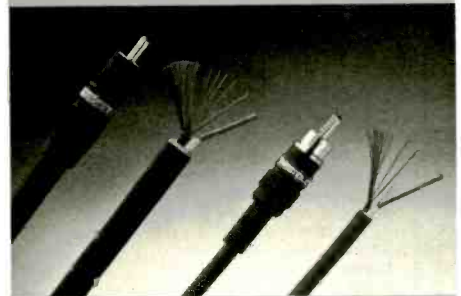
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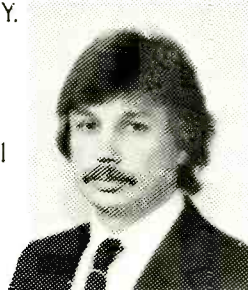
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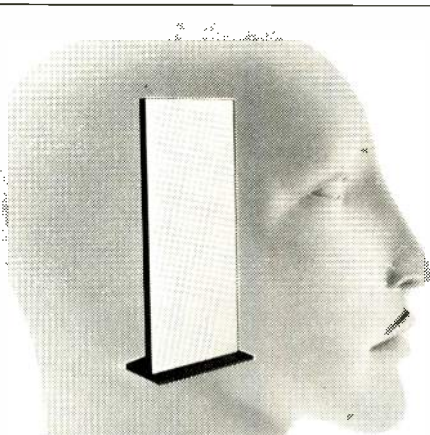
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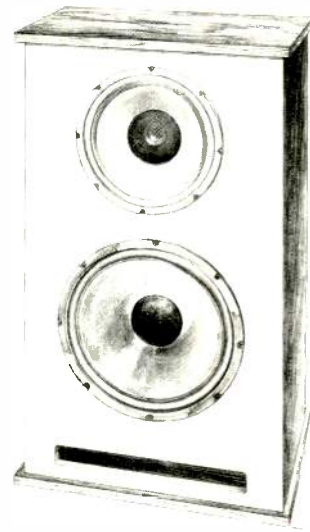
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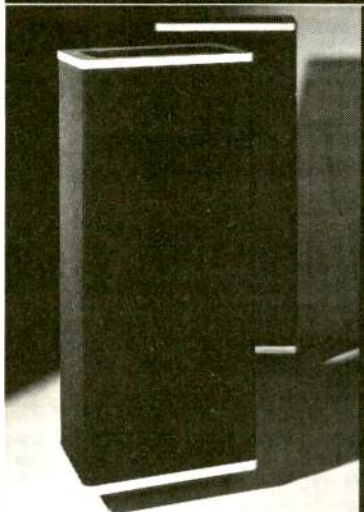
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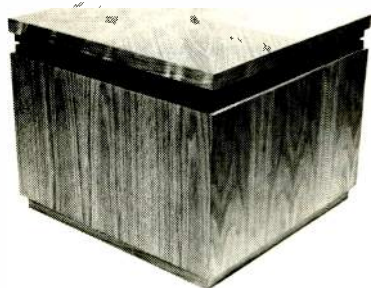
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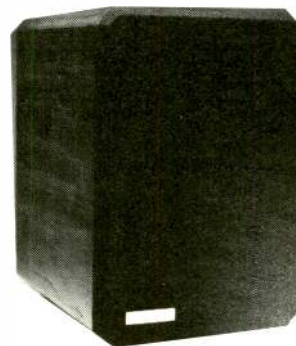
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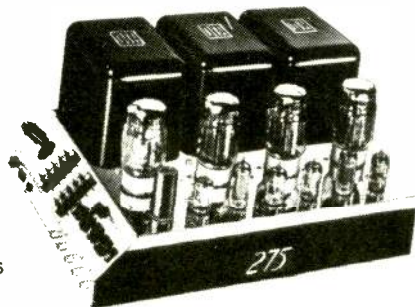
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# AD INDEX

Firm (Reader Service No.)	Page
Adcom (1)	24
Akai (2)	17-20
Audio Research (31)	6 & 7
Audio-Technica (3)	56
Boston Acoustics	13
Brystonvermont (4)	4
Canton (5)	7
Carver (6)	84 & 85
CBS Records (7)	93
Chrysler LeBaron	77
Columbia House	31
Custom Woodwork	68
DALI (9)	57
dbx (10)	29
Design Acoustics (11)	96
Harman/Kardon	3, 5
Infinity (13)	Cover III
JBL	75
KEF (14)	34 & 35
Kinergetics (32)	15
Levinson	10 & 11
Linear Power (15)	4
Maxell (16)	27
McIntosh (17)	65
Meridian	97
Nakamichi	25
NEC (18)	67
Nikko (19)	80
Onkyo	55
Ortofon (20)	69
Perreaux (21)	83
Pioneer (22)	Cover II
Polk (23)	23
Pyle (24)	71
Rogers (25)	28
Soundcraftsmen (30)	8 & 9
Studer Revox (26)	30
Technics (27)	Cover IV
Telarc (28)	61
Vantage	73
Velodyne (29)	89
Cecil E. Watts	15
Winston	59
Yamaha	63

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