

Audio

INTERVIEW
NILE RODGERS

SEPTEMBER 1985 • \$2.00

SONY CDP-620
COMPACT DISC PLAYER
HOT PERFORMANCE
LOTS OF FEATURES



GRAY MARKET:
WORTH THE PRICE?

TESTED
EAGLE 2 AMP—POWERFUL,
WITH SMOOTH SOUND
NAD 7130 RECEIVER
HONEST PERFORMANCE



CAMEL LIGHTS

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Today's
Camel Lights,
unexpectedly
mild.



9 mg. "tar", 0.8 mg. nicotine av. per cigarette by FTC method.

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OMS-1000
Optical Memory System

Nakamichi Digital Sound A product of the recording experience

Almost anyone can make a CD player. Only *Nakamichi* could produce the OMS-1000—the first magneto-optical disc recorder! The OMS-1000 is a research tool that took nearly 5 years to develop.

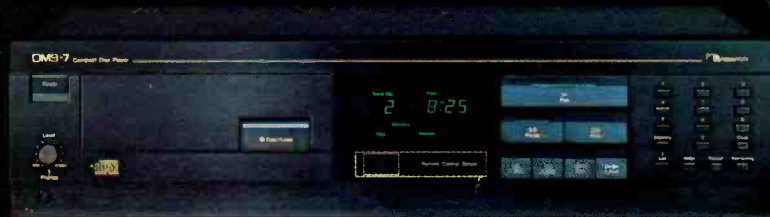
Now *you* reap the benefits!

Introducing the OMS-7 and OMS-5—the first CD *players* with a *recording* heritage—the first CD players with Nakamichi Sound, that ineffable clarity and natural reproduction that must be heard to be believed.

Experience Nakamichi Digital Sound now—at your local Nakamichi dealer.

OMS-7

Remote control, 24-command memory, and direct access to any track and index number—advanced features for our most sophisticated CD player.



OMS-5

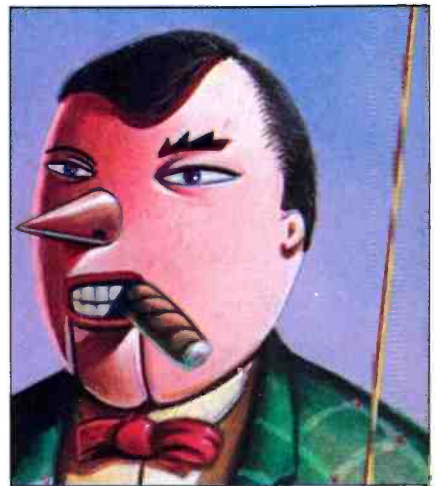
OMS-7 sound thanks to 4X-Oversampled Digital Filters, Dual D/A Converters, and our exclusive Direct-Coupled Linear-Phase Analog Signal Processor.

 **Nakamichi**

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The Cover Equipment: Sony CDP-620ES Compact Disc player.
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Not only is a CD player star darc equipment in Toshiba's outstanding System 150, so is the double cassette deck with coule-reverse, high speed dubbing and Dolby*B and C NR. As well as AM/FM stereo digital synthesizer tuner, 100 watt per channel integrated amplifier**; direct-drive turntable, 4-way speaker systems and 14-band graphic equalizer. All in a sleek glass-top cabinet. Toshiba's System 150. The only option is to buy it.

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Why all
previous
compact disc
players
seem merely
ordinary...

The Extraordinary ES Series CD Players... from Sony

Digital Audio ... In the Beginning

In the past few years, a revolution in sound reproduction has taken place. A revolution that began in the early 1970's when Sony developed a PCM digital recorder for professional use. And in the decade that followed, Sony led the industry in introducing a complete series of professional and consumer digital products that the music world has applauded for their transparent clarity and staggering accuracy.

Then, in 1982, Sony stunned the high fidelity industry by creating the world's first digital audio Compact Disc player. And as co-developer of the CD format, Sony can truthfully claim more extensive experience in the design and construction of Compact Disc players than any other manufacturer. From the development of the 16-bit linear quantization system to the format's CIRC error correction method; from software production to the first portable and car CD players; after years of research Sony has made Compact Disc a marketing reality! But this is only the beginning.

Sony's ES Series ... The Next Step

Now in one bold stroke, Sony introduces the new ES Compact Disc series.

These limited-production players are the finest ever built by Sony. A line of players so advanced, they take the Compact Disc format to the cutting edge of the future. With sound and performance so spectacular, they are destined to become benchmarks for the industry.

Impressive? Yes! But not unexpected. Not when you consider the company that started the digital revolution...

Sony's Third Generation Technology

The foundation on which Sony created the new CDP-520 ES, CDP-620 ES, and CDP-650 ESD series of players is our unparalleled third generation engineering. It is the result of extensive research into the traditional problems that are inherent to the digital conversion process.

The Classic Digital Conversion Problem

Perhaps digital's most controversial issue is how to deal with undesirable aliasing noise. Aliasing noise is a by-product of the digital process. Uncontrolled, you would hear it as annoying high frequency distortion.

Some CD players use steep slope-rate analog filters to neutralize this noise. While they are generally effective, the analog filter's "brick wall" effect means that anything above its frequency of operation is completely "chopped" off. Consequently, phase linearity suffers, and uniformity at the highest audio frequencies is only marginal.

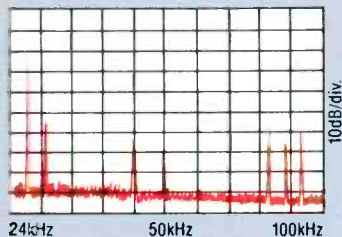
Other CD players use a method called "over-sampling" to raise the digital conversion frequency to a point well beyond the audible range. While providing no additional *music* information, this system has the advantage of providing better high frequency response and minimal phase shift. However, even with both a digital *and* a final stage analog filter, most oversampling system's more complex circuitry creates additional problems with high frequency spurious noise.

Sony's unique Unilinear Converter and digital filtering system provides the benefits of both previous designs. Unlike other methods, our high-speed D/A converter utilizes single, "master clock" architecture to synchronize all digital decoding functions. This eliminates the "beat frequencies" caused by the interaction on various clock rates found in typical oversampling designs—along with their dependent frequency irregularities. Data synchronization is theoretically perfect. And frequency response is absolutely unprecedented— ± 0.1 dB deviation in typical measurements!

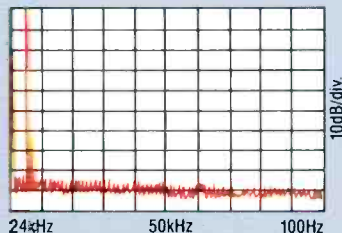
And with its integrated system of 88.2 kHz oversampling and high resolution 96th order digital filter, the Unilinear Converter attenuates spurious noise by a remarkable 80 dB! That's almost twice as effective as most conventional oversampling/digital systems. Plus, Sony's digital filter, combined with a gentle slope rate final stage analog filter, limits 'ripple' factor to a mere ± 0.01 db... as well as contributing to one of the best phase response characteristics in the industry!

Noise Spectrum Comparison

16-bit Oversampling



Sony Unilinear Converter System



No spurious noise. Spectacular frequency response. Superb phase linearity. Only Sony offers a total solution to the problems created by the digital conversion process.

High Density Digital Integration

Another major innovation in Sony's third-generation CD players is our new Very Large Scale Integration (VLSI) circuitry chip. It handles all 9 digital functions (error correction, synch detection, etc.) as a single circuit, thus simplifying the signal path. And Sony's VLSI is also smaller, more efficient, consumes less power and generates less heat. All of which makes it more reliable. (It also makes possible our remarkable car stereo and portable CD players.)

A Laser Fast As The Speed Of Light

A laser pick-up in a CD player requires four main attributes: Blinding speed for fast track access. Excellent stability and reliability. Superior tracking. And a margin for error of less than two microns (a micron is a *billionth* of an inch).

First- and second-generation CD players transfer torque from the motor to the pick-up using a complex worm gear and reduction gear mechanism. Unfortunately, this does not always provide smooth, accurate tracking. Nor does it balance the contradictory requirements of high access speed and pinpoint cueing.

The result is occasional mis-tracking. And that causes less than ideal performance.

Which is why Sony developed the new third-generation Linear Motor Tracking system. The motor's torque is transferred directly to the pick-up. So the worm gear and

reduction gears—along with their adverse mechanical effects, like "play," backlash, and friction—are eliminated. And since it has fewer moving parts, the linear non-cogging motor system is also more reliable.

The Linear Motor Tracking system would not have been practical (or even possible) with the relatively large, heavy laser used in first- and second-generation players. So we created a new miniature laser pickup, that's one-third smaller and lighter than previous models. Combined with our "3 spot" laser servo, the Linear Motor Tracking system is smaller, more precise, as well as more uniform in operation.

Sony Linear Motor Tracking System



Best of all, Sony's third generation laser assembly and Linear Motor Tracking system is fast—the fastest in the industry. It can access *any* location on the disc in *less than one second!* Try locating a selection with any other CD player. Some take as much as 15 times longer to find a given track.

The True Significance of the "Least Significant Bit"

In the high-performance world of digital audio, small imperfections are much more noticeable. Any weak link in the system reduces the accuracy and quality of the overall sound. So for our ES Series CD players, Sony incorporated our very finest analog parts and components.

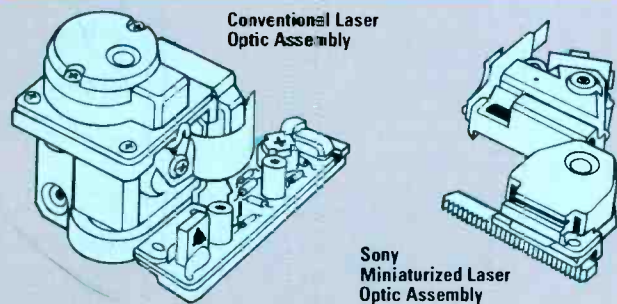
A new audio operation amp, for example, has been designed with separate signal paths for the left and right channels. This results in better heat dissipation and lower crosstalk.

Special ceramic-powder electrolytic capacitors transmit their charge more effectively than typical capacitors. So rise-time and pulse response characteristics are outstanding.

In addition the CDP-650 ESD has dual monaural circuitry mounted on a low resonance copper chassis. Specially designed insulator "feet" are also included to improve isolation from mechanical vibration.

This attention to detail may seem a bit obsessive to those interested only in specifications. But digital technology demands great imagination and dedication. That's why, for the 650 ESD, 620 ES and 520 ES, every key circuit has been redesigned. Every mechanism re-thought. Every feature re-examined.

The result is the finest, most refined, best sounding CD players you can buy. Each backed by an unprecedented three year limited parts and labor warranty.



CDP-520ES— The Most Affordable ES Series Compact Disc Player



The CDP-520ES offers impressive technology and sophisticated construction . . . plus, a wide range of playback options such as 16-selection programmability and a full-featured infrared Remote Control Commander™ Unit. Yet, the 520ES is as easy to use for the novice as it is for the experienced high fidelity enthusiast. The CDP-520ES . . . the player of choice for the serious music listener looking for value at an affordable price.

“The new Sony CDP-520ES is an excellent example of the state of the art in CD players . . . unquestionably a top contender in a crowded field, besides being a very good value for the money.” —Julian Hirsch, *Stereo Review*, July, 1985 (U.S.A.)

“A technical and sonic achievement.”
—*High Performance Review*, Volume 3 Issue 3 (USA)

“This is in my opinion quite simply the best-sounding CD player I know of.”
—J. Gordon Holt, *Stereophile*, May 1985 (USA)



A supplied Remote Control Commander™ allows for convenient usage of the 11 primary operation modes found on the CDP-520ES. The commander also allows you to directly access any selection in less than one second!



Logically positioned in a size/priority configuration, the CDP-520ES offers a host of playback features from a minimum of controls. Such features as 99 track Automatic Music Sensing (AMS); 16 selection programmability (RMS); 99 subcode indexing;

2 speed music search; as well as play, pause and reset options are included. The 520ES can also be set to repeat a single track, the complete disc, or any portion of music between two (user-selectable) points.

CDP-620ES— A Unique Blend of Performance and Player Design



The CDP-620ES points to a new direction in Compact Disc Player design. A special Music Calendar/concentrated display is provided to enhance the 20-key one-touch Direct Music Select front panel controls. Add to this features like Remote Control Commander™ unit programming and line-out/volume control, and the CDP-620ES sets the precedent for great sound and convenience.

“ . . . The sound quality is remarkably clear . . . (reproduces with) extremely wide dynamic range and exceptional high frequency imaging ”

—Sound Record Club, January, 1985 (Japan)

“ . . . the sound seems to be multi-dimensional . . . highly transparent with superior imaging . . . ”

—FM Fan—Issue #939 (Japan)



The 20-selection Music Calendar display provides all relevant music information at a glance . . . the number of tracks on the disc . . . the player's programmed selections

. . . or any single selection being played. These operations can be combined with Auto Delay, Shuffle Play, or Repeat modes for the utmost in playback flexibility.



An original Sony feature, the variable volume/line-out control allows you to independently adjust volume level from either the player or from the supplied Remote Control Commander.™

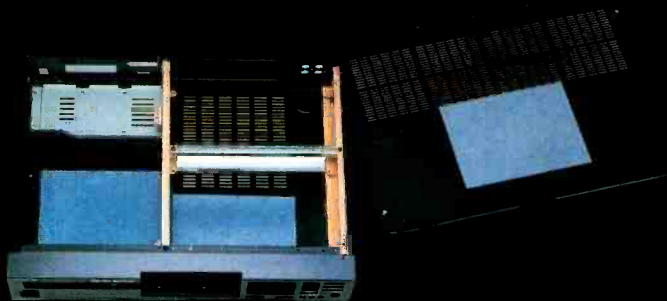
CDP-650ESD— The Compact Disc Player of the Future



In addition to its remarkable construction and unprecedented capabilities, Sony's CDP-650ESD is the world's first player to offer a digital data output port. With it, direct interface can be made of music 'data' into an out-board digital convertor or digital amplifier for superior sound reproduction. Or you can listen to the CDP-650ESD by itself via its built-in D/A LSI circuit. Either way, you'll experience the ultimate performance possible from the CD format!

"Sound quality of the CDP-650ESD is absolutely magnificent. . . . Until I can be shown that a better sounding CD player exists, I'm going to consider this model my new standard of reference."

—Leonard Feldman, *Audio*, July, 1985 (U.S.A.)



The CDP-650ESD employs an anodized copper chassis that holds magnetic radiation distortion to a minimum. In addition, low impedance, solid copper busbars are used to offset electrical noise. Unlike conventional designs, the 650's entire analog and digital circuitry are internally isolated into separate shielded compartments to keep mutual interference to a minimum.



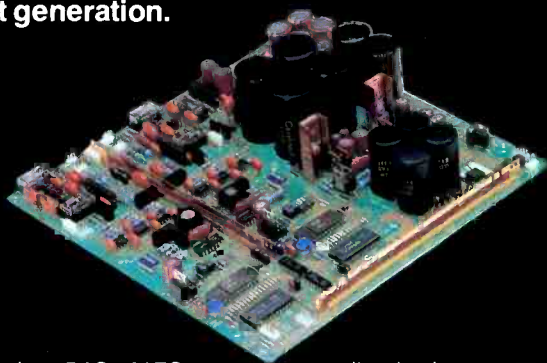
To reduce dynamic intermodulation distortion, a number of steps have been taken. The CDP-650ESD comes complete with special insulators that help isolate the player's transport from vibration. Furthermore, the player's internal transport is insulated by compliant rubber bushings that

help reduce shock transmitted from the chassis. As a final step, resonance-absorbing material is applied to both the complete casing and chassis of the player.

DAS-702ES— The World's First Outboard D/A Converter



The DAS-702ES has dual monaural, discrete component circuitry that provides sonic performance second to none. Because all digital products operate at different sampling rates, you can use the 702ES to decode a diversity of components like the CDP-650ESD and the PCM-3324 Multi Track Recorder. Plus with the coming of Direct Broadcast Satellite (DBS) transmissions and Digital Audio Tape (DAT) recorders, the future for this outboard decoding converter is unlimited. And unlike built-in LSI converters, the DAS-702ES performs its task without the usual restrictions imposed by chasis size, single path integration and heat generation.



The unique DAS-702ES converter circuitry employs three different sampling clock-rates for a multiplicity of applications. Sound quality is enhanced by the employment of dual-monaural construction throughout: separate high-speed ladder-type D/A converters, integrators, line and buffer amplifiers and low-pass filters. Electrical interference is reduced with multiple power

supplies that incorporate large capacity ceramic-based electrolytic capacitors. Linear crystal, oxygen-free copper wire (LC-OFC) is used for all analog signal paths; while all passive components are selected on a sonic basis. As a final step, all digital stages are fully isolated and mounted on thick, non-resonanting alloy material and reinforced throughout.

“The CDP-650ESD/DAS-702ES combination represents the state-of-the-art so far as CD replay technology and digital decoding are concerned, the technical story being as fascinating as the lab results are interesting . . . So far as many important subjective characteristics are concerned, the '702 used to decode the ('650) digital output sounded better than any other commercial player I have auditioned.”

—Martin Colloms, *Hi-Fi New & Record Review*, June, 1985 (U.K.)



The digital output interface transmits both the L and R channel data using a single digital cable. When in use, both audio and graphic data can be processed simultaneously, or the audio data can be processed only. In the off position, the CDP-650ESD's built-in D/A converter allows you to process the signal conventionally, through the analog amplifier stage.

Sony ES Series Compact Disc Players Features and Specifications

CD System	CDP-650ES	CDP-620ES	CDP-520ES
Format	Compact Disc Digital Audio	Compact Disc Digital Audio	Compact Disc Digital Audio
Signal Readout	Non contact semi-conductor laser (780 nm wavelength)	Non contact semi-conductor laser (780 nm wavelength)	Non contact semi-conductor laser (780 nm wavelength)
Playing Speed	1.2-1.4m/sec (CLV)	1.2-1.4m/sec (CLV)	1.2-1.4m/sec (CLV)
Playing Rotation	500-200 rpm, counter-clockwise	500-200 rpm, counter-clockwise	500-200 rpm, counter-clockwise
Digital System	Pulse Code Modulation (PCM) with Eight-to-Fourteen Modulation (EFM) coding	Pulse Code Modulation (PCM) with Eight-to-Fourteen Modulation (EFM) coding	Pulse Code Modulation (PCM) with Eight-to-Fourteen Modulation (EFM) coding
Sampling Frequency	44.1 kHz	44.1 kHz	44.1 kHz
Quantization	16-bit linear	16-bit linear	16-bit linear
Error Correction	Sony Super Strategy/CIRC	Sony Super Strategy/CIRC	Sony Super Strategy/CIRC
Disc Diameter	12 cm (4 3/4 inches)	12 cm (4 3/4 inches)	12 cm (4 3/4 inches)
Disc Thickness	1.2 mm (1/20 inch)	1.2 mm (1/20 inch)	1.2 mm (1/20 inch)
Disc Track Pitch	1.6 um (1/16,000 inch)	1.6 um (1/16,000 inch)	1.6 um (1/16,000 inch)
Disc Playing Time	Up to 74 minutes on one side	Up to 74 minutes on one side	Up to 74 minutes on one side
System	Unilinear Converter	Unilinear Converter	Unilinear Converter
Filter	Digital, Oversampling	Digital, Oversampling	Digital, Oversampling
Drive Mechanism	Linear Motor	Linear Motor	Linear Motor
Random Music Sensor (RMS)	20 Selection Programmability	20 Selection Programmability	16 Selection Programmability
Automatic Music Sensor (AMS)™	99 Tracks	99 Tracks	99 Tracks
Index Search	99 Subcodes	99 Subcodes	99 Subcodes
Shuffle Play	Yes	Yes	—
Repeat Modes	1, A-B, All, Program, Shuffle	1, A-B, All, Program, Shuffle	1, A-B, All, Program
Auto Delay	Yes	Yes	—
Full Function Remote Control	Yes (W/Direct Access)	Yes (W/Direct Access)	Yes (W/Direct Access)
Line-Out/Volume	Yes (Also Via Remote)	Yes (Also Via Remote)	—
Headphone Output (W/Level Control)	—	Yes	Yes
Subcode Output	Yes	Yes	Yes
Digital Output	Yes	—	—
Timer Switch	Yes	Yes	—
Concentrated Display	Time/Track/Program Mode	Time/Track/Program Mode	Time/Track/Program Mode
Music Calendar	20 Selections	20 Selections	—
Channels	Two channels	Two channels	Two channels
Frequency Response	2-20,000 Hz, ±0.3 dB	2-20,000 Hz, ±0.3 dB	2-20,000 Hz, ±0.3 dB
Harmonic Distortion	Less than 0.0025% (1 kHz)	Less than 0.0025% (1 kHz)	Less than 0.003% (1 kHz)
Dynamic Range	More than 96 dB	More than 96 dB	More than 96 dB
Stereo Separation	More than 95 dB (1 kHz)	More than 95 dB (1 kHz)	More than 95 dB (1 kHz)
Spurious Noise Attenuation	Greater than 80 dB (24 kHz)	Greater than 80 dB (24 kHz)	Greater than 80 dB (24 kHz)
Interchannel Phase Shift	None w/DAS-702ES (20 kHz)	Less than 45 degrees (20 kHz)	Less than 45 degrees (20 kHz)
Wow And Flutter	Below measurement	Below measurement	Below measurement
Access Time	Less than 1 second	Less than 1 second	Less than 1 second
Line Output	0.05 V-2 V rms; load impedance 10 k ohms	0.05 V-2 V rms; load impedance 10 k ohms	2 V rms; load impedance 10 k ohms
Headphone Output	—	28 mW at 32 ohms	28 mW at 32 ohms
Power Requirements	120 V, 60 Hz; RM-D502 Remote Commander two "AA" batteries	120 V, 60 Hz; RM-D502 Remote Commander two "AA" batteries	120 V, 60 Hz; RM-D302 Remote Commander two "AA" batteries
Power Consumption	16 W	16 W	15 W
Dimensions	430 mm (W) x 80 mm (H) x 365 mm (D); 17 x 3 1/8 x 14 3/8 inches	430 mm (W) x 80 mm (H) x 365 mm (D); 17 x 3 1/4 x 13 3/4 inches	430 mm (W) x 80 mm (H) x 365 mm (D); 17 x 3 1/4 x 14 3/8 inches
Weight	9 kg (19 lb. 14 oz.)	8.8 kg (19 lb. 7 oz.)	9 kg (19 lb. 14 oz.)
Supplied Accessories	RM-D502 Remote Commander; 2 "AA" batteries; Disc Cloth; Feet (4); Connecting Cables (pr)	RM-D502 Remote Commander; 2 "AA" batteries; Disc Cloth; Connecting Cables (pr)	RM-D302 Remote Commander; 2 "AA" batteries; Disc Cloth; Connecting Cord (pr)
Warranty	"Limited" 3 years, parts/labor	"Limited" 3 years, parts/labor	"Limited" 3 years, parts/labor

DAS-702ES Specifications

System:	Digital-to-Analog (D/A) Converter
Format:	Sampling Rates: 32 kHz, 44.056 kHz, 44.1 kHz, 48 kHz
Channels:	Two Channels
Demodulation:	16 Bit Linear
Frequency Response:	5/20 kHz, ± 0.5 dB (44.1 kHz sampling rate)
Harmonic Distortion:	Less than 0.004% (1 kHz; 44.1 kHz sampling rate)
Dynamic Range:	More than 95 dB (44.1 kHz sampling rate)
Stereo Separation:	More than 90 dB (1 kHz)
Line Output:	0-5 V rms; load impedance 10 k ohms; Output impedance 100 ohms (fixed or variable)
Headphone Output:	0-14 mW at 32 ohms
Digital Input:	0.5 V p-p, ± 20%; impedance 75 ohms
Digital Output:	0.5 V p-p, ± 20% impedance 75 ohms
Power Requirements:	120 V, 60 Hz
Power Consumption:	25 W
Dimensions:	430 mm (W) x 105 mm (H) x 410 mm (D) 17 x 4 1/8 x 16 1/8 inches
Weight:	11.5 kg (25 lbs. 6 oz.)
Supplied Accessories:	Audio connecting cables (2) Digital connecting cable (1)
Warranty:	"Limited" 3 years, parts/labor

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SONY
THE LEADER IN DIGITAL AUDIO.

Sony Consumer Products Company, Sony Drive, Park Ridge, New Jersey 07656

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Continuous-Loop Cassette, Anyone?

Q. I am interested in locating a continuous-loop cassette at least 30 minutes in length. Is there such an animal? If there is, where can I locate it?—Rich Jessen, Billings, Mont.

A. What you're looking for is actually called an "endless" cassette. Since this is used in answering machines and automatic display devices, you'd probably have better luck at office-products or audio-visual dealers, rather than at audio or other consumer stores. The tapes are usually Type I. They may not last as long as regular cassettes and may not allow rewinding, but they do exist. On the other hand, perhaps your needs could be met by a deck with automatic reverse.

Cold Effects

Q. What are the effects of extreme cold—freezing or below-freezing temperature—upon tape? Would this adversely affect fidelity?—Aqan Lorin L. Gade, Virginia Beach, Va.

A. To my knowledge, cold temperatures within the range ordinarily encountered by humans will have no bad effects. However, tape exposed to extreme cold should be allowed to come up to room temperature before being used. May I suggest an experiment? Take a tape that you don't value, put it in a freezer for one day, bring it out, allow it to come up to room temperature, operate it, and note yourself what adverse effects there are, if any.

Dolby Mistracking

Q. My cassette deck has switches for tape type and for Dolby B and C NR. I have been using Dolby C NR and a well-known brand of normal-bias (Type I) cassette. I recently began using CrO₂ tapes, again with Dolby C, and noticed a slight loss of treble. I shut off the Dolby system and tape hiss returned, but so did the high-frequency response. Cymbal crashes, fade-outs, and quiet passages were clearer and steadier, and the music in general was more transparent. Is this to be expected, or is there something I can do about it?—William Eichlin, New Milford, Conn.

A. I think you have a problem of Dolby mistracking with the particular type and brand of tape that you

switched to. Dolby employs variable treble boost in recording, then uses a complementary, variable treble cut in playback to restore flat response while reducing noise. The amount of treble equalization varies with the treble signal level. Accordingly, the record and playback levels going through the Dolby encoding and decoding circuits have to be matched so that the playback treble cut matches ("tracks") the record treble boost.

A qualified technician should be able to check your deck and adjust it, if necessary, for correct Dolby tracking with the particular type and brand of tape you plan to use. If you don't wish to go to this trouble and expense, you might experiment with other tapes. The degree of Dolby mistracking will vary among types and brands of tape because of varying tape sensitivity (amount of tape output for a given amount of signal input to the tape). This is one of the reasons why some deck manufacturers recommend specific tapes for their decks.

Excess Speed

Q. My open-reel deck has performed admirably for over 5 years, but now I have a bit of a problem. The deck is running at about 10 ips regardless of the position of the speed control or the pitch control. I wonder if you have any idea of what could cause this. I usually do my own repair work on all my equipment.—Raymond E. Disbrow, Belleville, N.J.

A. If you have been through this kind of repair work before, perhaps an eyeball exam of the transport will reveal the reason for faulty operation, such as a slipping belt, inoperative lever or cam, etc. First, though, purchase a service manual from the manufacturer to serve as a guide in locating and remedying the trouble. Also, you might consult the manufacturer by mail or telephone.

Equating Channel Levels

Q. When recording, should I always strive to set the two recording levels at "equilibrium" even though the level of the original source is significantly higher in one channel than it is in the other channel?—Gabriel Vazquez Padua, Bayamon, P.R.

A. If the channel levels of the origi-

nal source are unequal, and if in your judgment this is undesirable, the record gain controls should be adjusted to achieve the desired balance, rather than turned up equally.

From B to C

Q. I have just purchased a cassette deck with Dolby C NR. I have another deck with Dolby B. Can I dub a cassette with Dolby B noise reduction onto a cassette with Dolby C, and vice versa?—Thomas J. McDermott, Rowland Heights, Cal.

A. Play the Dolby B NR cassette with the old deck in the Dolby B mode. Feed the signal from this deck into the new deck and record with Dolby C NR on. This will produce a Dolby C cassette. Reverse the procedure to make a Dolby B dub of a Dolby C tape.

Tape Wear

Q. Do metal tapes wear cassette deck heads more than other types of tape? Does rerecording (after erasing) cause the sound quality of cassette tapes to deteriorate?—David Zaccagnino, Brea, Cal.

A. So far as I have been able to ascertain, metal tape causes no more wear of tape heads (and guides, etc.) than do the other tape formulations.

Although tape does not last forever, a tape of good quality can normally undergo hundreds of passes (recordings and playbacks) before noticeable deterioration occurs. To an extent, physical tape wear depends on the deck, that is, on the manner in which the tape is handled with respect to tension, head contact, etc. Magnetic characteristics are essentially unaffected by use unless substantial amounts of oxide have been worn away.

Correction

To convert white noise (equal energy per frequency) to pink noise (equal energy per octave), the white noise should be rolled off by 3.01 dB per octave as frequency rises, not 6.02 dB per octave as stated in the July "Tape Guide." ▲

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.

Motor Noise in Portable Recorders

Q. I recently purchased a portable AM/FM radio and cassette recorder/player combination. My problem with this unit is that the motor produces output from the loudspeakers. I have operated the equipment on batteries to see if what I was hearing was really 60-Hz interference. It was not, so I must conclude that it is coming from the motor. How can I filter or otherwise remove this unwanted sound?—Leonard George Paoletto, Florence, Ariz.

A. Motor noise is a problem with many small machines like yours because of the common power supply for the motor and the electronics. In some instances, one needs to filter the motor to a greater degree than what may have been provided by the maker.

We often find the motor connected across the power supply, with a filter capacitor connected across the windings of the motor. Thus, there are no time constants in the form of either series resistance or inductance, which, if present, could have isolated the motor from the rest of the package. (These motors have brushes and commutators that produce interruptions in current flow, which may then create instantaneous voltage changes that cause the noise you hear in the loudspeakers.)

I suggest that you disconnect the "high" motor lead, the one not connected to ground, even where this high lead is negative with respect to ground. Connect a resistor between the motor lead and the original point of connection to the rest of the system. You may also want to connect a capacitor between the junction of the motor winding and the added resistor and ground, observing proper polarity. The value of the capacitor should be the same as that of the main bypass across the supply. As for the value of the resistor, keep it as low as possible, perhaps 5 ohms. A significant voltage drop across this resistor may adversely affect motor speed.

Filtering is not always the problem. Some sophisticated motors use servos to control their operating speed. If the motor contains a strange pair of wires other than those needed to actually turn the motor, these are the servo leads; there may well be a voltage present on them. An a.c. servo's signal

generator can be considered an audio-frequency generator much like those used in many Hammond organs, so if these leads run too close to the playback circuitry or head leads, the servo signal may be reproduced in the loudspeakers. It is also possible that the servo control board itself is located so close to the playback components that the signal tone is induced. You may have to install a metal shield between the servo board and the rest of the circuitry. This shield must be grounded, and it must not be permitted to short out other circuit elements.

Blowing Fuses

Q. I have a mono power amplifier. I made the mistake of connecting a light organ to its output terminals, which caused the fuse in the power transformer's primary circuit to blow. I replaced the fuse, but it blows with each replacement and subsequent trial. I checked the power transistors; they were fine. I connected an ohmmeter to the power cord and measured 0.03 ohm d.c. resistance, which seems too low to me. The rest of the power supply was checked, and it appeared all right. Is there something I have overlooked?—Mike Lapenna, Montreal, Que., Canada

A. Because of the high power output of today's amplifiers, their power transformers must deliver sizable amounts of peak current. This means that the d.c. resistance of their primary windings is often very low. Even so, 0.03 ohm is low enough to be easily accounted for by just the resistance of the line cord plus that of the test leads which connect it to the ohmmeter. In any event, you cannot equate the d.c. resistance in the primary of a power transformer with that primary's impedance at 60 Hz. The latter governs the current to be drawn when a.c. voltage is applied to the transformer.

You cannot rule out the possibility of a short circuit in the primary of the transformer. To determine whether one exists, disconnect the secondary windings. Once again plug the amplifier into the wall socket and turn it on. If the fuse blows, this may be an indication that the primary is shorted or that there is a short in the secondary.

Before giving up and replacing the power transformer, physically check all

of the electrical connections. Remember to unplug the light organ before making your checks, and don't forget any convenience outlets. It just could be that your trouble is a short in the light organ, which, under normal circumstances, should be capable of operating just as you had intended.

Output Transformers and Speaker Voice-Coil Protection

Q. Some amplifiers use output transformers. Does their use have a bearing on voice-coil protection in the event of a shorted output transistor? Also along these lines, fuses help to protect a loudspeaker from damage, but what about loss of damping because of their series resistance? Is this significant?—Eugene L. Bershada, Freehold, N.J.

A. Output transformers used in some solid-state amplifiers will, in the event of output-transistor failure, bear the brunt of the short-circuit current resulting from a defective output transistor, thus sparing the loudspeakers.

Fuses will reduce the effective damping. (In my opinion, this loss of damping will not produce noticeable audio-quality degradation.) This small sacrifice is more than offset by the prevention of possible voice-coil damage in the event of a shorted output transistor.

Rms Power

Q. What is meant by the rms power output of an amplifier and the rms power-handling capacity of a loudspeaker system? Also, if a particular driver is rated at 30 watts music power, is this the same as 30 watts peak?—Loren Gade, Virginia Beach, Va.

A. An "rms" power or power-handling rating refers to average, continuous power. (Technically, the letters stand for "root mean square," one way of calculating such averages.) An amplifier may be capable of producing a higher output for short times (peak, or music power); a loudspeaker may be able to withstand higher-than-average power for an instant (which is peak power, again). 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.

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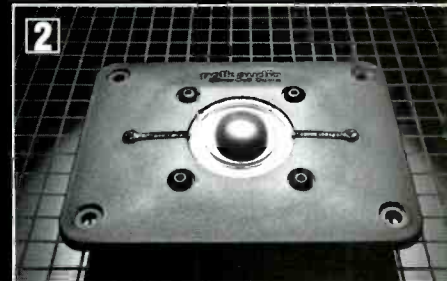
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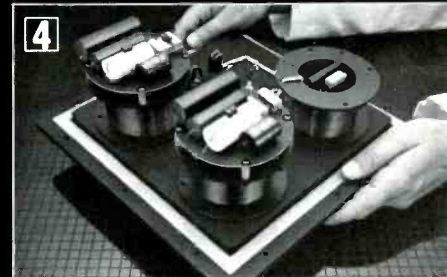
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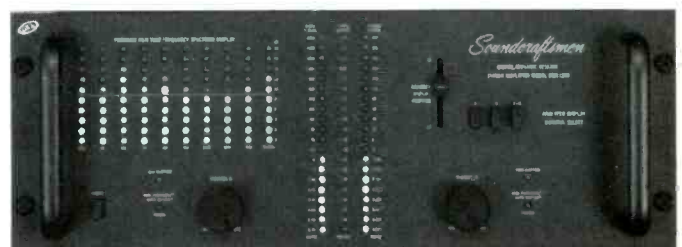
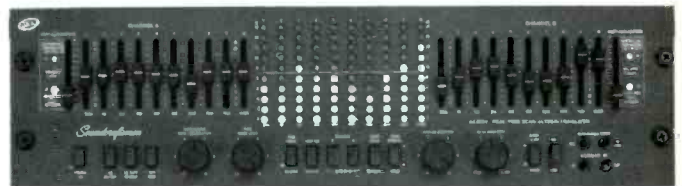
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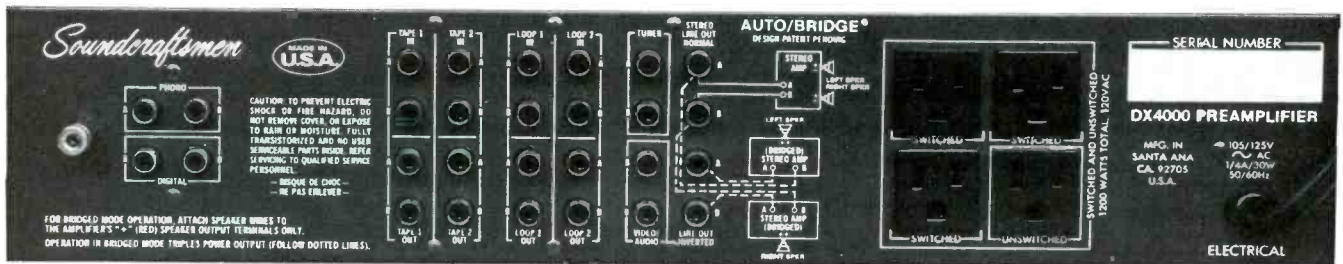
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KEN POHLMANN

BEAUTIFUL OR BEASTLY?

For the past year or so we've examined many of the elementary aspects of digital audio technology. Discussions of topics such as sampling and quantizing, CD-player design, Compact Disc format and low-pass filters have, I hope, illustrated their workings and taken away some of the mystique often associated with them. Digital audio is, after all, merely a kind of technology used to store the information comprising music, just as analog audio is.

Of course, an analytical look at music technology goes only so far because, when it comes to the music business, a host of other factors ultimately becomes the overriding concern. Sales of LPs peaked (along with the 8-track tape) in 1978 at \$2.473 billion, declining to \$1.69 billion in 1983. Meanwhile, prerecorded cassette sales rose from \$250 million in 1978 to \$1.812 billion in 1983, thus displacing the LP as the leading audio medium.

What is the key to a medium's success? When it comes to market share, is fidelity the primary concern? Obviously there are other factors. For example, the cassette's quick rise to preeminence could probably be traced to the consumer's desire for convenience and portability.

Now, the cassette's rapid success is being humbled by that of the CD. In less than two years the CD achieved the same U.S. market penetration which took the cassette six years to reach. In the American market, CD sales rose from 800,000 units in 1983 to 4.9 million in 1984, an increase of more than 500%. Worldwide, 350,000 CD players and 5.5 million discs were sold in 1983, and in 1984 900,000 players and 17 million discs were sold. Clearly, the CD is a big hit; it is, in fact, the most successful new electronic product ever introduced.

Why is that? Let's avoid a lot of endless debate such as, "It's because the economy is good," or, "It's in spite of the bad economy." And let's even avoid the obvious non-sonic elements of the format's popularity: Convenience, longevity, portability, etc. Instead, let's go to the mat with one criterion: The aesthetics of the medium. Specifically, the question we can ask is, does the Compact Disc's fidelity



Illustration: Philip Anderson

justify its success? Or is it merely the fast food of the audio world?

The question is difficult to answer because of the dissimilarity of analog and digital media. Most performance specifications are throwbacks to the days of analog, and thus they measure parameters relevant to the quality of analog circuitry, but not necessarily to fidelity itself. Audiophiles have always questioned the omniscience of specs; with digital, that suspicion is even more suitable. For example, in terms of flat frequency response, signal-to-noise ratio, THD, etc., the CD is quite good. In my experience with many players, I have come to expect a frequency response from 20 Hz to 20 kHz, ± 0.5 dB; S/N greater than 95 dB, and THD of less than 0.003% at 0 dB and 1 kHz—or numbers in those ballparks. In fact, the specs for CDs are so good that I routinely employ CDs as a reference standard on the test bench for all kinds of measurements. Need a 1-kHz sine wave? How about a sweep tone, or tone bursts, or SMPTE IM? No problem—a CD test disc provides a highly accurate reference for all kinds of audio testing. But already we have diverged from our stated task of comparing aesthetics. Strictly according to

specifications (at least those designed to evaluate analog equipment), the digital medium is clearly superior. But what do specifications mean in relation to what we hear?

Beyond specifications remains the question of *sound*. It is apparent that a CD sounds different from an LP; this is evident even over broadcast FM. And the difference could stem from factors beyond those measured by our specifications. Exactly what constitutes it? Apparently there is something missing from, or added to, the sound of a CD (or both). But why is this " \pm Factor" judged good by some and bad by others? Is it music information, or distortion, that is missing? Has new music information been added, or a new kind of distortion? Or a mixture of both?

With those kinds of questions, the battle lines are clearly drawn. A digital advocate would state that additional music information has been added and distortion taken away, and would point to the excellent specifications and sound quality to prove it. An analog advocate would state that music information has been lost and distortion added, and would similarly point to the sound quality to prove it. Leaving aside the question of specifications,

we are left with differing opinions of the sound quality. It appears that in lieu of more meaningful specifications only a subjective evaluation can begin to settle the issue.

So, what is different about the sound quality when comparing digital to analog? A CD has several obvious advantages, such as lack of clicks and pops, groove noise, and wow and flutter. Other, perhaps more debatable, advantages are solid low-end response and accurate localization. This brings us to the essence of the debate. Many analog advocates might grudgingly concede the above, but would single out high-end response and ambience as deficiencies in the CD.

Although the Nyquist Theorem was proved in 1926, it is still not accepted by some. Despite healthy skepticism, the facts of the theorem haven't changed in the last 59 years. Simply stated, all of the information below half the sampling frequency can be encoded, and any information above that frequency must be excluded. The frequency response of a CD is thus flat from 0 to 20 kHz, less any deficiencies of the analog output circuitry interfacing the player with an analog amplifier. If you like the frequencies between 100 and 400 Hz, then you have to like the frequencies between 10 and 20 kHz; they are absolutely identical during the digitization process. Of course, the Nyquist Theorem is as much of a limitation as it is an opportunity. Only frequencies below the half-sampling frequency are encoded. If you want a higher frequency, then you must increase the sampling frequency.

So what does all this mean? Let's consider the case of the highest note of the highest pitched instrument in an orchestra (no, it's not the cymbals), a piano. The C note four octaves above middle C is 4,186.01 Hz. Let's round it to 4 kHz for simplicity. Since it is a complex waveform, it will have an overtone series at multiples of the fundamental: 4, 8, 12, 16, 20, 24, 28, 32, 36 kHz, etc. Although each higher partial generally decreases in amplitude, in theory the overtone series would extend infinitely. Our digitization system would encode everything below the half-sampling frequency; in the case of the CD, up to about 20 kHz. Thus the fundamental and four partials would be

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If your hearing extends beyond 20 kHz, then the CD has indeed robbed you of musical information that lies above that point.

encoded, and all musical information above that point (24 kHz and up) would be excluded.

The question thus ultimately boils down to hearing. If your hearing response extends beyond 20 kHz (and is acute enough to perceive the low-amplitude partials present there), then the CD has indeed robbed you of information—specifically, all information above 20 kHz. The 20-kHz high end was felt to be sufficient for most listeners; that, of course, explains why 44.1 kHz was selected as the sampling frequency. How high is 20 kHz? Well, most televisions emit a loud oscillation of about 15 kHz which drives some people nutty. That's three-quarters of the way to 20 kHz.

What about ambient information? Analog advocates might say that a CD recording "has no air," in other words, that some reverberant or spatial information is missing or has been affected. With 16-bit quantization the noise floor of a CD is about 98 dB down; thus the reverberation is not being lost in quantization noise. And it is not the length of the reverberation time, either; timings between analog and digital recordings show an equal period of decay. And why should ambient information be at all different from any other kind of acoustical information? The pressure function identifying the acoustical characteristics of a Steinway, and that identifying the acoustical characteristics of Orchestra Hall in Chicago, follow the same laws of physics. Once again, there is no analytical means yet available to demonstrate the subjectively felt differences between digital and analog sound.

Nevertheless, if a digital recording is compared to an analog recording, some listeners might describe the digital recording as being "cold" while others might describe it as being "clean"—two subjective expressions of striking descriptive similarity, yet one is a negative judgment, the other positive. Has the digital recording failed to capture some aspect of live sound, or merely eliminated some distortion which we have grown accustomed to in analog recordings? The weight of evidence favors the latter, though it must be conceded that perception of beauty lies between the ears of the beholder.



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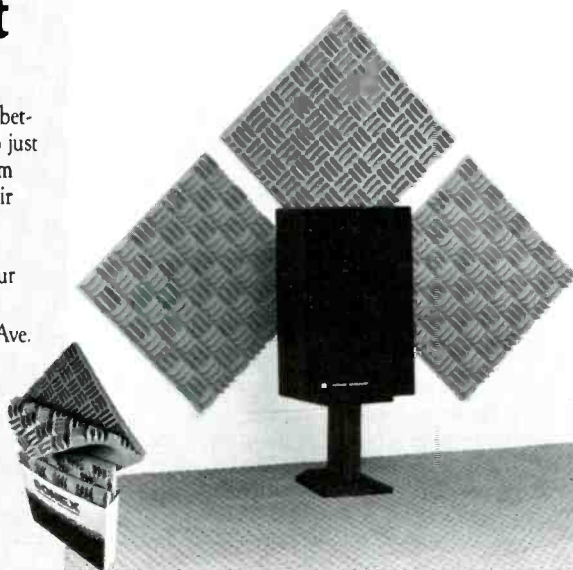
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A Real Team

Dear Editor:

It seems to me that in recent years your annual Lirpa issue had become a little strained, but this year's issue was right on track. I especially liked the design philosophy espoused by George V. Dajan and the down-to-earth advice of Namreh Nietsrub.

Until next year, meanwhile, I shall continue to derive similar pleasure from the humorous reviews of Lawrence L. Greenhill and David L. Clark. By the way, how long can the boys continue the pretense that their first names aren't Bob and Ray?

Lawrence Wallcave
Santa Rosa, Cal.

Send Flowers

Dear Editor:

I was very intrigued by Prof. Lirpa's method for perfecting a stereo system by straightening the power amplifier cord (see "Tape Guise," April 1985). The "straight wire with gain" concept yielded astounding results, as I shall relate. You see, in my haste to carry out the Professor's method, I misinterpreted some of his directions.

As I understood it, the idea was to relocate the amplifier where one could detect a clockwise rotation—namely the bathtub. As it happened, the power cord was at its straightest when I held it in that location!

Even with all the leads disconnected, the sonic (and other) effects that I experienced while turning the amplifier over in a bathtub full of water gave me new respect for the concept of a straight wire with gain. When I get out of the hospital, I'm going to try improving my TV picture the same way.

John Bruno
Brooklyn, N.Y.

No Niche Needed

Dear Editor:

I would like to lend my support to Roy Allison's comments about the recent turn that your magazine's editorial content has taken (see "Signals & Noise," April 1985). I can think of two specific instances, an "Auricle" and an "Equipment Profile," where brevity and/or lack of objective data have deprived readers of needed information.

The feature article "NAD's Floppy Tonearm" in the February 1984 issue

was very interesting, but obviously written by the product's designer. Longtime *Audio* readers were certainly as disappointed as I was to see the NAD 5120 turntable given such a cursory review in the same issue. The effect was to buttress a PR push, and this is not what I have come to expect from *Audio*. A new and unusual design like NAD's demands more rigorous examination.

Similarly, I would have liked to have seen more data on Sony's new D-5 portable CD player. As a D-5 owner, I have been very curious about its technical performance—I get a rising (!?) response in the top two octaves, for example—and the "Auricle" in the March issue told me very little that I couldn't have gleaned from the promotional literature.

Audio is the only magazine in the "High Fidelity" industry whose reviews I respect. The "Auricle" profiles combine the superficial aspects of the more consumer-oriented press with the golden-ear silliness of the little magazines. I don't think that *Audio* needs to make a niche for more of that particular kind of writing.

John Etnier
Portland, Maine

Tubes into Transistors

Dear Editor:

As one who believes that tube amplifiers should *not* contain transistors, I was disturbed that the Lirpa 1 amplifier (described in "The Perfect Amp: Zero Distortion" in the April issue) uses a transistor at Q1, and I determined to disprove the article's statement that this transistor "is irreplaceable by any vacuum tube."

Since Appendix I shows how to modify a transistor for this application, perhaps there is also a way to modify a tube. And there is.

Start with one of the metal tubes introduced just before World War II. Choose one without a grid cap—a 6C5 or 6H6 would be suitable. One that does not test "good" is okay—in fact, please do not use a good one, as they are no longer made, and surviving stock is required by antique radio collectors for restorations.

Drill a hole through the metal top in the center. The vacuum, which is not used in this application, will then es-

cape through the hole. When it has all leaked out the tube should be filled with mercury, poured in through the same hole. That's all there is to it!

A problem sometimes experienced with tube amplifiers is microphonics, caused by mechanical vibration of the tube electrodes. With this modification, there will be no such problem because of the excellent damping provided by the mercury.

Some people expect this tube to emit blue light in operation. This is because they confuse a mercury-filled tube with a mercury vapor-filled tube, such as the 83, which does emit blue light. This tube is triply protected against emission of blue light, since the metal envelope is opaque to blue light, the mercury also is opaque, and there is nothing in the tube to generate blue light in the first place.

Cecil Grace
New York, N.Y.

Blowing Their Horn

Dear Editor:

I would like to add a kudo that should at least equal those published in your April "Signals & Noise." Klipsch and Associates has to be the most conscientious audio manufacturer I have dealt with in over 30 years of hi-fi experience.

When I bought a pair of used, 21-year-old Klipschorns recently, I found that replacing the original drivers with updated Klipsch units exacerbated a mysterious problem in the middle and upper range of the system, and no one could figure out what it was. Finally, I sent the top sections of both horns down to Klipsch and they replaced horn, driver and crossover components, and the mounting flanges—free of charge! They even sent them back prepaid! The speakers sounded *great* (even more so with the addition of Klipsch's newest crossover).

I think that this kind of treatment, of the owner of a used product that was old enough to vote, must be some kind of record for commitment and a sense of long-term responsibility for one's products that goes well beyond any ordinary warranty. It surely is one reason for the continuing respect held for Klipsch products.

Larry Clare
Bethesda, Md.

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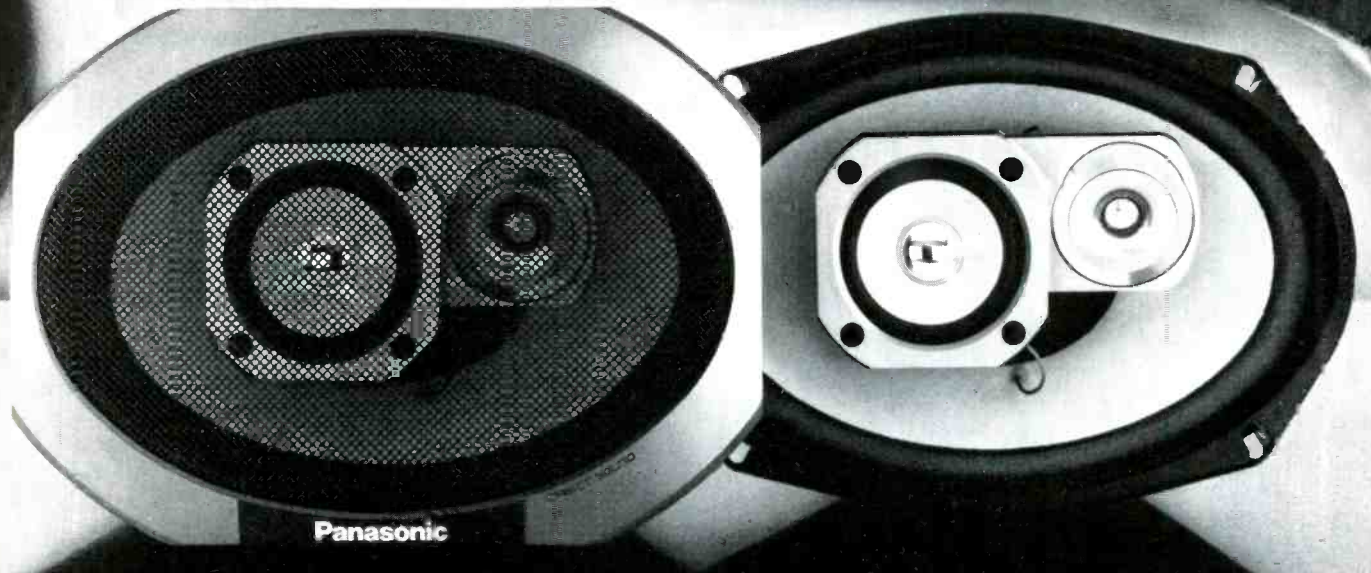
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
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TIMELY LESSONS

There's nothing like on-the-spot experience (with a bit of informed guidance) to push you through the learning process in any field, as you will understand if you read my installment on radio last month. Educators set up workshops to supplement texts and lecturing, audio specialists help you with hands-on sessions to get your sticky fingers where you want them. All this is just the old apprentice system, whereby various trades and skills—also the very highest arts—are carried forward from one generation to the next. But how about an accidental apprenticeship, unintended?

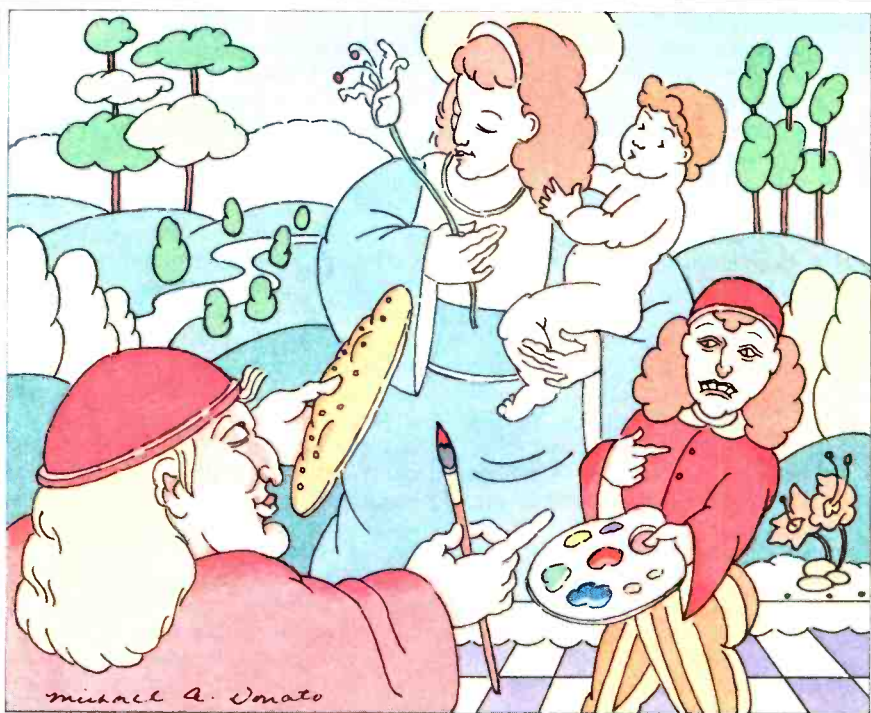
So it was for me in radio and plenty else, as noted before. A series of happenstances, or call it luck. As though I'd bumbled somehow into Titian's or Michelangelo's studio (*bottega* is the word) and found myself trying to paint feet on a half-finished Madonna. An apprentice by mistake, but even so, it might be interesting.

Routine work in a radio station of the 1940s was not that different from the same today, granted no automation and differences in equipment and programming. Most present-day operators could walk right in and get down to business. But for an outsider, then as now, the basics were a considerable surprise. I quickly learned about time, for instance, when I got past that first show of mine. It is measured in seconds, not minutes, and a half-hour program runs 28:30 or else. No dillydallying. As a result, to this day I am the most punctual oldster I know. People find it disconcerting when you are so literal—but not in broadcasting.

I learned, too, about the dread of time lost—the phenomenon of dead air. No signal. Five seconds of that is endurable; 10 is disturbing—the heart begins to pound. Thirty seconds of silence is total disaster. Sweat pours, hysteria mounts.

Some stations have deliberately tried, over the years, to relax this tyranny of the seconds, but it isn't really possible. It's inherent in the medium itself, AM or FM. Yes, we can be relaxed but only in proportion. A 10-second pause seems forever.

You'll note (and I learned) that recording has the same sort of time factor. Spacing between LP bands, for



example, now runs naturally in the 5 to 10-second range. But in live concerts that spacing can be 10 times as long and audiences don't mind a bit. A "live on tape" recording today, even with music unedited, must somehow be shortened in those painfully long (and noisy) intervals—as we hear the reproduced sound. You fit the message to the medium.

Curiously, television, combining audio and visuals, has an inherently much slower tempo, probably because it can command more attention through two senses, however soporific on occasion. TV shows are longer by far than the old radio equivalents, and correctly so. Blanks and silences do not seem to matter as much. Again, it's the nature of the medium.

I learned very quickly to use one vital time trick: back-timing. Brilliant idea! So simple. You start at the end and go backwards. If your plane leaves JFK Airport at noon, you back-time from that point, step by step, to find out when you can safely leave home. Elementary, but few people bother. I still back-time practically everything, but now I'm canny. When dealing with people who don't, I insert an extra NLQ, a Normal Lateness Quotient. Some peo-

ple are always 5 minutes late, or maybe 10, others much, much more. One guy, the other day, said on the phone, "I'll be there in 20 minutes." I knew him. He was punctual, right on the dot (including his NLQ), an hour and a half later. Fit perfectly into my back-timing.

On radio, if your show (always live, in the '40s, except for a very few muddied transcriptions on disc) ran too long it was usually dumped off the air at precisely the preset time. You weren't supposed to run overtime; whole networks were waiting on your final word. So you didn't. I learned to live with this imperious rule after several hideous mishaps. One of my later taped programs was a "mystery composer" show, a sort of musical guessing game. I did a long, tricky build-up, giving hints, with lots of music, and I had the bright idea of saving the composer's actual name until the very end to heighten suspense. At that point I said, portentously, "And now, the name of our mystery composer! Believe it or not, he is . . ." *Clunk*. I was cut off the air! Right on the last word.

That name would have gone 1 second overtime, due to a late start with the tape, the station's fault. No matter. The axe fell exactly on schedule. "You

The big vocal punch goes over in board meetings and on the basketball court, but it kills microphones.

have heard Edward Tatnall Canby . . ." said the announcer, not even noticing. And then the phones started to ring.

I made an unconvincing explanation the next week and thereafter resolved to run my tapes a bit short—and *never* to end with vital information.

Now, so many years later, even if I try to delay I always get to the doctor's office exactly on time, as scheduled—and then must wait an hour, or often two. Curious ideas some of us have as to the allowable plus or minus! I'd hate to be an M.D. with a program on the air. Of course, it's not only radio and all broadcasting that adheres to the tyranny of the second. Every music group, in studio or concert hall, must learn exact timing wherever there is audio involved. So must the home hi-fi user when it comes to video or audio cassette recordings. Time waits for no man! It never has.

For our timing we had, in the 1940s, a noncomputerized card catalog which at first had me somewhat scandalized. Every bit of music we owned on records was filed by *timing*, second by second. If you had 4:58 minutes to fill up after a featured work, you looked under 4:58 and took your choice of maybe four or five items. When I later came to making up dozens of recorded programs, all to a typically exact length, I found this system quite delightful. (So you thought we chose the music for its artistic worth, did you?) Now, I suppose, you do exactly the same thing on the house computer monitor. Might save 2 or 3 seconds over the old system on cards.

An even more personal bit of learning came for me when I splurged and had my very first broadcast on FM taken down on ET (electrical transcription). An air check. Very simply, I wanted to hear myself. Delusions of grandeur? Maybe, but more practically, I wanted to know what my show was like to the outside listener.

No tape, no personal recorders then. You went to a local recording studio and had them take you down off the air. Mine came on two big, 16-inch, 33-rpm lacquer discs, professional type, which I could play in the studio. They ran about 15 minutes a side. The alternative 78 lacquers for home playing ran around 5 minutes (narrower grooves than commercial discs). All

these were cut on two tables, overlapping the material at each ending. For a half-hour show on 78 this was painful. But at least you got all the content.

Yes, I indulged in a bit of megalomania. I remember going out into Central Park and gazing at the top of the Hotel Pierre, where our antenna was clearly visible—little *me*, emanating from way up there! But when I heard the ETs of the show, I was dismayed. It sounded awful. *I* sounded awful, I mean. Why? I had tried to do my best. Why did it sound so monotonous and dull? I was deflated, embarrassed.

Well, of course, in those days you did not ever hear the sound of your own voice as others heard it. In the broadcast, before the mike, I thought I was being witty and cheerful and very sophisticated. What a delusion! On the air, as recorded, I sounded like an idiot, and it wasn't the fi either, which on ETs could be quite good.

Well, live and learn, or retire from the field. I took those two big lacquer discs into our studio during off hours and spent many days working on them. I got out my script and *read it out loud along with the recording*, to see how it sounded from the inside of me. That study was another turning point. I found out several things that largely accounted for the trouble.

First was timing. When you speak via any electronic medium you must punctuate by *deliberate pauses*. Most people don't. I had blithely run my clauses, my sentences, even my paragraphs into one long, unbroken flow. You could understand if you tried, but I wasn't helping. I once heard a recording of a famous American novelist who read his own works exactly the same way. Excruciatingly dull. If you don't do it naturally, then you learn. You practice and practice, until it becomes second nature. All actors, all radio and TV people (including the President!) either know their timing instinctively or have studied it very, very well. As a matter of fact, when you read anything aloud, anywhere, the timing principle applies. Even to impromptu speeches. Pause for effect, also for grammar. So I tried and tried. I filled up my script with pauses and thus made it too long. But the next one went better.

Second was pitch—emphasizing speech by ups and downs of the

voice—and third was the big punch, the forceful explosion that carries. Teddy Roosevelt—ever hear him? (He left a few recordings.) That punching is a big temptation. It goes over in board meetings and on the basketball court. It quells any opposition if you do it right. But it kills mikes.

It seems I was a puncher and I didn't use the pitch of my voice nearly enough. (Do you?) To make my impression, notably as a teacher before a lot of apathetic students, I learned to punch like crazy without half noticing. I had punched my way (without enough pitch variation) straight through that first radio script and all I got for my trouble was a batch of momentary overloads and no punch at all.

So I practiced, as I went on to more broadcasts, making all my points at a dead level of volume, using only the pause and the rise of pitch to get impact. It began to work (more ETs). I sounded more interesting and the VU meter stopped banging its pins. I proliferated the pauses, short, medium, and long; the voice soared up and down (however silly it seemed at first), and my programs began to be almost professional. That direct comparison between my inside voice and its outside equivalent paid off.

Today it is simple to do all this with any tape recorder almost anywhere. Today our equipment, from mikes to speakers, can generally take a wider dynamic range, though the ubiquitous limiter will cut you back if you get too loud. But the rules still basically apply, as they did 40 years back.

I went further in those first years. I began to take on some announcers' tricks I heard (as you do now) every single day. You start a sentence like "And now . . . let's hear . . ." with an "and" in your very deepest bass, then a "now" at a higher pitch—and you curl that "now" around the diphthong, *naw-oo*, like the knell of doomsday. Announcers can make the silliest things sound important: "And *naw-oo*, a message from Chompy Cheese Bits"—phew! Grabs you. Why shouldn't I do the same, even on classical radio? So I did.

"And *naw-oo*, just listen to this extraordinary interpretation of (pause) Johann Sebastian Bach. . . ." It's a strange world, this audio of ours. **A**

SECOND-CITY FIRSTS

Setting attendance records at Consumer Electronics Shows has become commonplace, and the 19th Summer CES was no exception. By June 5, when the SCES concluded its four-day run in Chicago, 102,731 people had attended this vast showcase for the consumer electronics industry.

Record crowds notwithstanding, this SCES was a reflection of the current economic climate. Business has been on the flat side, and, to use that well-worn cliché, buyers exhibited a mood of "cautious optimism." More than a few complained that they were becoming rather overwhelmed by the vast diversity of products, and that making buying decisions was a frustrating and confusing exercise, fraught with peril. All this is exacerbated by the introduction of new technology hard on the heels of recent breakthroughs whose products are not yet fully developed.

Every CES has a "hot" product category, and this time it was 8-mm video recorders. The 8-mm format has been a sort of stepchild for a couple of years now, and many retailers frankly hoped it would just fade away. In fact, with blank-tape manufacturers generally reluctant to heavily commit their facilities to the production of 8-mm tape, the format had indeed been on the back burner.

All this changed at the SCES when, with much fanfare, TDK, Memorex, Maxell and Sony announced 8-mm video tapes, while Sanyo, Kodak, Pioneer, Canon and Sony introduced production models of 8-mm video recorders. Kodak and Canon, at least, had announced 8-mm camcorders (camera/recorder combinations) last year, but these new entries are all straight portable or tabletop recorders, capable of recording off the air or from separate cameras.

Compared to the average half-inch VCR, the 8-mm video recorder is in a much smaller package. The Pioneer unit measures 16½ inches wide by 4 inches high by 13¾ inches deep. The 8-mm video cassette is just slightly larger than a standard audio cassette.

The audio facilities are interesting: For monophonic sound, all 8-mm VCRs have Audio Frequency Modulated analog tracks. The big surprise is that many of the new 8-mm recorders (the



Kodak, Pioneer and Sony, anyway) will also feature stereo PCM digital sound-recording capability. This is only an 8-bit system, with a sampling rate of 31.5 kHz. The sampling rate limits its high end to 15 kHz (the lower end is given as 5 Hz by Pioneer and 20 Hz by Kodak and Sony, with no indication of dB variations given). Signal-to-noise ratio, which would normally be about 64 dB for an 8-bit system, is actually higher, due to companding. Here, too, the makers disagree on specs, with Pioneer saying 90 dB, Sony saying 88 dB and Kodak saying at least 80. Sony also claims wow and flutter of less than 0.005% rms.

The monophonic AFM analog track's specifications also vary according to the manufacturer. Canon's printed spec sheet cites a 70-dB S/N and frequency response of 30 Hz to 14 kHz, ± 3 dB, while Pioneer claims 80 dB and response from 50 Hz to 15 kHz.

The models with PCM stereo sound can also record PCM digital stereo in place of the video tracks, so these VCRs can be used as audio-only digital recorders. Six pairs of stereo tracks are provided, so a 120-minute 8-mm video cassette affords an astonishing total of 12 hours of stereo digital recording! It is not hard to envision some future version of the 8-mm recorder adapted for automotive or broadcast

use. Car-stereo aficionados could record 12 hours of their own programming using Compact Discs as super source material.

In spite of these technically interesting features and the general hoopla, the 8-mm video recorder was not greeted with universal enthusiasm at the SCES. Many grumbled that the introduction of these 8-mm units would muddy the waters in the present VCR market, generating much confusion among consumers. Many people also felt that the picture quality of the 8-mm system was a bit fuzzy and lacked the resolution to compete with standard half-inch VCRs. Undaunted, backers of the 8-mm format are busy (and having some success) in lining up prerecorded software from the Hollywood movie people. Quite obviously, there must be a good supply of movie software, or the format would be foredoomed to failure.

As with any new format, initial pricing is always high—in the case of these 8-mm recorders, the range is from \$1,500 to \$1,800. What are the chances of the 8-mm format succeeding in the marketplace? In spite of the backers' enthusiasm and some of the system's unique advantages, most dealers were not sanguine about its chances of replacing the standard half-inch VCR. "It would take years"

Many CD players are really "me too" models, supplied OEM by a few makers and, for the most part, sisters under the skin.

and "Picture quality must be improved" were typical comments. Time will tell, but technology has a way of accelerating things.

One possible source of improvement is the tape. Existing 8-mm tapes are already metal-powder formulations, but there is talk of metal-evaporated tape, and other exotic formulations that could make 8-mm a formidable contender in the VCR sweepstakes. The only metal-evaporated tape I've seen so far, though, is Matsushita's Angrom—which is an audio microcassette.

While the 8-mm introductions caused quite a stir at the SCES, the other hot categories—other types of video, and CD in all its manifestations—kept apace.

The audio/video marriage has borne many progeny, a plethora of products to please eye and ear. This year these take the form of complete audio/video systems centered on monitor-type TV sets—usually 25-inch models—along with a VCR, cassette deck, turntable, AM/FM tuner, preamp and amplifier, equalizer, and pair of loudspeakers. In some of the more elaborate systems, there is also a CD player, and most audio and video functions are operated by a wireless remote control. Some of the more upscale A/V systems with higher powered amplifiers, larger stereo speakers and generally better components can cost as much as \$5,000 and more. There is hardly a major supplier that doesn't have one or more A/V systems. Such names as Technics, Kyocera, Sansui, Sanyo, Kenwood, Pioneer and Yamaha come to mind.

One of the more touted features on many of these A/V systems is their ability to receive stereo TV broadcasts. That certainly is nice, but it is a sad fact that although stereo TV broadcasts are now an FCC-approved service, a relatively small part of the U.S. is served by such broadcasts. The hang-up, of course, is money. (The situation reminds me a great deal of the early days of FM stereo multiplex.) It appears that in many cases, a fairly sizable investment will have to be made by a TV broadcasting station to modify its present transmitter and associated equipment in order to transmit stereo TV. Nor does there appear to be a



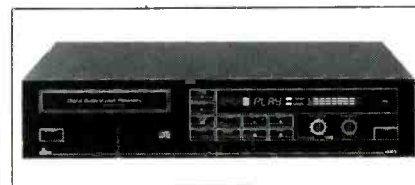
Prototype, Pioneer 8-mm video recorder



Kodak MVS-5380 8-mm video recorder



Toshiba XRV22 Compact Disc player



dbx DX3 Compact Disc player

quick resolution to the problem on the horizon. Of the networks, only NBC is showing much activity in converting their affiliate stations to broadcast stereo TV. This is said to be happening because NBC is part of RCA, which, of course, sells television receivers. With no similar spur, ABC and CBS apparently are taking a very low-key approach to stereo TV broadcasting.

As you would expect, CD technology was of major concern to dealers at the SCES. The number of CD players available has reached astonishing proportions, now approaching nearly 50 models. As I have noted before, many of these CD players are "me too" models, really supplied OEM by a few manufacturers and, for the most part, sisters under different cosmetic skins. This fact is not lost on the marketing departments in some companies. They

want to offer CD players which appear to have some alternative styling or features that make them different and set them apart from the pack.

Toshiba has come up with a novel way of differentiating their XRV22 CD player. This \$500 unit has a dual-disc setup: There are two CD turntables, and each can be randomly programmed for 15 selections. Thus with certain Compact Discs this would provide more than 140 minutes of music—probably enough to cover the requirements for background music or dancing at a party.

The dbx DX3 CD player has gone all out to be different. In addition to all the standard CD-player features, plus digital filtering, the DX3 has a built-in compressor, partially modeled after the "Over Easy" compressor used in dbx professional equipment. While at first glance this appears to be sheer heresy, a subversion of the much-vaunted wide dynamic range of CD recordings, it would seem to have a useful purpose. It can be used to maintain equal loudness levels for background music listening. More to the point, CDs can be copied onto audio cassettes for use in a car, where the wide dynamic range of CD is compromised by the noisy mobile environment.

There is another special circuit, DAIR (Digital Audio Impact Recovery), which is a bit more controversial. One would hardly think it necessary to expand the dynamic capabilities of a CD recording, but this DAIR is supposed to add more impact to transient attacks in music—to quote dbx, "to get a real sock from brass and percussion." I doubt if this would find much use in properly recorded classical CDs, but perhaps it would help in pop music, too much of which has a dynamic range of only 25 dB or less.

The DX3's third special circuit is the Ambience Control, derived from that of the dbx Soundfield One loudspeaker. This circuit is said to provide the out-of-phase, L-minus-R information to give the illusion of a more airy, spacious quality to the sound. Use of this circuit would depend on the recording venue and individual tastes. The DX3 CD player is \$599.

Next month, a cornucopia of other CD players and assorted audio bonbons from the SCES.

THE MR 20 STEREO MONITOR/RECEIVER

FROM **NAD**



Enter No. 21 on Reader Service Card

AmericanRadioHistory.com

Television Without Compromise.

High-fidelity video with stereo sound.

The MR 20 monitor/receiver from NAD sets new standards for the emerging "high fidelity" era in television. It combines brilliantly clear video with wide-range stereophonic sound to provide a television experience with more satisfying realism, and more dramatic impact, than anything previously available for home use.

The NAD MR 20 is a no-compromise monitor/receiver. It is a studio-quality video monitor that accurately reproduces every tonal shading from velvety black to glistening white highlights, and shows every detail in the broadcast picture with unprecedented clarity. It is cable-ready with sensitive 139-channel digital tuning and wireless infra-red remote control; it has inputs for seven program sources including

video disc and video tape and it is completely equipped for stereo sound (with built-in decoding for stereo and bilingual TV broadcasts). It costs more than an ordinary TV set; but, like a stereo hi-fi system, the MR 20 is a rewarding long-term investment in viewing and listening pleasure.

Television as it was meant to be.

Engineers in TV studios employ costly high-performance video monitors to check the quality of TV pictures before broadcast. But TV receivers sold for home use have always been compromised in quality, in order to simplify their circuitry and reduce manufacturing cost. As a result, most people have never seen a high-fidelity video image and do not realize how remarkably good — how sharp, clear, detailed, and realistically textured — a television picture can be.

If you love good music, you already know that a "high fidelity" stereo system provides more listening pleasure than a table radio. With its clear and undistorted highs, rich bass, and accurate timbre, a fine hi-fi system authentically reproduces the natural sound of music, and that makes it a deeply rewarding investment.

The NAD MR 20 brings the concept of high fidelity to video, faithfully reproducing the entire television picture exactly as it is broadcast, with no compromises or short-cuts. The advanced design of the MR 20 begins with the striking new shape of its square-cornered picture tube. Its flat screen shows the entire TV picture without losing information at the edges or corners, while NAD's high-performance video circuitry delivers brighter whites, blacker blacks, finer details, crisper contours, more realistic textures, a truer gray scale — altogether a clearer, sharper, more detailed and lifelike picture than you have ever seen on a television screen.

The New Technology of Television:

Television is no longer just TV.

Until recently, television was a restricted medium with limited viewing choices, fuzzy and ghost-ridden pictures, and low-fidelity mono sound (so low-fi that it actually was relayed from networks to local stations via telephone lines).

Today television has entered a new age. Broadcasts have improved in technical quality through better cameras, better electronics, and satellite relays. Cable and pay-TV provide dozens of program choices. Video games and home computers generate colorful video images for entertainment, education, and practical tasks. Video tapes and discs give you more freedom to watch what you want, whenever you want, and LaserVision discs rival the best broadcasts in sharpness and clarity. Spacious, wide-range stereo sound is available from video discs, "hi-fi" video tapes, and a growing variety of TV broadcasts, while the preparations for stereo have improved the quality of all TV sound.

The NAD MR 20 enables you to take full advantage of this dramatic evolution. Its wide video bandwidth and special sharpness-enhancing circuits resolve every detail in the best broadcasts and LaserVision discs, while also producing an astoundingly vivid display of the brightly colored graphics in computers and video games. The MR 20's designation as a monitor/receiver means that it provides direct audio and video "line" inputs (instead of antenna-type connections) for video cassette recorders and video disc players. The direct inputs provide clearer pictures, much better sound, more operating versatility, and are more convenient than having wires and switches dangling from the antenna input terminals.

To take advantage of all of today's new options, you could invest in a system of separate video components — a cable-ready video tuner, a decoder for stereo and bilingual TV sound, an audio/video control center with input-output connections and switching for the video and stereo audio from several program sources, and a high-resolution video monitor to display the picture.

You could — but you don't have to, because the MR 20 includes all of these. It offers all the quality and flexibility of separate video components, in a convenient all-in-one unit that is as compact and easy to use as an ordinary TV set.



The Audio-Video Home Theater.

Just as Dolby* Stereo sound in theaters has dramatically heightened the excitement and pleasure of movie-going, the addition of wide-range stereo sound makes television a far more involving and satisfying experience.

There's no need to add an external decoder for stereo broadcasts; it's included. The full-featured amplifier is equipped with standard preamplifier controls (bass, treble, balance) to tailor the sound to your taste. The MR 20 gives you five ways to listen:

1. Use the built-in speaker, as with an ordinary TV.
2. Enjoy stereo sound in private, via headphones.
3. Connect external speakers for stereo. A 2.5 watt/channel stereo amplifier is built-in, with connections and circuitry to handle the stereo audio from video discs, tapes, and stereo TV broadcasts.
4. Connect a patch cord to the Auxiliary input of your stereo hi-fi system, or to a higher-powered external stereo amplifier and speakers.
5. Use the matching self-powered NAD 8100 speakers.



Designed to match the MR 20, the economical NAD 8100 is a two-way loudspeaker system with built-in power amplifiers for the woofer and tweeter (40 watts total per channel). Each speaker contains dynamic filtering to remove high-frequency noise, a Dynamic Signal Processor for astonishingly powerful bass output, and magnetic shielding to make it completely safe for use near TV sets.



*Dolby is a registered trademark of Dolby Laboratories Licensing Corporation.

About NAD:

NAD is the world's leading manufacturer of affordable high-quality stereo equipment. Since 1978 NAD stereo components have won universal praise for their sophisticated engineering, excellent sound, ease of use, and superior price/performance value. NAD products are sold by a carefully selected network of dealers in twenty-nine countries around the world. If you haven't seen the name before, it is because NAD invests most of its money in engineering rather than advertising – relying on enthusiastic word-of-mouth publicity and an unbroken string of rave reviews in magazines to spread the news of the superiority of NAD's designs. Now NAD has brought its expertise in high-value engineering and innovative design to video.



We Make State-Of-The-Art Technology Easy To Use.

NAD's audio and video products combine outstanding performance with logical, easy-to-use controls. We build the sophistication into the circuitry, so you don't need advanced training to operate it. (For instance, to select Channel 4 just press 4 on the remote control. You don't have to enter 04, as you do with less advanced tuning systems.)

But behind the MR 20's elegantly understated exterior you will find some of the most useful features and most advanced video engineering available today. For example:

- Wireless** infra-red remote control.
- "Signal seek"** tuning that scans up or down, automatically stopping (perfectly center-tuned) on any active channel.
- Separate inputs** for regular and "premium" cable. Use the premium input (with an external decoder) for scrambled pay-TV channels, and use the MR 20's convenient remote-control tuning for all other channels.
- Convenient rear-panel** connections and front-panel selection for both a video disc player and a video-cassette recorder (VCR).
- Black-level clamping** and automatic contrast control for blacks that are pure black, not gray.
- Tightly regulated high-voltage** supply that maintains crisp, sharp focus even in the brightest white picture areas. From velvety black to brilliant white highlights, NAD video offers a greater range of picture contrast than any other TV on the market.
- Comb filter** to reduce color interference and preserve full resolution of fine picture details.
- Fine-pitch** in-line black matrix screen for brilliantly pure colors, crisply-defined details, and life-like textures.
- Switching-mode power supply**, filtered to eliminate hum and interference, and tightly regulated so that the picture does not flicker and shrink when an air conditioner clicks on.
- Built-in decoding** for TV broadcasts with stereo sound. (You won't need to add an external decoder later.) Plus full stereo input/output connections for other program sources, including Hi-Fi VCR's and video discs.

Why NAD Video Is Better: The Inside Story.

Your eyes recognize that the MR 20 delivers a better picture than other TV sets. Here are the reasons why:

Regulated Switching-Mode Power Supply

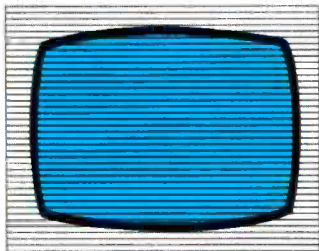
An efficient switching-mode power supply provides the voltages that the circuits need, safely transformer-isolated from the AC power line. Filtering eliminates hum and interference, and tight regulation keeps the voltages constant regardless of fluctuations in AC voltage. The picture doesn't flicker when a refrigerator clicks on, and doesn't shrink on hot summer days when air conditioners cause a heavy power drain.

Consistently Sharp Focus

In the MR 20 the high-voltage power supply that focuses the scanning electron beam on the screen is tightly regulated, so that it can produce more brilliant white highlights than other TV sets, without either "blooming" (blurring caused by the electron beam going out of focus at high intensity levels) or fluctuations in picture size.

Low Overscan

In other TV sets as much as 15 percent of the picture is over-scanned beyond the borders of the screen, forever lost to view. This over-scanning is done to ensure that the picture will continue to fill the screen even when it shrinks. Since the MR 20's picture can't shrink, it is factory-set for minimum overscan (no more than 5 percent). Together with the square-cornered screen, this ensures that you see virtually all of the picture, all of the time.



Over-scanned



Minimum overscan

Comb Filter For Sharp Horizontal Resolution

The MR 20 uses a high-precision comb-filter circuit that accurately extracts the color subcarrier from the video signal, minimizing false color interference while still preserving its full 4.2 MHz bandwidth. Colors remain pure; black and white stripes remain black and white; textures are reproduced with lifelike detail on the screen.

Video Pre-Shoot and Peaking

A special pre-shoot circuit sharpens contours and edges for an especially crisp look to the picture. And the Detail control on the front panel adjusts a peaking circuit that you can use to boost the highest video frequencies (to sharpen details in the picture, especially with a VCR) or, alternatively, to soften a picture that is grainy or snowy.

Fine-Pitch Black Matrix Screen

The color picture is produced by pure red, green, and blue phosphors that glow brightly when struck by the scanning electron beam. In the MR 20 nearly 500 tricolor phosphor groups fit across the width of the screen (spaced only .74 mm apart), resolving even the finest picture details.

Perfect Interlace for Sharp Vertical Resolution

A standard television picture is not formed by 525 sequential scanning lines but rather by fields of 262.5 lines each, alternating 60 times per second. If the lines in each field are precisely interleaved between those of the previous field, a smooth 525-line picture is obtained, and the individual scanning lines are spaced so evenly and closely that they are hardly visible. This is essential for optimum vertical resolution of fine details, and to produce textures that look realistic on the screen. The MR 20 achieves this goal.

Black-Level Clamping with Automatic Contrast Control

With ordinary TV, large dark areas in night scenes tend to become gray instead of black, and bright lights may produce a gray streak across the screen. Sixty times per second a special DC-restoration circuit in the MR 20 measures a black-reference level in the signal to lock in consistently pure, velvety blacks.

Having explained our approach to television design, we now invite you to visit your local NAD dealer and audition the MR 20 Monitor/Receiver. We are confident that you will find the MR 20 to be the best television you have ever seen or heard.

Specifications NAD MR 20 Monitor/Receiver

Tuning system	Digital synthesizer tuning, 139 channels total. Random-access keypad channel selection via remote control, plus signal-seek Up/Down scan.
RF connections	VHF antenna, F connector UHF antenna, screw terminals Cable input, F connector Cable output (to decoder), F connector Premium cable (from decoder), F connector Game/computer (RCA phono).
Cable tuning	All mid-band, super-band, and hyper-band channels (A-1, J-W, A5-A1, and AA-WW up to W-28).
CRT screen	Slot-mask black matrix, 0.74 mm pitch.
Over-scan	Less than 5%
Geometric linearity	5%, horizontal and vertical
Convergence	1.7 mm maximum error except in extreme corners.
Video bandwidth	Exceeds the NTSC broadcast limit of 4.2 MHz.
Resolution	Equals or exceeds the NTSC broadcast limit, both the horizontal and vertical.
Stereo decoding	EIA MTS (BTSC) standard, built-in; no external decoder required. Includes both stereo and S.A.P.

NOTE: All specifications are those in effect at the time of printing. NAD reserves the right to change specifications or designs at any time without notice.

Industrial Design: REINHOLD WEISS DESIGN/CHICAGO

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PRIVATE SHOW

I experience the Consumer Electronics Show as two different expositions, one public and the other private. My public CES is the vast, diffuse show I experience when I'm actually there, with new information reaching me so fast that it blurs into incoherence. Having only 38 hours of show time in which to see a sizable portion of the 1,400 exhibits is like speed-reading our October Equipment Directory. My private CES takes place in my office, when I sort out the boxes of press releases and spec sheets I've shipped back, and recreate the show—this time coherently—from them.

Not much newsworthy car stereo emerged from the public blur. This came as no surprise, since most car-sound products are introduced in January for the summer installation season. But the private show produced more than 11 pounds of car-stereo information—hardly a dry well, if not all worth passing on.

What should have been the most significant development took place off the show floor, where the EIA's car-audio engineering subcommittee met to set new interconnection and specification standards. The subcommittee did set a uniform color-code standard, so that installers will be able, in a few years, to confidently assume that a green wire on a Brand X unit goes to the same place as that on a Brand Y. Output levels and input and output impedances were also standardized (500 mV output for a tape level of 250



Blaupunkt's prototype CD player

nWb/m at 315 Hz, 1 kilohm output, greater than 10 kilohms input).

However, there was no agreement on plug standards, which means that installers will have to fabricate or buy adaptors every time they make up multi-brand car-stereo systems. According to subcommittee chairman Pat Hart, of Yamaha, most of the manufacturers on the committee already do make equipment whose connections match a European 8-pin DIN standard, but only for sale in Europe. Apparently, they'd rather use a separate system for the U.S. than take the chance that some of their customers might mix brands without having to work extra hard at it. When I heard that, I suggested to Pat that all makers agree on one connector and pin-out system that nobody now uses, so that no manufacturer would gain a competitive advantage

from standardization; compliance with the standard could entail supplying extra-cost adaptors as well as incorporating the standard connector into products. This, Pat replied, had already been suggested . . . and shot down.

On the specification front, EIA power specs will now be obtained after a 15-minute warmup at 1 watt into 4 ohms. Frequency response limits will be the system's ± 3 dB points and will be specified for both 120- and 70- μ S tape equalizations. Wow and flutter will now be specified as " \pm % peak DIN," with weighted-rms disclosures optional. S/N ratios will be measured at the standard output levels, and tape speed will be measured at a supply voltage of 14.4 V d.c. Standard test tapes have been agreed on for measuring separation and some other things.

The most widely expected development was that droves of CD players for automobiles would be available for sale late this year or early next. In alphabetical order: Alpine's 5900 should be available about now, for \$600; Blaupunkt's should be here in early '86; Delco may be putting players in some 1987 GM cars (and Ford may have them for some '86 models); Fujitsu Ten has no price or delivery date, yet, for its SD-110 (jointly developed with Toyota); Grundig (not at the show) should have a player soon, for about \$500; and JVC has a prototype under wraps which may be in the stores before the year's end. Also, Kenwood's DC-9 should be available, for under \$660, by now; Kraco plans to have a \$300 unit out next year, and Mitsubishi's CD-100 should be available already. Pioneer's two models (one for

Yamaha's YCD-1000 loads CDs in cartridges.



**SAY GOODBYE TO YOUR OLD TURNTABLE.
ENTER THE NEW STONE AGE.**



KYOCERA

90 CERAM. PLATTER BELT DRIVE TURNTABLE

Conventional turntables—possibly including the one you now own—can't completely protect your music from air-borne resonance and drive system resonance. The distortion that results can be as severe as the "howl" of acoustic feedback. Or as subtle as lost stereo imaging and poor inner detail.

Today Kyocera is overturning the old standards of turntable performance by harnessing a completely new generation of materials: Fine Ceramics.

TURNTABLES FROM THE NEW STONE AGE.

Recognized for their rigidity, thermal stability, and anti-resonant properties, Fine Ceramics are true "21st Century" materials. That's why they're finding new uses in everything from high-efficiency car engines to advanced computers. And now Kyocera is using Fine Ceramics to fight turntable resonance—in the base, platter, spindle, thrust bearing, and sub-chassis. For example, every Kyocera turntable suspends the tonearm and platter on a separate sub-chassis made of Ceramic Compound Resin (CCR). This remarkable material is so inert it deadens even severe vibration. So you'll hear quiet backgrounds, breathtaking detail, and spacious stereo imaging.

INDIRECT DRIVE.

Direct drive may be a "mus" feature in the mass market, but direct drive *must* pass motor bogging and vibration directly into the music. Kyocera has selected

belt drive to isolate the motor from the platter, for the cleanest possible sound.

THE BEST FOUNDATION IN TURNTABLES.

Kyocera's magnificent PL-910 boasts a massive CCR foundation, a floating CCR tonearm/platter sub-chassis, and an eight-pound Fine Ceramics platter twice as hard as steel. If you want freedom to choose your own tonearm, that's one more reason to choose the PL-910.

THE AUTOMATIC CHOICE.

Underneath the conventional exterior of the PL-701 floats a tonearm/platter sub-chassis of Kyocera's anti-resonant CCR. Other advantages include a low-mass carbon compound tonearm, belt drive, $\pm 3\%$ pitch adjustment, record stabilizer weight, and a computer-controlled fully-automatic mechanism.

A LOT FOR A LITTLE.

Perhaps your lust for high-end audio is held back by your budget. Consider Kyocera's semi-automatic PL-601. It has almost all of the PL-701's advantages, including the anti-resonant CCR sub-chassis. And it's surprisingly affordable.

So if your current turntable is ready for upgrading or retirement, bid it a fond farewell. Welcome to The New Stone Age.



Built right from the ground up.
Enter No. 17 on Reader Service Card



The coming of car CD has speaker and amp makers smiling at the chance to sell "digital-ready" equipment, which in this context just means "good."

Centrate systems, one for regular Pioneer installations) are available now, for \$550 and \$600, respectively; Sanyo will have a player early next year; Sony's two models (\$699 with FM/AM tuner, \$600 without) came out last year, and Yamaha's YCD-1000 should be out about now, for \$499.

There is more, here, than a laundry list. Already, manufacturers are seeking ways to differentiate their car CD players from other companies'. Fujitsu, for example, seems to be positioning its CD unit as part of a component system, with separate tuner, cassette player, equalizer and power amps (complete with spectrum-analyzer display on the front-channel amplifier); since component car systems have never been too popular here, I expect that strategy to change. Kenwood's CD player has a 20-dB mute button—a feature even more useful in the car than at home.

Mitsubishi is downplaying its CD unit to talk player systems, packaging the player either with a 50-watt (25 per channel) amplifier/equalizer for \$700, or with an AM/FM/cassette receiver and a four-channel, 100-watt amplifier for \$1,000. I saw the latter installed in a Mitsubishi car with controls in the steering wheel, like the one mentioned in last month's column, but no one I asked could tell me whether those controls worked the CD or not.

Pioneer is pushing vibration resistance with a fairly exciting film of their player running in a four-wheel-drive Toyota truck bouncing over the desert (driven by my quasi-namesake Ivan "Ironman" Stewart). Sony seems to be the only one, so far, to offer a combination tuner/CD unit. But JVC intends to follow, probably with its second rather than its first model, and Kraco's prototype had a tuner, too.

Yamaha is the only maker I've noticed citing digital filtration and oversampling (though at 88.2 kHz, not the 176.4 kHz used in so many home units). Their car player is also the only production model, so far, to load CDs in cartridges—good protection, but a nuisance if your home player only loads un-encased CDs. (Yamaha plans to have a cartridge-loading home player this winter.) JVC will have a cartridge-loading car CD player, too—and possibly even a compatible

one: Though JVC's cartridge is opaque and Yamaha's transparent, both have shutters which open to admit the laser beam. Both companies will supply a small number of cartridges (Yamaha says five, and JVC doesn't know yet), with more available through dealers.

There are subsidiary CD developments, too. Surprisingly many people seem to be using portable CD players in their cars—a trend bound to accelerate now that Technics has announced a portable similar to Sony's D-5 but slightly smaller. Noting this, Jensen has announced that it will add audio inputs and 9-V d.c. outputs to some of its in-dash units later this year.

So far, no car CD player has appeared with an audio compressor to fit the CD's wide dynamic range into the car's narrow permissible-volume range. (Road noise buries soft sounds, but raising the volume to overcome it leads to ear-splitting loud portions.) So dbx's new home player has compression on tap, in part to allow taping CDs to fit mobile listening conditions.

The coming of car CD has speaker and amplifier makers smiling at the chance to sell "digital-ready" equipment. In this context, "digital-ready" just means "good," except for higher power-handling. But it's an excuse for people to buy better equipment than they might otherwise have sprung for, so I guess everybody wins.


Digital may also account for speaker literature's slightly increased emphasis on protection circuits this year. For example: Kenwood's KFC-1010 tweeter system (designed to match the new KFC-5050 woofer/midrange unit) features an automatically resetting protection circuit with an LED indicator. Jensen's new Power Amplified Speakers (with 20-watt amps and three switchable EQ curves) have thermal overload protection, and B & W's car-speaker crossovers have an automatic protection circuit called APOC.

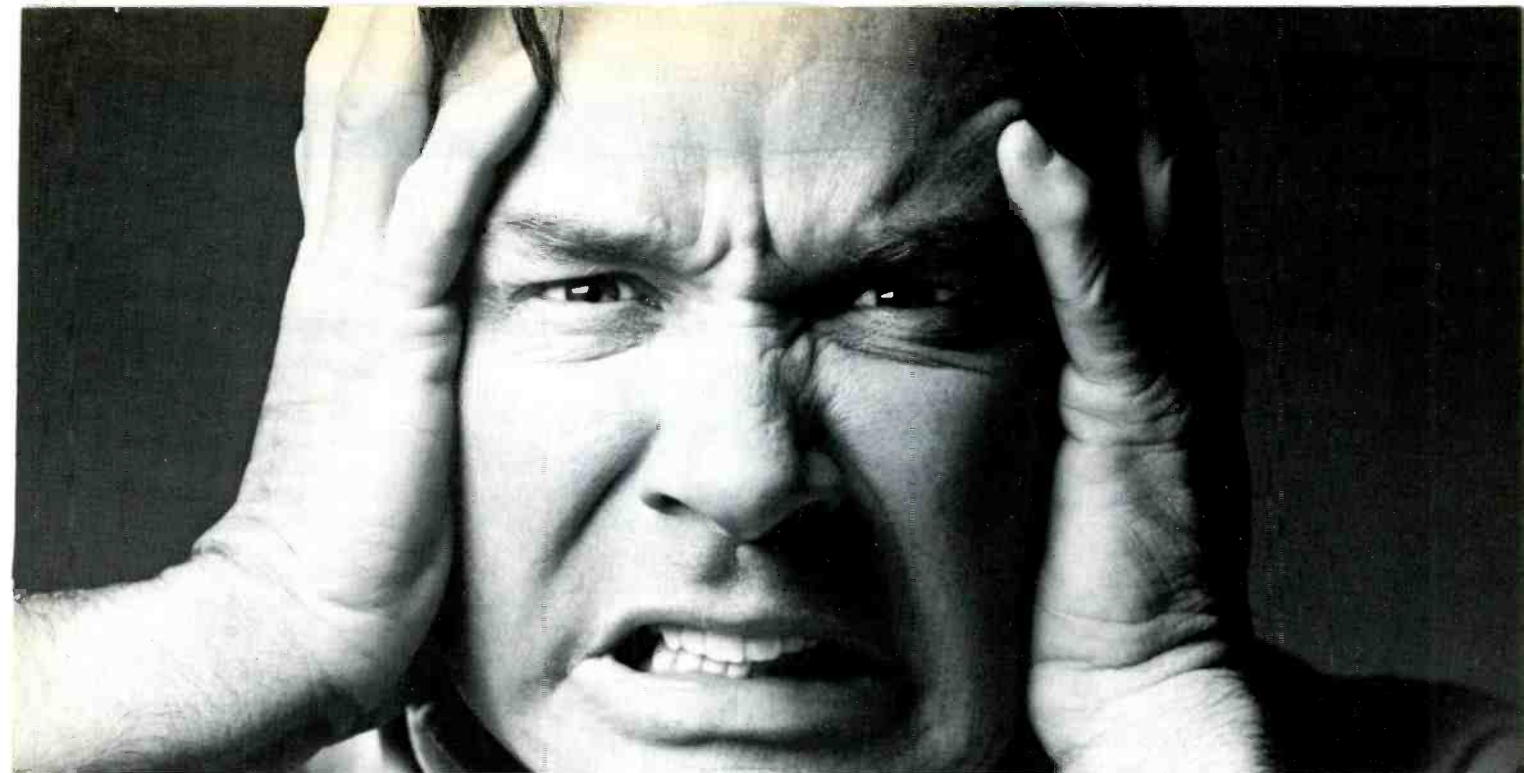
At the last show, the B & W MASS (Modular Automobile Sound System) speakers could be seen but not heard, as only mock-ups were on display. This time around I could also hear them, and I liked what I heard. The MASS line now includes a very versatile tweeter, the LT40, which I did not see in January. Developed from the tweeter used in the Model 801 home

speaker, this one comes in a surface-mounted swiveling and tilting enclosure with a height just under 3 inches and a footprint a bit over 2 inches square. It should solve a lot of installation problems. At \$99.50 each, plus \$69.50 per channel for the recommended LX40 passive crossover modules, it's not exactly cheap, but there are installations for which it may be the only practical solution.

Kraco announced a three-way, 6 by 9-inch system, the TPS-693 (\$119.95 per pair), whose cone midrange and dome and piezoelectric tweeters are mounted on a tiltable bridge to aim the upper frequencies where they're needed. Sanyo has joined the honeycomb-driver brigade, with three flat-driver models ranging from the four-inch, coaxial FSP402 (\$70 per pair) to the three-way, 6 by 9-inch FSP693 (\$150 per pair). Kenwood's KFC-5050 midrange/woofer, mentioned above, also has a flat, honeycomb diaphragm. Denon is using alpha boron for tweeters, a material already used in their MC phono cartridges. Fujitsu Ten's SG-1623, a 6½-inch, coaxial, three-way system, uses a parabolic cone which reduces its mounting depth by about a half-inch. Even thinner are the SFI Sawafuji Dynapleat drivers, with flat diaphragms and flat magnets for a mounting depth of only about 1 inch. Pioneer took the opposite tack, in a way, by introducing an 8-inch, rear-deck-mount, three-way system, the TS-207 (\$170 per pair). Sony now has a sealed-enclosure system, the XS-700 (\$500 per pair), which will fit cars but whose construction also recommends it for marine use.

I noted four new entries in the car-speaker field. Design Acoustics has its first mobile speakers, in friendly competition with parent company Jensen, designed to mount from either in front of or behind car body panels. ESB, from Italy, showed massive surface-mount systems. Coustic, a new firm, introduced its first speaker line, and Trinity Loudspeakers showed systems with passive subwoofers for sports cars, pickups, 4x4s, RVs, vans, and other vehicles where ordinary car speakers won't fit.

It looks as if the rest of my private show won't fit into this column, so we'll leave the electronics 'til next month. 



What most speakers have done to your favorite music is too shocking to hear.

Look what they've done to your song.

They've distorted it. Colored it. Added and subtracted from the music. That's because most speakers depend on conventional cone drivers. Now, cones may be great for ice cream, but they don't give you the true flavor of great music. You see, sound waves are distorted by the cone's shape and come to you unevenly. In fact, they're usually biased toward the low-end of the scale.

So what you really hear is the cone's interpretation of the original. Prince's cone, for instance, instead of Prince. Or Rubinstein's version of the "Moonlight Sonata" as interpreted by the cone.

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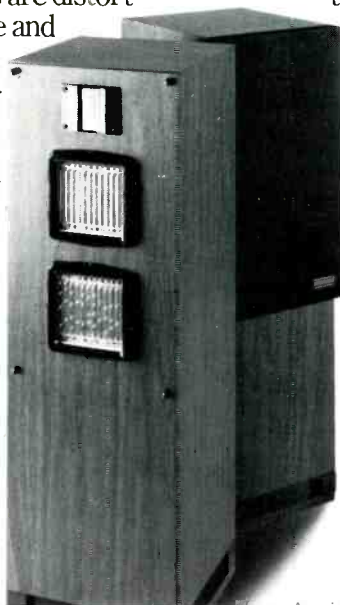
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THE VIDEO SPECTRUM

It's still possible to discuss audio without ever mentioning video, but the opposite is no longer true. The video people have discovered—a little late—that sound quality sells. So, while that old cliché, "the marriage of audio and video," hasn't really taken place, the pair have offspring, anyway.

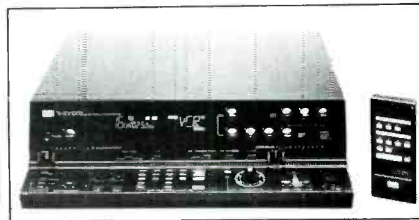
For example, we now have integrated audio/video systems (see this month's "Behind the Scenes"), video media with AFM sound tracks (such as LaserVision, and both Beta and VHS Hi-Fi VCRs), media with digital sound (a few LaserVision discs and players and the latest 8-mm VCRs), stereo (all of the above, plus broadcast TV), and surround sound (more than 100 movies available on tape, disc and—once the stations get their stereo act together—over the air).

More to the point of this column, we also have a growing number of audio components with video-oriented features (chiefly receivers and integrated amps with built-in video/audio switching), and video-system components that work purely on the audio end of things. Over the past few months, and at the last Consumer Electronics Show, I've run into quite a few of these products. Time, now, to see what trends are developing.

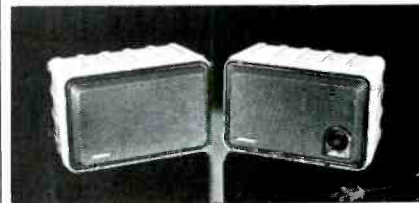
As Bert Whyte points out in his column, TV stations and networks have taken a low-key approach to the MTS stereo TV-sound system. PBS has been sending out stereo programs for years, mainly to be simulcast over local FM radio stations, so the public TV stations have the programming and need only pick up the equipment. (New York's WNET is on the air in stereo already.) Of the commercial networks, NBC is moving fastest, though mainly for programs that feature music, such as *Miami Vice*, *Friday Night Videos*, and *The Tonight Show* (which has its musical moments, but which is probably included more for its importance to the network). ABC reportedly plans some stereo in the fall, while CBS just mumbles bashfully. Ted Turner's Atlanta-based "superstation," WTBS, is broadcasting stereo, too, but listeners outside the Atlanta area will probably be catching it in mono for some time, until the cable companies start carrying the MTS subcarriers along with the main channel signals.



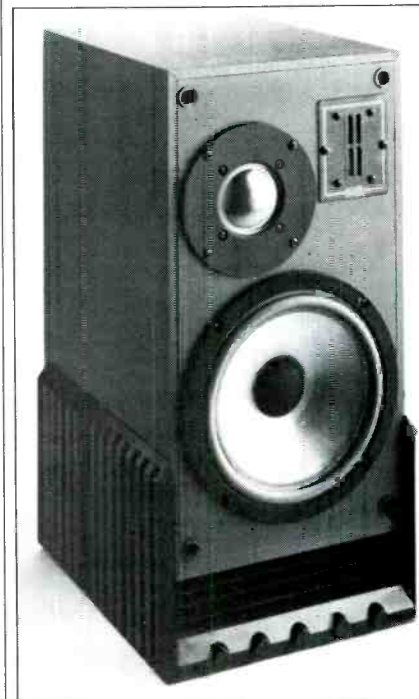
Recoton V622 TV Stereo Decoder



Sansui S-XV1000 Audio Video Control Center



Bose Video RoomMates



Infinity VRS-1 speaker

I suspect the network stations will beat the independents into stereo since, aside from movies, only new programs will have stereo sound and the networks run the bulk of the new programs. As the stereo programs trickle into reruns, independent stations will have more reason to convert.

I'd also expect faster action from stations in areas with large foreign-language audiences. The appeal, here, would not be stereo so much as the Second Audio Program (SAP) channel, which could carry a foreign-language sound track. The SAP could also carry a foreign movie's original-language sound track while a dubbed English track (which most viewers prefer) goes out over the main sound channels. This will have to await film prints which carry both sound tracks; and if there are subtitles, they may be hard to read, even on a 26-inch screen. New Jersey's WNJT puts a reading program for the blind on its SAP channel; WNBC here in New York has had music on its SAP the few times I've sampled it.

In any case, broadcasters won't be wildly enthusiastic about MTS/SAP sound until their audiences are equipped to receive it. As near as I can tell, every major TV-set maker is equipping at least its top models to receive stereo directly, and offering plug-in adaptors for most of the rest. A growing number of VCRs have stereo-ready or stereo-adaptable tuners, too. Most of the stereo adaptors around are specified as being able to work with most makes of adaptor-ready VCRs and TV sets; a few of these, such as Sansui's MT-A25 (\$200), have built-in amplifiers.

Recoton, however, has an MTS adaptor that even works with sets which lack stereo-adaptor jacks. The V622 decoder, designed by Larry Schotz, has the usual input for connection to a set's stereo output jack, of course. But it also has a "Schotz Stereo TV Probe" (included in the V622's \$149.95 price) which can be fastened outside the TV set to pick up the audio i.f. frequencies and decode the stereo from that. Other features include a stereo synthesizer, an ambience-enhancement circuit (to make the speakers sound farther apart), and adjustable DNR noise reduction.

The Recoton's specs are pretty

good, too: S/N of 73 dB in mono and 65 dB in stereo, distortion under 0.35% (lower in stereo!), frequency response down 6 dB at 14 kHz, and separation of 33 dB at 1 kHz (and still 25 dB or better from 100 Hz to 10 kHz). Audio Research isn't exactly quaking at those numbers, but let's face it, this is TV.

The one area where video has a sonic advantage is in surround sound, which movies use in a more standardized and more dramatically successful way than records ever did. There seems to be a consensus configuration developing for surround decoders: Three surround settings plus a stereo synthesizer and a built-in amp, all operable by remote control.

NEC's AV-300 Surround Sound Center (\$299) embodies all these trends: Surround settings for Dolby-stereo-encoded movies and videos and two other "Theaters," 120 watts of amplifier power (switchable to 30 watts x 4 channels or to 60 watts x 2 channels), and wireless remote control. Its most distinctive-looking feature is a diamond-shaped balance control resembling the cursor control on NEC's lap computers.

Sansui (which had tried hard to establish quadraphonic sound on records) has the DS-77 Audio/Video Sound Processor (\$350), with surround settings the press release calls "Theatre," "Hall" and "QS Surround" (Sansui's original matrix); the last one is labelled "Disco" on the accompanying picture. The DS-77 also has a subharmonic synthesizer, a "peak-attacker" to restore dynamics, and a stereo amplifier rated at 10 watts per channel, but it has no remote control.

The AVM 8000 Surround Decoder, from Aphex Systems, has the remote, but no amplifier and no stereo synthesizer. What it does have is outputs for eight channels (center left, center right, front, and back, as well as the four corner positions) plus a subwoofer channel. Its three surround settings include "SQ-8," "SQ/Cinema" and "Cinema Matrix." One of these, Aphex says, is an updated version of CBS's SQ matrix, now used on music videos, while another will reproduce SQ records with improved realism.

The Audionics SD-2 Dolby surround processor has fewer fancy features and more audiophile pretensions. It of-



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It's a subject our citizens are particularly fond of discussing. You see, this is the home of Jack Daniel's Distillery. And here, in these Tennessee hills and hollows, is where Mr. Jack started making whiskey in 1866. Our citizens will tell you how we've never changed his old-time methods. A sip, we believe, and you'll know why we never will.



Many audio/video receivers offer video-oriented features beyond mere switching, such as stereo synthesis and a bit of picture processing.

fers only the Dolby stereo matrix (the one the movies use), and has no amp., no stereo synthesizer and no remote. It concentrates instead on such things as direct-coupled circuitry.

Canon has a processor, the SP-10, which can provide surround sound with no built-in or added amplifier (a passive matrix is my guess), but by adding a rear amplifier, "the effect can be enhanced."

Denon's AVC-500 Audio/Video Control Center has a rear-channel Ambience Recovery circuit, a stereo synthesizer and a stereo amplifier (20 watts per channel). It also has a five-band equalizer with a twist—it operates only when there's an audio signal, so it won't, if boosted, emphasize background noise during quiet passages. Yamaha has a Natural Sound Processing Amplifier, the SR-30, with a comb-filter surround circuit, a stereo synthesizer, and two-position high-filter and "Bass Extension" circuits; it delivers 30 watts per channel.

Shure will debut its HTS 5000 Home Theater Sound System late this year. It has only one surround mode (Dolby), but adds digital time delay, an "Acoustic Space Generator" circuit, outputs for six speakers (the usual four plus a center front and a subwoofer), and, of course, a wireless remote control.

Now that it's practical to link good audio equipment to a video system, you'll see a host of "audio/video" components which are basically audio components with built-in video switching (and often dubbing). I've seen integrated amplifiers of this type from Akai, JVC, Marantz and Pioneer, and receivers, similarly, from Akai, Denon, Kenwood, Mitsubishi, Onkyo, Pioneer (who were, I think, the first), Sansui, Sony and Yamaha.

But many of these receivers offer video-oriented features beyond mere switching. For example, Onkyo, Pioneer and Yamaha have stereo synthesis for mono tapes and programs, Onkyo's TX-47V and Sansui's S-XV1000 have surround systems, and the latter even has 8-watt amplifiers for the rear as well as 80-watters for the front channels. The Sansui and some Sony models are equipped for TV/FM simulcast stereo, so you can watch or tape the picture off the air or cable while listening to the FM stereo sound track. Both

the Sansui and Mitsubishi's DA-R56 also incorporate a bit of picture processing, and the DA-R56 has front-panel video inputs, too. Remote controls are common, for greater convenience when you park the audio receiver by the video one.

Technics' A/V receivers, introduced last year, are altogether different. Instead of video switching, they include tuners which receive the VHF TV band (channels 2 through 13) as well as AM and FM. The top-of-the-line SA-560 has an MTS/SAP decoder built in; the others have jacks for accessory decoders. Instead of cable-ready tuning, the Technics has a cable input, presettable to channel 2, 3 or 4, with a fine-tuning button in case the cable box's output is a bit off frequency. Other features include front-panel VCR inputs, a stereo synthesizer, and a switchable equalization curve to "help reduce irritating buzzing bass and hissing treble" heard from many VCRs.

If you only want to update your tuning facilities, and not your entire system, Pioneer's TX-V1160 AM/FM/TV tuner (\$329.95) may be just the thing; it picks up UHF as well as VHF sound, and has MTS/SAP decoding as well as simulcast switching. It has presets for 12 stations each on the FM, AM and TV bands, and accepts an optional (\$49.95) remote control.



Luxman T-407 TV Tuner/Video Remote Control Center

Luxman's T-407 is built on the assumption that you're satisfied with your FM/AM tuner or receiver; it picks up only TV bands (VHF, UHF and cable). It also has an MTS/SAP decoder, video switching facilities, and a wireless remote control. A Remote Eye (included in the \$600 price) lets you control it from another room.

Of course, you might consider a true

video tuner. Proton's 601T, for example, tunes cable as well as broadcast TV channels, has the MTS/SAP decoder and FM simulcast switching, includes a remote control and fairly elaborate video source switching, and tunes in pictures as well as sound (in case you have a video monitor handy), all for \$450. You can even view one video source while recording another.

The combination LaserDisc/CD player introduced by Pioneer a few months back is now also available from Luxman and NAD, giving you a choice of color schemes (Lux's is gold, NAD's is black). Others may put their brand on it, too, before the year is out.

As Bert Whyte mentioned, everybody and his cousin is coming out with an integrated A/V system (i.e., one in which the same remote control works both the video and audio equipment). To Bert's list of seven companies that produce such systems I can add eight more—Akai, Fisher, Hitachi, Marantz, Mitsubishi, NEC, RCA and Toshiba—and I bet Bert and I missed a few between us, too.

Video-ready speakers have also become boringly common, so I'll mention only those few that break the mold to some extent. Bose's self-amplified Video RoomMates (\$279) are similar to the RoomMate speakers they introduced a while ago for use with headphone portables; the main differences that I can see are a volume knob, lighter colored cabinets, and different inputs (phono plugs instead of a 3.5-mm stereo headphone plug), presumably with different input levels and impedances. Options include wall brackets (\$19.95), mounting arms (\$39.95) and a travel bag (\$39.95).

Audiophiles will be interested to learn that Fried and Infinity are bringing out video-shielded speakers. The top three models of Infinity's four Video Reference Standard speakers adjust in height from 18 to 25 inches, to match the heights of the video monitors they're used with. The top two (the \$799/pair VRS-1 and \$479/pair VRS-2) have built-in amplifiers; the \$299/pair VRS-3 seems to be a VRS-2 without the amp. Both Naiad and Speakerlab now make TV bases with built-in, high-quality speakers; Naiad also has a small amp for video use.

Enough!



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NILE RODGERS: MAKING TRACKS

Nile Rodgers may be the hottest and the hippest producer on the pop music scene today. He could probably claim that title simply on the basis of his production of Madonna's smash-hit LP, *Like a Virgin*. But his credits also include a list of extremely commercial yet hardly mainstream hits such as David Bowie's *Let's Dance*, Mick Jagger's solo-debut album *She's the Boss*, which he co-produced with Bill Laswell, and "The Wild Boys" single for Duran Duran. He has also produced records for Diana Ross, Jeff Beck, Peter Gabriel, Debbie Harry, Johnny Mathis, Inxs, Kim Carnes, and Sister Sledge.

In addition to his impressive record as a producer, Rodgers is one of the most sought-after session guitarists around, and in fact he says he primarily thinks of himself as a jazz guitarist. He can be heard on many of the records he's produced, and on others such as Hall and Oates' *Adult Education* and *The Honeydrippers* EP.

Rodgers' greatest success as a musician came when he teamed up with friend and producing partner Bernard Edwards to form the group Chic in 1977. The group's first single, "Dance, Dance, Dance (Yowsah, Yowsah, Yowsah)" went gold. Chic's second album, which went double platinum, contained the single "Le Freak," one of the biggest hits of the disco era. The third record also went platinum, in 1979. Rodgers' latest solo album, *B-Movie Matinee*, was released earlier this year by Warner Bros.—T.F.

I wish I had known you were in the house band at the Apollo Theatre when I was doing my book on the Apollo; I would have interviewed you then. How did you end up there?

I was working for *Sesame Street* and Loretta Long. Her husband was Peter Long, and he was the manager or something at the Apollo.

Yeah, he was the PR guy.

Ah, so now I know what he really did. When the Apollo was looking for a guitar player who could read, Loretta said, "Hey, why don't you try Nile out, he seems to be really great with the *Sesame Street* stuff, so check him out." I did the first job and they liked me at the Apollo, so I stuck around. I guess I was around 19 because everybody was going to the Manhattan School of Music. This was the early '70s, right there at the end, when the whole thing [at the Apollo] was starting to wind down. They started booking other stuff in there. It got weird . . . I'm sure I did some of the last few gigs there.

What kind of music were you listening to then?

At that time it was jazz, basically. A lot of rock 'n' roll. Blues. The thing is, I had been into rock 'n' roll and blues and stuff earlier, so of course I continued to listen to it. But at that time in the '70s I was more fascinated with jazz. When I was working at the Apollo I had money, so I could buy any record at that point. *That's interesting because we're about the same age, and that's when I started to get into jazz, too. In the early '70s rock 'n' roll seemed to be getting pretty boring.*

Yeah, it was getting boring. Especially after Hendrix, and because of the politics and stuff. It didn't seem to have that color and that flare it had when Hendrix . . . You know, a lot of people died around the same time, too. And even if you weren't a big Doors fan or a big Joplin fan or whatever, still just the impact of it all happening around the same time seemed like, "Damn, this isn't the right stuff!"

You were at the forefront of the disco movement with your group Chic in the '70s, and with your production of groups like Sister Sledge. I wonder if this turn away from rock to jazz had any direct impact on the way disco developed as a sound.

Disco was always a sort of ambiguous category to me in those days. I thought that disco meant anything you wanted



Photograph: Robert Lewis



SISTER SLEDGE



Disco music was more sophisticated than any other type of pop I ever played—and I've played everything.

to do as long as the drums went [he mimics a fast drumbeat]. That's what I thought. So what we did in Chic was basically play jazz. My first records, my own stuff, my compositions or the record dates where I was in charge, we basically did updated versions of jazz songs. The first formal arrangement I did was "Bess, You Is My Woman Now." Then we did "Air Mail Special." And we got a lot of really great players together and we went in and did disco records, but we were playing jazz. We were playing all the changes. We just changed the beat and the groove around.

So there was a connection between the jazz you were listening to and the disco you were playing?

Oh, absolutely. We wanted to be known as players, so when we decided to play pop music we thought all we had to do was take really great jazz songs—because we loved the melodies, we loved the heads—and just play those and give them a funky feeling and they'd be happening.

You once said you turned to disco out of necessity. What did you mean by that?

Well, disco was the music that was really happening at the time. We were a bar band, basically, Bernard Edwards, Tony and I. We were just doing the Top 40. We were gigging from place to place. What the Top 40 consisted of then was rock 'n' roll tunes from Thin Lizzy and groups like that, but the bulk of the stuff was disco songs. The Trammps and The Bee Gees. This was when *Saturday Night Fever* was happening. Cocomotion, Donna Summer, Silver Convention, that was the stuff that was really happening. This was what was on the radio and the Top 40, so consequently this is what was in our repertoire. From doing gigs, you grew to like it. I've always liked whatever I've played. I'm not anti any type of music. I used to play in folk bands when that was happening. Bluegrass, I still like bluegrass. I started to really enjoy playing pop music. Then I started to try and write it.

Anyway, so we had a rock 'n' roll band or a jazz fusion kind of rock band, and we weren't really getting anywhere. Everybody liked our tapes, but when they saw us, because we were basically a black band, I guess

[they thought] the sound was sort of black because of our vocal sound. When I listen to the tapes now I say this is total nonsense, how could they ever know? We didn't sound like a black band. We weren't singing like Earth, Wind and Fire, we were singing like The Stones. That's where we were coming from at that time. But anyway, we couldn't get a record deal until we did "Dance, Dance, Dance." Now meanwhile, we had been writing songs all along, but they were all rock 'n' roll songs. Power chords and the whole bit. As soon as we did "Dance, Dance, Dance," our first disco song, we got a record deal.

So that's what you meant by out of necessity—they would not accept a black band playing rock 'n' roll?

Absolutely not. They definitely would not, there's no question about it. And they loved our tapes. They used to keep them at all the record companies, but when they looked at our pictures or when they'd meet us, they'd say, "How do you market these guys? Who's their audience?" We would say, "What do you mean, how do you market us? You market us to the same people who are buying the records we buy." It just didn't make sense.

You've said and others have said that the white New Wave groups now and in the recent past are just doing disco. Yeah, it's true. It's funny because it's actually hip now. A lot of the bands that I meet, especially those who came out of the whole New Romantic phase, they love the word disco. They think it's a cool thing. When they're sitting down writing a song they say, "I want something that's a real disco kind of record." They're into it. It's a great thing to them. I can just remember when they had the whole backlash, the Disco Sucks campaign. This is very funny. We went to a party for *Record World* or *Cashbox*, or one of those magazines. It was in a club, a restaurant in the front and a disco in the back. Because at that time disco sucked—it was the funniest thing you could ever imagine—nobody would go to the disco. They were all afraid [laughter]! We were dying. Bernard and I walked in and everybody was packed in like sardines in the front part because they were so terrified to walk into the disco. It was such a bad word. Meanwhile, the num-



ROB SABINO, ADRIAN BELEW, PETER GABRIEL AND RODGERS AT SKYLINE STUDIOS, NEW YORK CITY

ber-one record was "Funkytown." It was the funniest thing I'd ever seen in my life. I said, "Damn, these are the people in *my* industry. These are the *hip* people. These are the people who grew up with rock 'n' roll. These are the rebels. Look at them, they're fucking cowards! They're afraid to go into the disco!"

Wouldn't you think this battle had already been fought in the '60s by the Motown people? This stuff about white music and black music.

No, no. It seems like it's always going to be an issue, unfortunately, or at least for a long time. You know, when I did the Bowie record, I must say David is a pretty hip guy to take a chance like that, because everybody around was saying, "Oh, that'll never happen. How can you mix somebody who's great like David Bowie with somebody like Nile who does disco records? And disco sucks, everybody! Right? I mean, it's not happening." When we sat down and talked, he realized I was into a lot more. And I don't mean to say that disco is not happening. Take it from a guy who has played everything. I mean, I used to be in blues bands for years and I know, man, when I was playing in blues bands we were *looking* for new ways to play changes. I loved it when somebody turned me on to a progression. Like, if we had a couple of minor seven chords in there, wow! This is happening! In fact, disco music employed much more sophisticated chord changes than any other type of pop music that I ever played

before. To me, I was playing jazz, just with a cool beat, basically. You know, with good hooks.

All that's to say that when I started talking to Bowie, we started talking about other forms of music. We even started talking about opera. He realized, I guess he probably knew it beforehand, but with musicians it's just communication. You want to extract from all different styles. Stevie Ray Vaughan did all the solos on the *Let's Dance* album, and he's a very strong blues stylist. It worked because the different things just mesh. You use somebody's ears to talk to you through their concept. I mean, so what, was Stevie Ray Vaughan playing black music? Is he a white guy playing black music? Yeah, you can argue the roots, but there are a lot of great white guitar players who play blues, and they play fantastic. When I was a kid—and I grew up in basically a serious jazz household—I remember my uncle, who was a great arranger, always used to say to me, "Man, when I was younger I used to think that white cats couldn't play, but half the guys in my band are white guys." That's ridiculous. All the great horn players I use now are white guys, and they're all young, too. So where did they learn? I even feel stupid talking about it, actually. In my lifetime I know that that's so ridiculous. And I know that nobody—or at least I hope nobody—is hiring me because of the fact that I'm black. I know that when I call guys, I've never heard anyone say that.

Photograph: John Bellissimo



Photograph: © '83 Ebet Roberts

DAVID BOWIE

I believe in technology
to the highest order.
Like any artist, you
just have to grab all
the colors you can get.



The weirdest person I've ever had work on a record with me is Anton Fig, because he's from South Africa. He comes in and everybody goes, "Yo, man!" He hears all the South African jokes, poor guy. Everybody goes, "Hey, whoop, I guess this is the first time you ever played with black people, hey Anton?" I guess it's some sort of issue. We seem to be chipping away at the iceberg a little bit now. Now you see these great collaborations. I don't think anyone even thinks about it. I don't think, if somebody calls me up, that they were sitting there talking to their manager saying, "Let's call that black guy Nile to come and produce the record." I don't say, "Hey, let's get that white guy Daryl Hall to come and sing backup."

Was that whole "death to disco" thing racial?

I don't know. Of course, I'm sure that it was some sort of weird blue-collar movement or something like that, people who were saying, "Where are The Stones?" Because those types of bands really did suffer during that period. I'm a pro now, I know what record sales were doing in that time. A lot of these total unknown people like Silver Convention, who were they? They came out of nowhere and were topping the charts. Donna Summer and stuff, just out of nowhere. Stars were coming. I guess that happens with any new movement. Where did groups like The Thompson Twins come from? Or Duran Duran and Culture Club? Out of nowhere. So what happened is that these new groups were coming and doing a lot better than the established bands. During those days I couldn't even *find* an Elton John record, and he was my favorite. The disco stuff was really happening. Everybody was doing disco, Frank Sinatra, Dolly Parton, everybody.

Was disco music really a producer's medium?

More so than any other type of music?

Yeah.

No, no. the only thing that happened was that for the first time it was a little bit more honest . . . I guess it was the techno stuff, that's what changed it around. The fact that drum machines were introduced, and sequencers and things like that. So if one person could do all the jobs, he would do it. In the old days it was very rare that you'd find

somebody like Stevie Wonder or Steve Winwood. Those people were unique. You wouldn't see albums where one guy played bass, guitar, and the whole bit. But since synthesizers came of age, one person could go play the whole thing. So when disco was popular, one or two people could do the whole thing. I guess that's where that came from.

But also, weren't a lot of these disco groups just manufactured groups that some producer put together in a recording studio?

Oh, well, come on! That's the history of rock 'n' roll! Come on! How many bands have you had where they really couldn't play? They'd leave the studio and the producer would come in at night and play the parts right. Or else the band would just look great, and they'd put them out there anyway. You'd see them live and go, "What? That's the same group?" Come on, that's records, that's not a bad thing. It's not an everyday practice, but how about The Monkees? They had great records. Still some of my favorite records are Monkees records. Who knows how that stuff was done? I never saw The Monkees live. The Archies. Big novelty records were all production records.

I suppose you could say the same thing about The Sex Pistols, too.

Yeah, right. There are a lot of bands like that. A lot of groups can have weak links in the chain. Usually somebody else in the band can cover the part for a record. We all know about the famous Troggs tape. They couldn't even get the rhythm track down. I don't know if it's a joke or whatever. . . .

What's the famous Troggs tape?

You don't know about that?

No.

Everybody in the recording business knows about that tape. After they had "Wild Thing" these guys are supposed to be out in the studio doing their next record. They couldn't even get the rhythm track together and they broke out into a big fight. Most recording studios have this Troggs tape in their library. You put it on and you hear the guys trying to rehearse the song and they can't get it together. Finally they start having a fight and they're cursing each other out. They're going [with English accent], "Oh, you fucking asshole,

you played the thing right the first time! You went do, do, do, do! Just do it again!" Who knows who ended up really playing the drum part? I think that's a real minor issue. That's like saying, when you look at a movie, who did what? Who knows what you do to get a movie made? Anything that's recorded, the magic should be in the recording, in the product itself. A record is different from a live performance. That's what you're buying; you're buying the record. I saw the movie *Diva*, and they were asking the woman who played the diva how come she'd never done a record. She says, "Because in *my* concept of music, music is a fleeting moment. It's only meant to be enjoyed while it's passing because tonight I may sing this and tomorrow I may sing that. It's only important while it's happening. It's not important sitting on the shelf." That was sort of cool in a way. But records *are* important because you want to enjoy what was captured that moment, that night, to be *shared* with everyone. There are a lot of things you can do with a record that you can't do on stage.

So making a record sound like the artist does on stage is not an important factor for you?

Nah. Totally not. When I first heard Hendrix's *Axis: Bold as Love* and I heard them do that tape flanging thing, who knows who thought of that? All I know is that I bought a Hendrix record, and that thing went [he imitates a tape flanging sound]. Who cares who thought of that? I was listening to a record. It knocked me out. I bought a Sly Stone record the other day because I want to cover a song. This thing had this extreme stereo stuff, the whole band over here and a tambourine on the right side. I thought, "What dodo came up with this?" Obviously it was hip in those days. I thought it was the greatest thing, because basically we just wanted mono. We wanted two mono speakers.

Let's talk about electronics a little bit. You're a believer in electronics, technology, synthesizers.

Oh, to the highest order.

You never worry about losing musicality or soul in the larger sense?

Never. Absolutely never. As a matter of fact, on my album—and I play guitar—a friend of mine came in; he had some

programs of guitar sounds that we put into a drum machine that I was absolutely in love with because of the sound. I didn't care that I wasn't playing the guitar. It was the sound that was great to me, and I was making a record. I came up with the ideas and concepts, and when this record comes out it's going to say Nile Rodgers. So on one song I did some guitar programming, and some bass programming. Who care about that stuff? That limits your art. It's all just paint, right? You just have to grab all the colors you can get. If somebody introduces these new metallic colors that have bits of metal flake in them and gold leaf and stuff—all of a sudden you're starting to get a texture to your work that you didn't have before when you just worked with these primary, oil-based paints with no other textures in them. Somebody introduces a new thing and you say, "Damn, look at this great stuff I can do." Other people develop styles around materials. You can see certain artists who develop styles around just what they use. Technology just allows composers especially to be more creative than they have been. I mean, I can't play the French horn but I have some great French horn sounds in my Synclavier. It allows me to interpret the French horn the way I hear it. In the old days when I had Chic, sometimes it was damn frustrating to write out the arrangements and listen to them played poorly all day. I mean, I'd just sit there for hours and hours and hours. And I'd say to myself, "Damn, I wish I could play cello because I'd have it right."

Of course, the other side of the coin is that sometimes you get an interpretation from a musician that *you* would have never thought of in a million years. You can write out a chart for somebody, and you're listening to the section, and somebody in the back makes a mistake and you go, "Wait a minute, what was that again?" You say, "Wait a minute, that's all wrong," and you look at the paper and the copyist copied it wrong, but it sounds hip and you use it. Of course, you lose that spontaneity.

And musicians lose jobs too, right?

Not that I know of.

I mean, if you don't need a string section, that string section is out of work.

Yeah, but hell, all my life I've always been in the You know I went to classical school. Hell, how many jobs did I get, you know? I never heard the concertmaster sitting around saying, "Damn, you know, we need to find some more pieces for classical guitar players. Man, I sure miss that guy who used to play in our orchestra." No way. Hey, come on.

Are people just going to have to adapt to electronics? Is it like when sound came in to the movies? There were a lot of people squawking about how horrible it was, and it would change everything, and it would cheapen everything. And, of course, ultimately it didn't.

Well, initially it did because you had to get used to the new. You were only accustomed to the old. You were accustomed to these great mime artists, these people who could emote and make you laugh without saying a word. So we just had to get used to the people talking. Some of them had terrible voices and we couldn't stand them any longer. A lot of them were great and they continued on.

Is that where we're at now with electronics in the record industry?

I don't think so. I don't think that it is such a major issue at this point. I personally think that recorded music and live music are two different things. I, for one, when I go see bands nowadays and I see them playing tapes and things like that—I don't come from that school—to me that's the funniest thing I've ever seen in my life.

You mean like Frankie Goes to Hollywood?

Sure. There's a million of them. Big ones. Good ones. I'm sitting there going, "What is this?" I see the drummer go and flick on the tape of a bass drum going boom, boom, boom. That's totally ridiculous to me. I didn't study all these years to go play a tape when I'm doing a live show.

So that's jive?

To me it is. I believe in playing. But to me a record is a record. The thing that makes me fascinated with records and films is, I'm blown away with technology. I don't want to see a film that's washed-out black and white like the old days, and subtitles on the screen and no talking. I want to see more and more technology. When they improve

the sound in the theater to sound like the sound in my home, then I'll even love it more. I like new things. I want to see more innovation. And personally, as a composer and as a writer, I like the freedom of being able to do my own horn parts myself on a synthesizer, and use my interpretation and know that the damn thing is going to be right when I get finished playing with it. I think that's a great thing.

What's the cutting edge right now in technology, and what are the things we can look for in the next few years?

Right now it's fascinating to me. This is the most stimulated I've ever been in my whole life. I can't even keep up with all this junk I'm buying. To me the most fascinating thing, and I know to some people this is going to sound like a drag We're working on systems where if somebody who lives in England, say, has a system similar to what I have, and he's got a track and he wants me to play on it, well, he can send it to me over the satellite to New York. My system can pick it up. It will go down on tape. I can listen to it, put my guitar overdub on it, send it back to him, and it'll all be digital information. It will sound exactly the same as when I played it. And it'll be clear as a bell and it'll be dynamite. Right there in his home as if I were there playing it with him. We just transfer the messages to each other digitally. The quality is perfect. Now, a lot of people would argue about that, but to me that's great, that's efficient. Now I don't have to go there and move into a hotel, and raise the budget \$20,000 or even hassle with England! I think that's a great thing. In fact, that's *more* communication, not less. I can play on your record if you're anywhere.

It sounds like the music industry's "global village."

Yeah. It's all just communication.

Is that system something that is really imminent?

Absolutely. Maybe in the next year or two. Oh, yeah, it's going to be happening in a big way.

How did you make the move from being a performer and producing your own records to producing other people's records?

To be totally honest, Chic was only a production to us. Chic was not the band that we were going to be in. It

was like what you were talking about before, disco being a producer's thing. Well, yeah, we were producers, we were songwriters. We also sang and performed, but we didn't feel that we had to go out and represent it. Quite frankly, we didn't know if it would be a hit or not, because we had so many bad things happen to us, plus we really wanted to be rock stars. We didn't see ourselves just playing in clubs. We wanted to be like, all right! [He mimics the sounds of a huge crowd, and laughs.] That sort of thing. We didn't basically want to assume responsibility for Chic. We didn't really know what this disco thing was all about. We were just writing songs that sounded good to us, that made us feel great, that made us want to dance to them.

But right from the beginning you produced the group yourself with Bernard Edwards. There was never any question of bringing in an outside producer. We were Chic. But the thing is, we weren't necessarily going to be Chic forever.

How did you also decide you wanted to be a production whiz for other recording artists?

That was purely an accident. Other producers were producing us before we were Chic officially. And no one could get a record from us because we were overplayers. We wanted to be *players!* We were musicians. Jazz, man! So when a producer came in he could never communicate with us and make us understand that we were making records. Now, this was us; we didn't want to be seen as The Monkees, we wanted to be like Return to Forever, that's where we were coming from. No producers could get records on us. They got records, but they were like son of Mahavishnu.

These were records that never actually came out?

Absolutely never came out. They were tapes; they never actually became records. No record company signed us. We decided to cut our own stuff. It started off as jazz, then progressively became more commercial. The first proper disco record we wrote—it's funny to say proper disco record—was "Everybody Dance," which was the most jazz-like song in our repertoire. When we realized that, we did it for ourselves—we did this not as a musi-

cal representation of ourselves, but as what we could do if we wanted to make a commercial record. We thought we could . . .

. . . *produce this product.*

Right. When you're actually there doing it, you think it's something special, and something really heavy. So once we did it for ourselves we said, "Damn, we could probably do this with anybody." That's really how cocky we were. This was our first record, and we went to the head of Atlantic Records and said, "You know, we could make your secretary a star." This is really funny [laughter]. We were 20-something years old and we're in there telling the president of Atlantic Records that we could make his secretary a star because we thought that we had really lucked onto something. Not realizing that all we had found was songs, and people—us—who could play the tracks, and people—us—who could make them into records. But we didn't know that. We thought we had done something *magical*. We didn't realize that all we were was just producers, and we just happened to be songwriters and musicians as well, and also I did the arrangements.

So when did you figure that out?

It took a while, because we had all these big records. And we didn't realize that all we were doing was what people like Quincy Jones or Phil Ramone do. I don't really know how they produce records because I've led a very sheltered life. I've never really worked with other producers outside of Bernard Edwards.

Did it take a stumble or two on your part?

Yeah, it took working with Diana Ross on *Diana*. That's when we realized that we didn't understand why things were going so well for ourselves. We had no idea. We said, "Damn, what did we do? We wrote a song. We cut a track. We went in there and sang it." We didn't think we were the greatest singers in the world, so why did that work? Because it just did.

So what happened with Diana?

See, we had never worked with stars before. We didn't realize that there was a communication thing. We didn't realize what producers did. We thought that whenever we produced a record all we did was sit at home and write all



HALL AND OATES



With Chic, we thought we'd done some magic. We didn't realize we were just producers who also wrote.



MADONNA

Madonna's the kind of person producers dream about working with. You know she'll work on it until it's right.

these songs. Once the songs are written, we go in and cut the tracks. Once the tracks are cut, we go in and put the backgrounds on. Then we sing the lead vocals. That's how we produced a record. So it was no different for anyone. Sister Sledge, Diana Ross, we didn't care who it was. Diana Ross walks into the studio and says, "Well, how do the songs go?" We said, "What do you mean, how do the songs go? We're going to go home and write them. We don't know how they go. What do you want the songs to be about?" "Well, my life is here in New York and I don't want any of the old life. I don't want to talk anything about California or my past relationships." I said, "Great, so you're coming out with a new bag." We wrote that down and went home and wrote "I'm Coming Out." That's how it worked to us. That's it. That's how you produce a record. So Diana said, "I'm going to have to hear the songs." We said, "Sure, you'll hear them when it's time to sing them." We had no idea. We thought *everybody* did it that way. We really did. So then we got pissed off. We said, "What do you mean? You mean you have to hear the songs? Oh, so we're *auditioning* for you? What do you mean by that?" She says, "Well, I've never just walked into the studio and somebody tells me to sing, 'I'm coming out, I want the world to see.'" We said, "All these big records you've had, what do you mean you've never done that?" We honestly didn't know. We never rehearsed. Rehearsal? I'd never heard of such a thing. "Oh, we got to *learn* the songs first and then record them?" I said, "I'm a pro, you can teach the song to me in the studio and I'll play it." I mean, I survived like that at the Apollo. You learned the show that morning and you had to play it that afternoon.

But that's not the way records are made, you found out.

But *I didn't know that.* We had a big fight with Diana Ross. She left the studio and we didn't see her for months.

Really? Over this . . .

Over just the way that we worked. This whole thing of, "Well, you come in and we'll tell you what to sing, and when you finish singing it we'll tell you when you can go home." And we're, like, 25 years old, and this is Diana Ross! Well, we truly didn't know. I mean, we

weren't trying to be crazy or tough, we honestly didn't know any other way. If somebody had proposed a different sort of way to us, we couldn't guarantee that the record would sound right. Because I didn't know how to do it if it wasn't *my* song. I couldn't imagine what the record would sound like.

She actually remixed the record herself without your approval, didn't she?
Absolutely.

And that's the way it came out?

Shee, boy, did it ever. But, you know, what happened is that a really great friend of ours, Bob Clearmountain [an engineer and producer], listened to her version of it and said, "You know, Nile, these are great songs, man. You can't keep a record like this down. No matter how bad this sounds to you, believe me, to the people it's going to sound dynamite." I said, "Bob, listen to it, there's no bass, there's no nothing. My guitar doesn't sound like that. That's the worst guitar sound I've ever heard in my life!" [Laughter.] He said, "Nile, trust me, man. It's cool. That's how Motown records sound. It's cool." He was right. I really was afraid. I was terrified. I thought the record was going to be a huge flop, just because of the sound. It shows how paranoid you can get about something like that when really, like people say, "If it's in the grooves, it's in the grooves." It's hard to mess it up.

You still don't like it, huh?

No, well, I have the original at home so it sounds great to me!

You play the original?

Of course. Of course! I have the *real* one, with the real big horn sound. Oh, they made a mistake because they didn't know that was going on, they didn't know how we did the record. We built a composite trombone solo which is *fantastic* on my record. On their record . . . the guy made a lot of mistakes—which wound up being cool, ultimately, in the end, because they're good players. He didn't make a total jerk out of himself. But on mine he's really wailing. He sounds *fantastic*.

We'll never know. When should an artist produce himself, and when should he go to an outside producer?

That's a very difficult question to answer. But let me say this to you as an artist finishing my own record: It makes you incredibly anxious. I don't know if

I'm as objective as I'd like to be, even though it's a very subjective medium. I don't know if I can say, sometimes, if I want to go with this thing because it's best for the record or because I want to appear hip. Do you know what I mean? I might want to take this lyric out because I feel stupid talking about, say, Kellogg's corn flakes, so I put in sushi instead to sound hip . . .

Even though Kellogg's corn flakes might be better for the disc?

Right. Whereas if it were *your* song I'd say to you, "Come on, give me a break. Kellogg's corn flakes is happening, *everybody* knows about that. So what if your snooty, cool New York friends know about sushi, big deal!" That's the difficult part because when you're producing yourself, you're like an actor. Now that I've been working with films and stuff I see how actors are very conscious about how they're coming off. So they're looking for scripts and saying, "Damn, when so-and-so says that line he really comes off heavy, that sounds dynamite." And they go to the director and say, "Can I have that line?" You start doing that to yourself. You say, "Wow, when so-and-so gets that part it sounds really cool; maybe if I put that on a guitar, I'll have a cool part." It may sound really petty, but I'm sure a lot of people get into that sort of thing. Because you are talking about yourself, and you're molding yourself to the way people are going to see you.

Do you think there are a lot of people who are producing themselves who shouldn't be?

Yes. But then there are also a lot of people who produce themselves who do great work. Also, some of the people who I think are great artists allow themselves to be produced well. Certain people are just fabulous artists, and whoever they're being produced by, they'll always shine through. The artistry is always there. Bowie is like that. David Bowie will never *not* be Bowie. He'll always be Bowie, there's no way you can change that. Or somebody like Jagger. Oh, even a better example is Madonna. She'll always be Madonna, no matter what. She is one of those really special, unique artists that . . . I swear, I wish a lot of producers could work with people like that. She's the kind of person you dream

about. The kind of person you know will work on it until it's right. And what's right for Madonna is the same kind of thing that's right for Bowie—the question is whether the feeling is right, not whether they sang it perfectly. If the story is being told properly. When you hear their records you know just what they're talking about.

Does a Madonna or Bowie know what they want when they come into a studio, or are they just very receptive to a good producer?

I think they have a very good idea of what they want, and they're also very receptive. What governs this stuff? What's wrong? What's right? Who knows what can change it from day to day? I can wake up in the morning with a very clear picture of how a song is going to be, and I get to the studio and it just doesn't work. You don't like it, even though you were clear on it. It's just not happening. So if somebody suggests a better way to do it, sure, you can fight it and just insist that your way is happening because you wrote it. Or else you go along with it and try and develop it with him. It's having very strong editing powers—that's what I think a good producer is, a person who can take their ideas and stop them, like that, in an instant, and let their minds be free and listen totally to what somebody's got to say. Something new. That's what makes a person a good, receptive artist or producer. That you can stop your idea and totally grasp what another person is saying and either develop it with him or make the decision right on the spot, "Nope, it's not happening, let's move on to another idea." That's *my* payoff in this business. What I get out of the record is the enjoyment of those moments when that happens. And it happens every day, 20 or 30 times a day. To be able to stop and create something out of just a shell of something that was there.

And you have that power to say, "Nope, it's not happening," even with a Bowie or a Jagger?

Yes. I think that's my greatest asset or my greatest value to a person, the fact that I'm a songwriter. I write melodies all day. So if you come in and you have a song, and you say there's some part that just doesn't make sense to you, I can give you a thousand suggestions, I

hope. Some days I can't, but those are the days we just go home early.

That happens from time to time?

Oh, man, it happens all the time.

Do you consider yourself a good technician on the board in a studio?

Oh, no. Heavens no. I mean, I know how it works, and I can work a board if I have to. But I'm not an engineer/producer. I didn't go to engineering school. This would be Greek to me except that I've been doing it so long that I know what it all does now. Plus, I have a little studio at home, and they're all the same. I truly believe in great engineers. *That's* the thing to me. Dig this, I'm really simple when it comes to music. I think that first you have a song. Then everybody connected with that song has to make the song better, no matter who it is, whether it's the assistant engineer, the singer, the bass player, the guitar player, everybody's got to make it better than what you did at home by yourself. If I come in and think I have a good song, rehearsing with my band, when I come in and play it you got to make it better than what I just did. I can make it as good as I made the demo at home. Anybody can do that.

Let's talk about some of the people you've worked with as a producer. Let's start with Jagger. You did three cuts on his solo record. How did that come about, and was he a little nervous about making his first solo?

Outwardly, no. Inwardly I'm sure he probably was nervous. If he says he wasn't, then I like him even *more* than I like him. I think he's great. How could you be in The Rolling Stones and be Mick Jagger and not be nervous about making a solo record? Damn, if he isn't nervous then he's *really* hip [laughter]. *I'm* nervous!

Were you nervous working with him?

No. I'm never, never nervous working with people. No, I mean I was nervous making my own solo record, so I know Jagger had to be nervous.

Did the songs come together relatively easily?

Well, you know, we had a feeling-out period of him starting to understand my sounds, and me understanding his sounds, and his technique and my technique. Finally, talking worked everything out. When Mick Jagger said, "Nile, get the hell out of the studio

and get in the control room," I said, "Now I know what you want!" [Laughter.] Then I understood. I said, "Right, Mick. Gotcha, pal!" And then I really dug it. As soon as he said that to me it was very clear. But for two weeks it was like boxers trying to feel out . . . I got that punch in. Great. Well here's a couple more. After that we were cool. I realized he wanted a producer-producer. He wanted me in there working on *sounds*. He wanted me to capture the moments, these fleeting bits that would go by and he'd say, "Whoops, that's it—hold on to that thing." I couldn't do it if I'm out in the studio jamming, because my music is fleeting too. And I'm hanging out with all the guys, and we were losing stuff. That's the way he makes records, whereas I make my decisions right on the spot. On every record that I do there's only one copy. I don't have two versions of *anything*. Either it's happening or it's not. With Mick, he's from a different school, sort of like Bryan Ferry. They want you to play everything possible and then they'll figure out which parts are hip, and then ask you to refine that.

Are you going to be doing the new Stones record?

No. We were talking about this for a long time. I guess I can't say no, because I don't really know what stage they're in. He's in town now so I guess I'll ring him and see what the deal is. I would think it's probably good for them to try and do it by themselves. It seems to be working out.

But you'd like to do it, obviously.

Of course. Who wouldn't want to do The Stones?

Do you like being a session musician? I know, for instance, you played guitar for Bryan Ferry.

I love being a session person. I have a philosophy about that too: I don't learn my own songs and I don't learn your songs, either. I don't rehearse. You give me the chart when I get to the studio. Either you give me the chart or I'll learn it with the band or whatever. I play my best guitar on *your* record.

Let's go on to some others you've produced. Jeff Beck—was he a hero of yours as a guitar player?

Serious hero. Jeff, he's the man to me. He's the greatest guitar player alive today, in my opinion. He plays what I would like to hear more than any other

guitar player. When I worked with Jeff I had a different concept in mind. I wanted to make a record with somebody like that very accessible. I want other people to enjoy Jeff Beck's guitar playing as much as I do, and the way to get that out there is to have him on a *song*. Not just great fusion records, which I'm sure he can do forever without me. I wanted to give him songs that people would sing. So that's what I tried to do. I tried to say to him, "Like 'Beat It.'" The reason why Eddie Van Halen's solo is so great on "Beat It" is not just because it's great—it is, and he plays great solos all the time—but because of the fact that it's on that *cool song!* That's what makes it really happening.

Was Beck there for that? Did he understand that?

Oh yeah, sure. We talked about it a lot. He likes my songs. We had a good time.

That's not a problem for someone who came out of the '60s, the long-guitar-solo era?

Well, I let him play long guitar solos [laughter].

How about Duran Duran?

Duran Duran is not quite the same as these other people. First of all they're a group. It's a completely different relationship than with a solo artist. When you're dealing with a group it's almost like first you have to be the den mother, like a Boy Scout troop. You have to gain the respect of everyone, which is cool. I don't have any problem with that. Duran Duran were fans of mine before I worked with them. They loved Chic music, so that was great. Plus, there were a lot of Duran Duran songs that I liked as well. Bands are a very different animal. You have to deal with the personalities collectively and individually. And I work best on a one-to-one basis. I just grew up working with individuals. There's a lot of psychology that goes into production because these people are stars and you absolutely have to respect that. I always feel that I work *for* you, not that you work for me. I don't even feel like I work *with* you. I'm employed by you. And I think that it's your record, and you got to give a person that. So when it's five people and you have to give them their records individually and collectively, it's rough. But I get along great with Duran Duran.

Do they make records as great as their videos?

They make great videos. They make good records too. I mean, some of their songs I like more than others, but that's true of any artist. I guess Duran Duran probably falls under more criticism because of the audience they appeal to. If they appealed to older people like Bryan Ferry does, I guess they'd be really hip. Their songs are cool. Like "Don't Say a Prayer." When I saw them live I was crying when they did that song. I was standing on the side and I heard this [he mimics the rhythm] and it sounded so beautiful to me the tears started streaming down my face. Madonna looked at me and went, "Yo, brother, where're you coming from?"

And Madonna?

Madonna is the greatest. I don't care what anyone says. Madonna is so cool. I said this to Diana Ross, too. I said, "I wish everybody were like Madonna, in a weird way." I like the fact that she's the hardest working person I've ever seen in my life. She was here in the studio before me most of the time. She'd swim like miles every day before she came to sing. That kind of dedication I don't see too often. It makes you feel proud. It makes you feel dedicated. It makes me say, "Hmm, maybe I'm getting a little fat here around the middle. Maybe I should go practice."

Is she a great singer? Does she really care about being a great singer?

I don't know if she cares about being a great singer. I think she cares about being a good singer and being a good storyteller, and that's what singing is about to me. That's all that it's about. I mean, is Bowie a great singer? What's a great singer? I mean, yeah, *Aretha's* a great singer. But Bowie is a great songster. He tells the story and he means it. He delivers the story. To me, I'd rather work with somebody like that than a great singer, because I make records. I'm not really capturing what I consider in my head great live performances. I'm making a contrived thing for a specific type of artistic statement—a record. So even if you sang the same part five times, who cares? If the fifth one is right, that's the one that goes on the record, not the first one. Because this is captured forever. You want it to be *dynamite*. **A**



Photo courtesy of Arista Records

THE THOMPSON TWINS (TOP); DURAN DURAN (BOTTOM).



Photograph: © '84 Ebet Roberts



My goal isn't to capture live performance. I'm making a contrived thing for a specific artistic statement.

GRAY MARKET: Is It Worth The Price?

DANIEL C. SWEENEY

Few consumers know the gray market by that name. The term is industry argot, an insider's designation for a certain part of the marketplace. And yet the audio gray market probably touches the majority of audio equipment purchasers at one time or another—and it touches them in ways that directly affect the worth and usefulness of their investments in both hardware and software.

To understand the impact of the gray market, we must first know its scope, dimensions, operations, and, most significantly, its functions—its reason for being.

The gray market arises primarily as a response to the unfulfilled desires of consumers. If some item is desired and desired strongly, and yet is not easily obtainable (either because it is not distributed through a regular market channel or because the price for the item is perceived as unacceptable), then the impetus is there for the formation of some new channel for the delivery of goods. If that new channel is not sanctioned by the manufacturer—and frequently it is not—it can be designated as gray market.

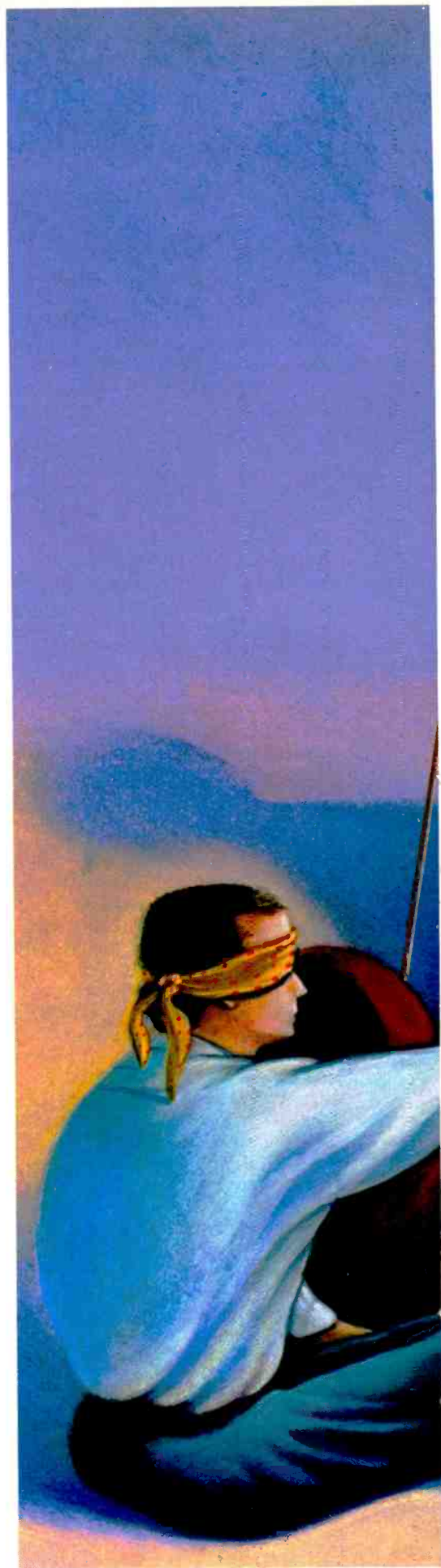
Gray market may be defined very simply as an irregular and unsanctioned mode of distributing a product. It can be distinguished from the black market by the lack of anything illicit in the transactions. Gray market bypasses a manufacturer's local authorized distributors, but it does not violate any trade laws.

In the manner of broad definitions, this is all quite abstract, but the gray market itself is never without concrete manifestations. Far from being some economist's hypothesis, several removes from the actual movement of goods, the gray market is always firmly rooted in the consumer's cravings for very specific products. Here's an example of what I mean:

My first significant audio purchase was made through the gray market, in 1980. At the time I wished to buy a pair of Acoustat Model II electrostatic loudspeakers, a very hot item among knowledgeable consumers. Acoustat speakers were, at that time, esoteric audio components subject to price rigidity—in other words, no authorized dealer was likely to discount them. In 1980 I did not understand the workings of the esoteric wing of the industry, and I felt that the unspoken stricture against discounting was unfair. I was determined to get the speakers at a discount, and I succeeded. I bought them through the gray market.

Today, as then, a minor industry exists for customers who want esoteric goods but who perceive the list prices for such goods to be unfair. The gray market accommodates these customers.

The gray market also accommodates far, far greater numbers of customers interested in fast-selling, low-end items such as boom boxes, portable cassette players, cheap auto radios, and the like. Here availability rather than price is the chief force in stimulating





RAGLAND

Illustration: Greg Ragland

“The person who buys gray goods is not someone who wants a lasting relationship with a manufacturer.”



the gray market, and some interesting distortions occur on the wholesale level. At some point, supply through regular distributors does not keep up with demand for a particular product, but prices do not rise as per classical marketing theory because of fierce competition among retailers, which works to keep retail prices just a few percentage points above dealer cost. Unable to increase their profits by driving prices up, retailers must do high volume just to stay even, and to do volume they must enlarge their supplies. This they do by patronizing unauthorized distributors—gray marketeers, as it were. The end result of gray-market purchases by ordinary retailers is that significant numbers of consumers buy gray without ever knowing it.

In the low end the gray market is as

much the creation of the legitimate retailer as it is of the consumer, while in the high end the established retailer tends to be bypassed. In the high end the customer who buys gray usually has some idea of what he's getting into, whereas the low-end customer is completely in the dark. The distinction is important because, while both types of customer are at risk, the high-end buyer is more likely to have accepted the risk as a condition for obtaining a discount.

No one knows how big the gray market is. Joe Abrams, national sales manager for Sumiko, a high-end company which has suffered considerably at the hands of gray marketeers, estimates the gray-market share in audio at no more than 1%. Jay Frank, a Southern California retailer with extensive experience in buying gray-market goods wholesale, believes that these products account for over 50% in the low-end portable market, but much less in the mass market and in the high end. Mike Detmer, national sales manager for Stax Kogyo, another company which has considerable problems with gray-market distribution, guesses that less than 10% of his company's output passes through the gray market.

In fact, gray-market share varies widely from one level of the market to another and from one company to another. Because the gray market is, by definition, irregular, its market share tends to fluctuate both overall and on each individual level, as new sources of supply open up and established ones constrict or vanish.

Since the consumer is the foundation of the gray market, let's examine him for a moment. In most cases, he's someone who buys on price. Gray-market goods are generally considerably cheaper at the retail level than normally distributed products, and discounts can be especially large in the case of high-end and esoteric products. In Los Angeles, for example, Nakamichi Dragon cassette decks were recently selling for approximately \$1,100 on the gray market. Normal retail cost is \$1,800. In the same city, Esoteric Audio Research 509 vacuum-tube, mono amplifiers, which normally sell for \$2,600 per pair, retail, were

recently going for \$1,000 per pair. These are extreme examples, but they indicate the substantial savings which can be had by buying gray.

In the middle and lower portions of the market, where discounting is usually the rule, price differentials will not be so pronounced. Jay Frank states that gray-market Sony Beta movie cameras have been offered at certain Los Angeles retail establishments at less than dealer cost, though typically margins on video equipment are very low anyway—as little as five retail percentage points above dealer cost. Frank further states that gray-market portables routinely sell at or below dealer cost in the Los Angeles area, though, here again, legitimate retailers normally maintain profit margins of less than 10 points.

In the high end of the gray market, where the dollar differentials are greatest, the customer who patronizes the gray market tends to assume a distinct form. "He's a one-time buyer," says Mike Detmer of Stax Kogyo, who's spent countless unpleasant hours confronting such customers over warranty issues. "He is not the individual who would buy our product ordinarily or who would want to form a lasting relationship with the company."

"He's a person after a deal, above all else," says Peter McGrath, owner of the prestigious Sound Advice, a high-end salon in Coral Gables, Florida. "He's a person with no understanding of the importance of dealer support or of the fact that many esoteric products are only as good as the dealer who sold them because of their demanding setup requirements."

The gray market also serves the individual impatient to embrace the latest technology. The Japanese audio industry commonly introduces new product categories in the home market as much as two years prior to the North American introductions. Word of the innovations reaches the U.S. and demand builds among the knowledgeable. For example, Compact Discs were available in Japan and Europe some time prior to their appearance in the U.S., and in 1983 many, many gray-market discs appeared in the U.S. to satisfy American demand. Now that CD production has moved State-side, gray-market CDs have largely disappeared, but in the future we may

expect to see gray-market distribution of other as yet unreleased new technologies.

Not surprisingly, the most consistent customer for gray-market goods is the retailer himself—usually the mass-market retailer. The reason is simple. Once gray-market products of a certain brand become readily available in a given geographical area, prices at the retail level are affected radically. Mass-market products on the wholesale gray market usually sell for at least 20% below their cost from authorized U.S. distributors, and they're sold to anybody with the money. Unauthorized dealers rush to buy the product, as do dealers who are authorized to sell the same brands as those being sold on the gray market. In other words, dealers will end up selling unauthorized merchandise in the very lines they're authorized to carry.

"You have to do it to survive," says the general manager of one \$20 million chain in the deep South. "If your competitors are selling at below your cost, what are you gonna do?"

We can certainly sympathize with the retailer in such a predicament, but we must also question his treatment of the consumer who ends up buying a gray-market unit, without valid factory warranty, from a retailer designated as an authorized representative for the brand. Gray-market goods are often meant for use in Asia and are not designed for U.S. line voltages or broadcast standards; selling them as equivalents to models designated for the U.S. seems perilously close to fraud, especially under the auspices of an authorized dealership.

Not all dealers go to the gray market because of price wars, though. Most manufacturers impose some standard requirements on the retailers to whom they sell, such as stated credit ratings, service and installation abilities, whole-line orders, minimum monthly orders, position within a given local market, adherence to unspoken pricing structures, etc. Retailers who can't meet manufacturers' requirements, or who are seeking highly desirable restricted lines, have no choice but to go to the gray market.

The wholesale gray market can also include the proprietor of the audio salon, the very individual who often is

quickest to decry the activities of the gray market. High-end dealers occasionally buy small specialty items not distributed in the U.S., particularly phono cartridges. The appearance of nearly unobtainable exotica in his shop lends the retailer a certain distinction, and purchasing such distinction is relatively inexpensive. High-end dealers sometimes also engage in another form of gray marketeering known as transshipping, which I will discuss later in this article.

The gray market is not the mirror image of normal retail distribution structures, and not all products are readily obtainable through it. The gray market tends to operate only where shortages, rigid pricing structures, and limited authorized distribution result in considerable unmet demand for a product.

By far the greatest amount of gray-market activity is in the area of blank tape. Tape in the past has been subject to enormous markups by authorized distributors and the pressure for lower prices has been intense. Probably more than a quarter of the blank cassettes sold in the U.S. now are gray market in origin, and they are sold in every imaginable type of retail outlet. Much of the tape comes from India and Southeast Asia where the cassette is, by far, the dominant audio medium. The Southeast Asian demand for blank tapes is enormous and insatiable. Diverted shipments in the millions of units scarcely affect the supply, and Japanese manufacturers may well lack the ability, and perhaps the will, to regulate distribution closely in that market.

In the area of hardware, gray-market goods appear at every level but they predominate in the low-end portable market, where gray marketeering is ubiquitous. In brand-name component stereo, supplies of gray-market goods are apt to be very erratic, and many brands virtually never make it through the gray-market pipeline due to tight control by manufacturers over retailers and distributors alike.

The principal branded components appearing on the gray market are either Japanese or British in origin. In general, American audio products, now consisting chiefly of branded loudspeakers and high-end electron-

“The gray-market customer is after a deal, above all else. He doesn't understand the importance of dealer support.”

ics, seldom appear on the gray market because American manufacturers are able to trace sales to unauthorized dealers and to cut off distributors or retailers who make such sales.

As might be expected, Japanese components form the biggest presence on the gray market, but they vary in availability considerably from one brand to another. Yamaha has begun to appear on the gray market recently, and Kenwood is common there, while Pioneer, once prevalent, is now entirely absent. The giant Sony Corporation has long had serious problems from gray-market distribution in the U.S. Perhaps the hardest hit have been Nakamichi and Stax, both of which are relatively small companies marketing select, high-priced components and neither of which has sufficient staff to

“If competitors are selling at below your cost, what are you gonna do? You have to do it, to survive.”



effectively police its Far East dealer network.

Among Japanese components, phono cartridges have been especially numerous on the gray market in the past, probably because they are easy to transport. But the declining demand for cartridges and many manufacturers' practice of bringing out special, U.S.-designed models seem to have reduced activity in this area.

English audio equipment accounts for a relatively tiny percentage of gray-market sales in the U.S., but since English products are important in the enthusiast market, English gray goods deserve some attention. The English gray market operates chiefly in the area of loudspeakers, and in that respect it is unique. (Asian branded loudspeakers are not a factor in the

gray market, and American speakers are an insignificant factor.) Secondary gray markets for English turntables and English vacuum-tube electronics exist as well.

The gray market in English goods is chiefly a result of the very high price differential between retail lists in England and in the U.S. Imported English components are principally high-end products and carry typically high dealer markups here. Distributors generally take a healthy cut as well, with the result that English retail prices are usually lower than U.S. dealer cost and often substantially lower. On high-priced objects like vacuum tube amps, savings to the consumer who buys gray can run in four figures.

Aside from English products, limited numbers of European audio components appear on the gray market from time to time. Revox components are available at present, and Blaupunkt automotive audio components have appeared occasionally in the past. Generally, however, the European gray market is limited to being an English phenomenon.

Gray marketeers are as various as their products and customers. Many sorts of entrepreneurs inhabit the gray market and many, if not most, also work through normal distribution channels.

The biggest of the gray marketeers, the captains of industry, as it were, handle only mass merchandise and operate exclusively at the distributor or wholesale level. E.N.S. in Los Angeles is a prime example of the type, a well-established, well-financed gray-market operation that serves retailers all over the country.

The workings of such gray-market giants are somewhat obscure. For reasons that will become obvious, they are not inclined to identify their sources, but from hearsay evidence supplied by retailers and manufacturers, I have been able to develop a model for the gray-market network in the Far East.

Gray-market distributors, essentially, exist at the sufferance of the manufacturers. Japanese electronics manufacturers, particularly the big ones, tend to be ambivalent about the gray market. Most Japanese corporations place a

premium on full employment and high production, so that gaining even a small additional market share is a primary goal. At the same time they know that if the gray market becomes too extensive their American marketing arms will wither away. Many end up temporizing and tolerating a sort of controlled gray market.

The heavyweight gray marketeers take advantage of this manufacturer temporizing. They very often bypass the American distributor and buy from wholesalers in the Orient, sometimes in Japan, sometimes in Hong Kong or Taiwan. Speculation has it that some gray marketeers buy factory direct. Some definitely buy at slightly above dealer cost from major retailers. Essentially, they buy product where they can get it, and they buy big orders for cash. The goods are usually intended for Asian markets and often have model designations and numbers that indicate as much.

The gray-market distributor, once he has secured his goods, will generally sell to any retailer who has cash in hand. He does not maintain a dealer network as such. Such gray-market wholesalers operate chiefly out of Los Angeles and New York. Some activity occurs in Seattle and San Francisco as well. Big, established gray marketeers ship goods to their customers anywhere in the country, but smaller operators sometimes travel from city to city with truckloads of gear, selling their merchandise as they go.

Below the wholesalers are the one-step gray marketeers, the horde of individuals who import goods directly and sell to end users. Such individuals deal predominantly in the high end. Most specialize in particular types of products and sell either Japanese or English, but not both. Jim Miller of Analogue Excellence in Los Angeles is the dean of the Japanese importers. He specializes in high-end and esoteric Japanese tonearms, cartridges and turntables and is the authorized distributor for a number of lines such as SAEC and Micro Seiki. The now-defunct mail-order operation called The Source, located in New Jersey, was the leading authorized importer of British goods, particularly loudspeakers, and no clear-cut successor has emerged since its demise.

Both Analogue Excellence and The Source do, or have done, considerable dollar volume, but most one-step high-end gray marketeers are utterly marginal. Many acquire a single shipment of goods, take out classified ads in the audio press, dispose of their inventories, and leave the business. An example of the latter is Michael Sanders, president of Quicksilver Audio, who consented to be interviewed for this article. Sanders, himself the manufacturer of highly acclaimed tube-type amplifiers, acquired a shipment of English vacuum-tube components which he sold at less than half their usual retail price points. He subsequently stopped selling British products. (In mentioning this, I intend in no way to impugn Sanders' integrity, for he took the trouble of rebuilding each amp with premium passive components before offering it for sale, and made it clear to customers that he was not, in fact, an authorized distributor.)

Below the one-steppers is still another tier of gray marketeers with no direct access to foreign suppliers and who avoid wholesalers as well. They buy, instead, from other retailers, and, in fact, much gray-market activity in the U.S. involves horizontal rather than vertical movements of goods. Usually the term transshipping is used to describe the practice where an authorized dealer sells to an unauthorized one. Transshipping generally occurs in the high end, though it's not confined to that portion of the market. High-end stuff is more frequently transshipped simply because expensive audio products tend to move slowly, and one high-end retailer may find himself with excessive inventory and cash-flow problems while another has an eager buyer with cash. The heavy profit margins of high-end goods permit a retailer to sell above his cost to a discounter—often a mail-order discounter—who will then sell the gear below list to the end user and still make a profit.

Some retailers transship regularly to make a profit rather than to escape a cash-flow predicament, but manufacturers are quick to notice the increase in orders, and the practice is risky for the retailer. In other instances, isolated components are transshipped simply as a favor to another dealer, and the dealer accepting the transshipped

merchandise does not discount. Transshipping from retailer to retailer is virtually the only way that American-made audio products enter the gray market. The pair of Acoustat speakers I obtained were transshipped.

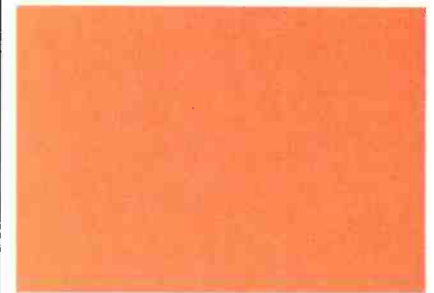
On the distribution level, gray marketeers tend to be clearly identifiable types of businessmen, but on the retail level there are no hard and fast distinctions between those who sell gray and those who avoid the practice. A high percentage of retailers on every level of the industry, from box-house, mass-market operations to appointment-only, high-end salons, will buy and sell gray if an individual transaction offers sufficient profit incentive and if the risk of retaliation from manufacturers is low. But gray marketeering is most widespread in the mass market, if only because the audio gray market itself is predominantly a mass-market phenomenon. In this respect, gray-market audio differs markedly from other gray markets, such as that for automobiles, where high-priced exotics form the bulk of the business.

Assessing the effects of the gray market is difficult. No one tabulates its sales or charts its development; any conclusions about its impact on either the industry itself or on the consumer can only be tentative.

On the manufacturing end of the industry, the effect of the gray market is likely pretty negligible across the board. Our unnamed \$20 million retailer made this observation on the impact of the gray market in Japan: "It's just another market to them [Japanese manufacturers]. The only time they care is when it's big enough to cripple their American subsidiaries. They can crack down any time they want. They just trace the goods back to an Oriental distributor and nail him." All other retailers interviewed reiterated this, and the sporadic appearances of various brands on the gray market—Kenwood one year, Sony the next—seem to indicate that major manufacturers are quite capable of curtailing gray-market activity at any time. Smaller, specialist manufacturers, such as Nakamichi, Stax, Revox, etc., are probably not capable of exerting sufficient control to totally dry up the gray goods.

Gray market is of more concern in

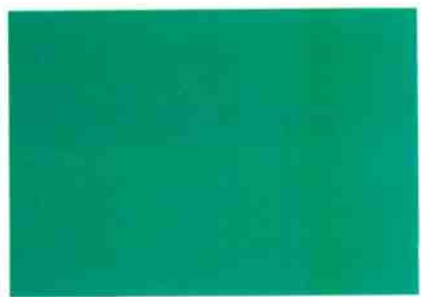
“To Japanese firms, it's just another market. They could crack down on gray goods any time they wanted.”



the extreme high-end and esoteric segments of the industry. Here, the gray market appears to threaten the very existence of the sector.

In the U.S., at least since the late '60s, limited-production audio components have generally been sold in small specialist shops or audio salons. Distribution is often deliberately limited to one shop per designated market area, and retailers are strongly discouraged from discounting—not that most of them would want to, anyway. Each retailer has his own market area, and he's safe from competition within it, at least as regards a given brand. No authorized retailer outside his area can discount to lure away customers, and everyone has his own piece of the high-end pie.

“The legitimate, authorized dealer is doing all of the work, but he isn't getting the profits that are due him.”



Manufacturers and retailers alike agree—at least off the record—that such an arrangement is necessary for the survival of the high end. High-end products sell in limited quantities, so the argument goes, and the individual sales of such products demand relatively large amounts of time and effort on the part of the retailer. Without high profit margins and “protected” retail prices, no retailer would bother to sell the high end, and the really premium goods simply wouldn't find a market.

Some dispute this theory. Jim Miller of Analogue Excellence points out that esoteric components are discounted in Japan and claims they sell far better there than here. He believes that de facto price control actually stunts the growth of the high end in the U.S., but

few others in the high end appear to agree with him.

“Gray marketeers don't compete fairly,” says Mike Detmer of Stax in rebuttal. “Most of them have mail-order operations and don't demonstrate product. They refer the customer to an authorized dealer, the customer hears the product there, and then buys it from the mail-order discounter. The legitimate dealer is doing all the work in representing the product, and he isn't getting the profits that are due him.”

Naturally, most customers are more concerned with their own finances than about the condition of the industry as such. If they can save money on the gray market, then it would appear to be to their benefit, at least in the short term, to shop there.

The consumer's situation isn't so simple though. Most gray-market items are designed for different line voltages than products intended for the U.S. The nominal Japanese line voltage is 100 volts rather than 120—not a gross mismatch, but enough to throw off the biasing of items such as Stax electrostatic speakers and headphones, with a resultant decrease in reliability. In the case of tuners and receivers, the problems can be more profound. Gray-market radios are sometimes calibrated to entirely different broadcast standards and function poorly in the U.S. At the very least, operating instructions are likely to be in a foreign tongue and therefore useless to most English-speaking consumers.

But the biggest problem confronting the consumer is in getting warranty work. American subsidiaries of Japanese and European manufacturers are understandably reluctant to provide support for products from which they derive no revenue. Many refuse to honor Japanese warranties, and they've protected themselves by pressuring their own parent companies to issue U.S.-only products while keeping Asian-market models separate. A few companies, e.g. Panasonic, make a practice of providing warranty work on any product regardless of country of origin. Others, such as Sony, are inconsistent. Some, like Nakamichi, provide service for a fee, but many refuse service and direct the customer to send the product to its country of origin for repair.

At this time, the future of the gray market is unclear. European automotive manufacturers are lobbying vigorously to get legislation that actively outlaws the gray market and makes it black. On the consumer electronics front, Panasonic has sued a gray marketeer, claiming that gray marketeering misrepresents the manufacturer and ultimately damages his reputation. In addition, the New York State legislature has passed a gray-goods law that requires stores selling these goods to notify customers prior to sale about the nature of any warranty. Similar legislation is under consideration in New York City, and according to a *New York Times* story quoting Gary Walker, spokesman for New York City's Department of Consumer Affairs, the local laws are likely to be tougher than the State regulations. There are, of course, many, many electronics stores in New York City, and a large percentage of them do an active trade by mail. The various Sony Walkman models are hot items in this market, and some of these stores give a tip on the nature of the contest by including “Sold With Original Headphones” in the ad copy. Whether or not a salesman has, over the telephone, given his verbal assurance about a warranty, it may well be worth the trouble to insist on a valid U.S. warranty in the case of more expensive hi-fi gear.

The *Times* article gives a special consumer telephone number for folks who are having a problem with what they believe are gray goods: (212) 577-0111. Additionally, they can write the New York City Dept. of Consumer Affairs, 80 Lafayette St., New York, N.Y. 10013.

While the State legislation has not been signed by Governor Cuomo, it is likely to go forward. As written, it would give a consumer 20 days to seek a refund if disclosure was not made, and the Attorney General could impose a \$500 fine for violations. Additionally, the Attorney General's office offers help in settling disputes. Write to the Attorney General, Consumer Frauds Bureau, 23 World Trade Center, New York, N.Y. 10047.

No one can predict the effect of the legal and legislative assault on the gray market, but it can't help but inhibit unauthorized distributors. **A**



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LET'S GET IT TOGETHER  BUCKLE UP

EQUIPMENT PROFILE

1

SONY CDP-620ES COMPACT DISC PLAYER

Manufacturer's Specifications

Frequency Response: 2 Hz to 20 kHz, ± 0.3 dB.

Harmonic Distortion: Less than 0.0025% at 1 kHz.

Dynamic Range: Greater than 96 dB.

Channel Separation: Greater than 95 dB.

Number of Programmable Selections: 20.

Output Levels: 2.0 V, fixed; up to 2.0 V maximum, variable.

Power Requirements: 120 V, 60 Hz, 16 watts.

Dimensions: 17 in. W \times 3 $\frac{1}{4}$ in. H \times 14 $\frac{3}{8}$ in. D (43 cm \times 8 cm \times 36.5 cm).

Weight: 19 lbs., 14 oz. (9 kg).

Price: \$950.

Company Address: Sony Drive,
Park Ridge, N.J. 07656.
For literature, circle No. 90



It's been only a short time since I tested and wrote about Sony's top-of-the-line Model CDP-650ESD Compact Disc player (see *Audio*, July 1985). While other CD-player prices were plummeting, Sony maintained that there would always be a market for a state-of-the-art unit that employed the very latest technology and offered all the features a serious user could possibly ever want. My review of the CDP-650ESD was nothing short of ecstatic. I still regard that player as the definitive model, one that can serve as a reference for judging other CD players both in terms of sound quality and in terms of features. That unit, however, has a suggested price of \$1,300—rather steep in view of the fact that perfectly adequate (if basic) CD players can be had for around \$300 or even a bit less, even from the very same Sony Corporation.

Sony must have realized that these days a \$1,300 player is not something throngs of people will wait in line to purchase. Accordingly, they have now come up with the CDP-620ES—a very slightly downgraded version of the CDP-650ESD that incorporates pretty much all of the new tech-

nology found in the more expensive player, but which sells for a full \$350 less. What has Sony omitted in order to accomplish this cost savings? According to them, the main visible difference between the 650 and the 620 is the omission of the 650's unique digital-code output port on the rear panel of the lower cost unit. I'm not referring to the special accessory connector that will be needed for attaching a video-graphics interface box when those become available; both the 650 and the 620 have that connector. I'm talking about the additional connector that gives the user access to the audio bit stream itself and therefore allows digital-to-digital audio data transfer. Also, the CDP-650ESD's chassis is of anodized copper (which probably contributes substantially to the price difference, and which Sony says has better resonant and thermal properties). In addition, the more expensive model has more massive feet.

I found a couple of other differences—minor ones—between the two players, that the people at Sony didn't mention. The first of these has to do with the grid-like track-number display on the front panel. The CDP-650ESD's grid shows a total of 20 numbers, while the 620 displays only 18, though 20 programmable playing steps can still be memorized by the lower-priced unit. The final difference I discovered between the two units is a feature found on the 620 that is actually not present on the higher priced 650. That's the headphone output jack. According to the people at Sony, introducing a headphone amplifier in the circuitry of a "pure" CD player such as the 650 can actually affect sound quality a trifle, so it was not done. The lower priced 620, I guess, is not regarded as a CD player in which total perfection is the goal, so its designers compromised enough to incorporate a headphone amplifier and its associated output jack with level control.

As for myself, I welcome the addition of the jack on the lower cost unit; and if it introduced any sound degradation, I confess that I failed to hear it!

Control Layout

The front panel of the CDP-620ES is almost identical to that of the CDP-650ESD. The disc-loading drawer remains pretty much as it has been on earlier Sony home players: It is opened by touching an "Open/Close" button to its right, and is closed by touching the drawer front, the "Open/Close" key again, or the "Play" button. Numbered keys from 0 to 20, plus a key labelled "+10," are found near panel center and are used to call up desired tracks for play or to perform random-access programming. The "+10" button speeds up the process if you want to call up a track number above 20. Track 44, for example (if one existed on the disc you've inserted), would be called up by touching the "+10" button four times, and then touching the "4" button. "Play," "Pause," "AMS" (automatic track advance and track retard) and "Play Mode" keys ("Continue," "Single" and "Program") are found to the right of the numeric keyboard; "Check" and "Clear" keys used for verifying programmed instructions or for clearing them from memory are located below the numeric keys. A "Stop" key and two manual search keys are near the front panel's lower right corner. The search keys are used for fast access, in either direction, to a given point on a disc while you are listening to it.



I welcome the addition of a headphone jack to the new Sony player. If it degrades the sound, I confess that I failed to hear it.

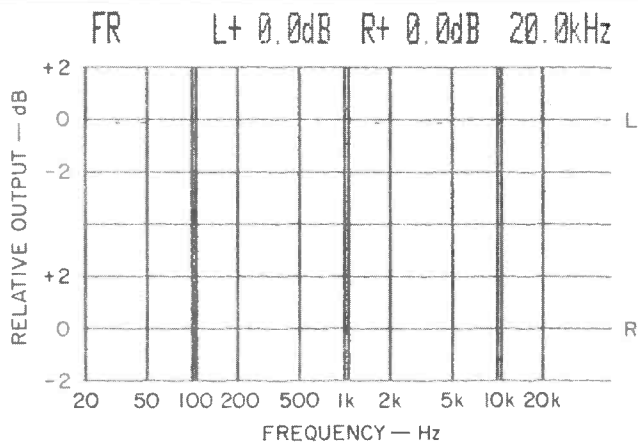


Fig. 1—Frequency response, left (top) and right channels.

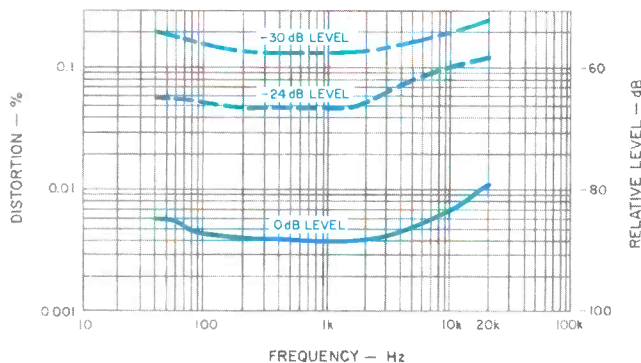


Fig. 2—THD vs. frequency at three signal levels.

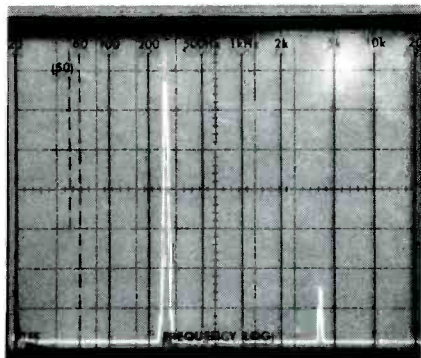


Fig. 3—Spectrum analysis of 20-kHz test signal (large spike) shows inaudible component at 40 kHz, more than 60 dB below reference level. Horizontal scale: Linear, from 0 Hz to 50 kHz.

At the lower left corner of the panel are switches which turn the player on and off manually or by an optional external timer. Additional buttons beneath the display area are labelled "Repeat" (for playing, over and over again, a single track, the entire disc, or a segment of a disc between two preselected points), "A ↔ B" (for setting those start and end points), "Time" (for toggling between an elapsed-time and a remaining-time display), "Auto Delay," and "Shuffle Play." When the "Auto Delay" button is pressed, two seconds of silence are inserted before the first selection begins. This function is toggled off by pressing the same button a second time. The "Shuffle Play" feature is an interesting one. When this button is pressed, all of a disc's selections are "shuffled" and played in random order. When all of the selections on the disc have been played once, the shuffle-play function is automatically cancelled. There would seem to be no end to what you can do with a Compact Disc player once a microprocessor is incorporated in it!

The front panel's display section presents a wide variety of useful data. When a disc has been inserted in the drawer, a "Disc" indicator illuminates. Next, a "Track" indicator briefly displays the total number of tracks on the disc, after which the actual track number being played is shown. Another display indicates elapsed time of track play after first indicating total time on the disc. (Remaining time can be toggled alternately with elapsed time, as described above). A "PGM" (ProGraM) indicator lights up when the player is in standby mode for programmed play, and an "Index" indicator shows the index number of the selection being played. (If the disc is not divided into index segments, "Index" will illuminate with the numeral "1" at all times.) The previously described numeric grid shows how many selections are programmed and which one is currently being played. If you program more than 18 selections, the word "Over" lights up.

A headphone jack at the lower left and a variable output level control at the lower right complete the CDP-620ES's front-panel layout.

A full-function wireless "Remote Commander" control module duplicates just about every function on the front panel, including random-access programming, all the repeat-play features, shuffle play, and even remote adjustment of output level for the variable-output jacks. Interestingly, when you perform the latter adjustment remotely, you can see the control knob on the panel revolve in response to your commands!

The player's rear panel has both fixed- and variable-level output jacks, plus the multiple-pin connector intended for future link-up to that video-graphics interface module referred to earlier. The rear panel also has an initializing switch which allows you to choose which play mode (continuous, single-selection or programmed) the unit will be in when first turned on.

Measurements

Sony claims that the circuitry of the CDP-620ES is virtually identical to that found in the more expensive CDP-650ESD. My own measurements suggest that if that is indeed the case, then some variations of measured performance occur even when "uniform" sophisticated LSI chips are used to do

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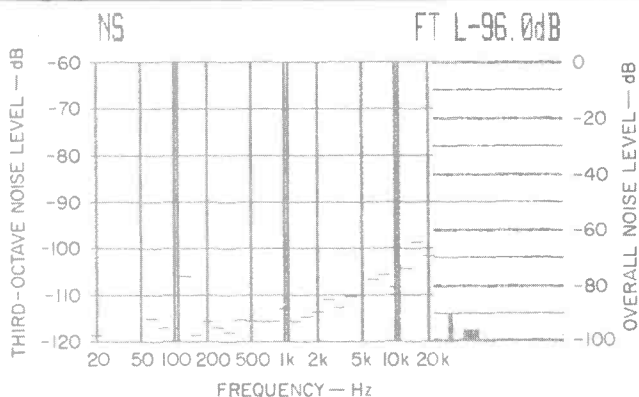
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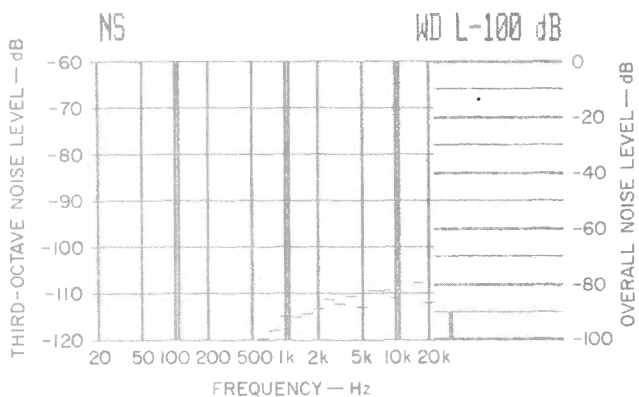
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Time after time, the unit found and began to play requested tracks almost before I could look up from the remote control I was using to instruct it.



A



B

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

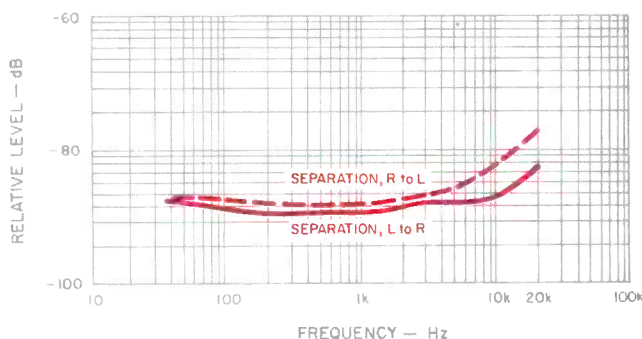


Fig. 5—Separation vs. frequency.

most of the signal processing and amplification. While the CDP-620ES's frequency response was every bit as flat as that of the more expensive Sony model (see Fig. 1), and in fact varied by no more than ± 0.1 dB over the entire range of measurement from 20 Hz to 20 kHz, total harmonic distortion was ever so slightly greater. At 0 dB it measured 0.0038% at mid-frequencies. I'd say that's nothing to get upset about, but it is, nevertheless, higher than the 0.003% I measured for the CDP-650ESD. Total harmonic distortion at mid-frequencies and other frequencies, at three playback levels, is shown in Fig. 2.

I noted no out-of-band "beats" at around 24 kHz when I used a spectrum analyzer to sweep from 0 Hz to 50 kHz (linearly) while a 20-kHz signal was being reproduced by the player. This is due in part to Sony's new digital filter and oversampling approach, introduced in several of their third-generation players, and also in part to their use of a single master digital clock (the timing circuit that synchronizes everything to the 44.1-kHz sampling rate of the standard Compact Disc).

What did show up, however, was a second-order distortion component way out at 40 kHz; such a component was not visible or detectable when I measured the CDP-650ESD. Of course, since this component is at 40 kHz and its amplitude is down more than 60 dB compared with the fundamental (see Fig. 3), I couldn't get too upset about it. I only mention it—and show it—to point out that the performance of this CD player, though very close indeed to that of the higher priced 650, is not identical to it.

Unweighted signal-to-noise ratio measured exactly 96 dB, as claimed, while A-weighting increased the S/N reading to exactly 100 dB (see Figs. 4A and 4B). SMPTE-IM distortion measured 0.0044% at full output level, increasing to 0.025% at a -20 dB recorded level. Twin-tone IM (using 19-kHz and 20-kHz test tones of equal level, supplied from one of my digitally produced CD test discs) measured no more than 0.003%, both at maximum recorded level and at a level of -10 dB.

Stereo separation, plotted as a function of frequency in Fig. 5, ranged from about 88 dB at mid-frequencies to around 83 dB for the left channel and 77 dB for the right channel at high frequencies. The minor difference between left-to-right and right-to-left separation is undoubtedly due to wiring layout in the chassis and differences in capacitive coupling at high frequencies.

A 1-kHz square wave reproduced by this new CD player is shown in Fig. 6. As far as I could tell, the waveshape was identical to that obtained from the CDP-650ESD. Specifically, the shape was indicative of digital filtering and two-times oversampling, which are the methods used by a majority of late-model CD players. Reproduction of the unit-pulse signal, shown in the photo of Fig. 7, was also identical to that obtained from the Sony CDP-650ESD and other late-model CD players.

In Fig. 8, the usual display of a 200-Hz signal from the left-channel output and a 2-kHz signal from the opposite channel output shows no detectable phase shift. As you can see, the low-frequency and higher frequency sine waves cross the zero axis in a positive-going direction at the same time, as they should.

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Except for access to the digital audio code, the CDP-620ES offers the same quality sound and almost all the features of its higher priced sister.

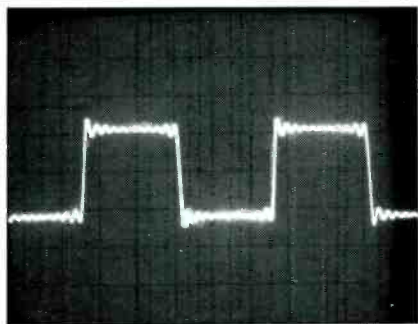


Fig. 6—
Square-wave
reproduction,
1 kHz.

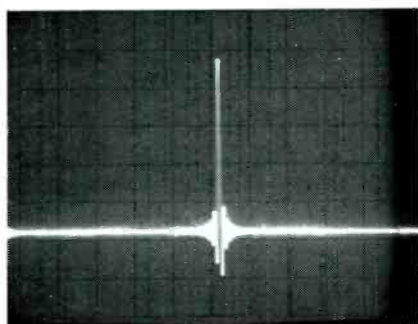


Fig. 7—
Single-pulse test.

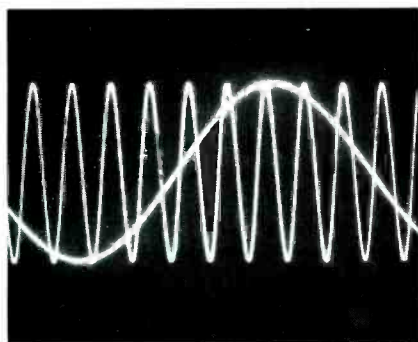


Fig. 8—
Two-tone
phase-test
signal (200 Hz
and 20 kHz).

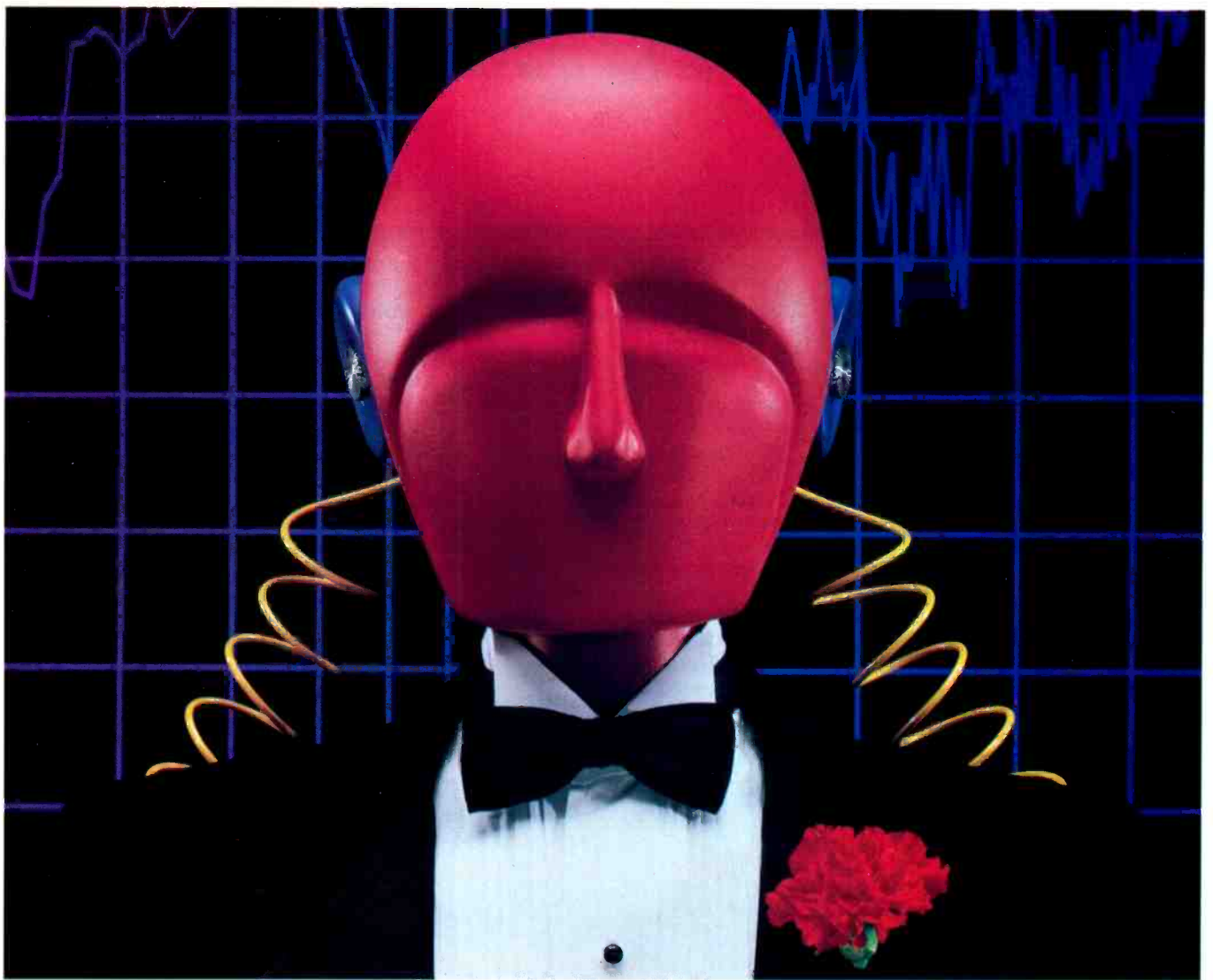
Use and Listening Tests

I was just as amazed by this player's speed of access as I had been by that of the CDP-650ESD. When Sony tells you that these machines can access any given point on a CD within 1 S, that is no exaggeration. Time after time, using test discs that have many more tracks than are likely to be found on musical CDs, I called upon the machine to search for double-digit-numbered tracks; almost before I could look up from the hand-held remote control I had used to enter those instructions, music of the requested track began to play. The lower mass pickup and the linear-motor pickup drive designed for the third-generation Sony CD players have been used in this latest model too, with superb results: not only in terms of search speed but in terms of tracking stability and lack of susceptibility to external shock and vibration. It almost goes without saying that the "defects" disc I use to evaluate error correction and tracking ability posed no real challenge for the CDP-620ES.

Of course, the really important thing about this or any other CD player is the sound quality that it delivers. I have maintained that the best sound I ever heard from any CD player came from the CDP-650ESD. I can't say that the sound of the CDP-620ES surpasses that of the CDP-650ESD, but I can tell you that after many hours of listening and comparing I could not, in all honesty, detect any difference in sound quality between the two. Since I tested the CDP-650ESD a while ago, my library of CDs has grown some more and I now have additional CDs that I think are able to separate the "very good" players from those that are plainly "superb." The CDP-620ES clearly belongs in the second category, but in so classifying it I wonder whether Sony has inadvertently outsmarted itself. Unless you have a really good reason for wanting the digital audio code available from the CDP-650ESD's external port, why on earth would you want to spend an extra \$350 for the top-of-the-line model when you can get the same high-quality sound and just about all of the convenience features (not to mention that headphone output jack) in the newly introduced CDP-620ES?

Leonard Feldman





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cars . . . without the Music System,’ the pride simply wells up inside.

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“So, I cordially invite you to visit your Buick, Oldsmobile, Cadillac, or Chevrolet dealer to experience the Delco-GM/Bose Music System. Only then will you ‘believe every rave you’ve read, and then some” (**Auto Week**).

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Sound so real, it will change how you feel about driving.

2

ELECTRON
KINETICS
EAGLE 2
AMPLIFIER**Manufacturer's Specifications****S/N Ratio:** Greater than 100 dB.**Input Impedance:** 100 kilohms, constant.**Damping Factor:** Greater than 800, 20 Hz to 20 kHz.**IM Distortion:** Less than 0.1%.**THD:** Less than 0.1%.**TIM Distortion:** Unmeasurable below clipping.**Power Output:** 120 watts/channel into 8 ohms, 200 watts/channel into 4 ohms.**Load Impedance:** 2.0 ohms to infinity with music signal.**Signal Phase:** Non-inverting.**Peak Output Current:** 50 amperes.**Rise Time:** 2.5 μ S.**Fall Time:** 2.5 μ S.**Input Sensitivity:** 1.3 V rms for full output.**Class:** AB.**Full Power Bandwidth:** D.c. to 200 kHz.**Dimensions:** 19 in. W x 5 in. H x 10 in. D (48.3 cm x 12.7 cm x 25.4 cm).**Weight:** Approx. 30 lbs. (13.6 kg).**Price:** \$850.**Company Address:** 2521 Daytona Ave., Lake Havasu City, Ariz. 86403. For literature, circle No. 91

The Eagle 2 is John Iverson's newest power amplifier and is designed to give the listening public a sample of his latest thinking on amplifiers, plus some good old American construction, at a reasonable price.

John had a revelation after his recent updating of the bigger Eagle 7A. This concerned how to predict amplifier performance as a function of circuit topology, types of devices used, and operating points of the devices. (He does not say whether he means audible or only measurable performance.) John chose a simple common topology and made a breadboard to test his theories. Apparently they worked, and the result is the Eagle 2.

John also has said that he wants to make an amplifier with two to four controls on it, which the listener could use to get the sound he wants. These controls wouldn't affect things like frequency response, but might alter phase response independent of amplitude response, operating points of devices, etc. I give him every encouragement as I believe this can be done and would be an ultimate service to the listener.

What we have here is a dual, 120-watt (into 8 ohms), Class-AB design with an enormous power supply and simple yet elegant construction. A U-shaped chassis forms the bottom and sides. On the bottom of this main chassis is a large power transformer, two 80,000- μ F, 50-V filter capacitors, and a 25-ampere rectifier bridge. The front panel has a single, illuminated, two-button power switch. Actual amplifier circuitry is all mounted on the inside of the rear panel, on a heavy, mil-spec, double-sided glass p.c. board. Input and output connectors terminate directly on the p.c. board without any discrete wiring. The board is designed for the shortest possible signal paths from input to output. Also mounted on the inside of the rear panel are four large Sanken output transistors, plus two TO-220 pre-driver and two TO-220 driver transistors for each channel. The filter capacitors are wired to the p.c. board via relatively short pieces of Monster Cable.

On the outside of the rear panel are two large heat sinks, two signal-input phone connectors, two sets of five-way binding posts for speaker connections, a line-cord socket, and a line fuse. A perforated top cover forms the last side of the enclosure. Parts and construction quality in this unit are first rate.

Circuit Description

I wasn't given a schematic of the Eagle 2, but discussion with Iverson and some tracing on my part reveals the following topology: An LM351 Bi-FET op-amp serves as the input amplifier. The output of this op-amp is coupled to a pair of complementary bipolar pre-driver transistors operating as common-emitter amplifiers. The actual coupling is shown in Fig 1. The collectors of the pre-drivers are connected together through a bias regulator and into the bases of the driver transistors, which are complementary bipolar devices operated as emitter followers. The emitters of the driver stage are coupled to the bases of the two pairs of complementary output transistors, which are also operated as emitter followers. The discrete part of this circuit is phase inverting, and some negative feedback is applied from the output to the bases of the pre-drivers. An overall feedback loop is

taken back to the input of the LM351. This design is totally d.c. coupled, with the result that the d.c. gain is the same as the a.c. signal gain. The topology just described is very similar to that of some early Marantz and BGW solid-state power amps.

Measurements

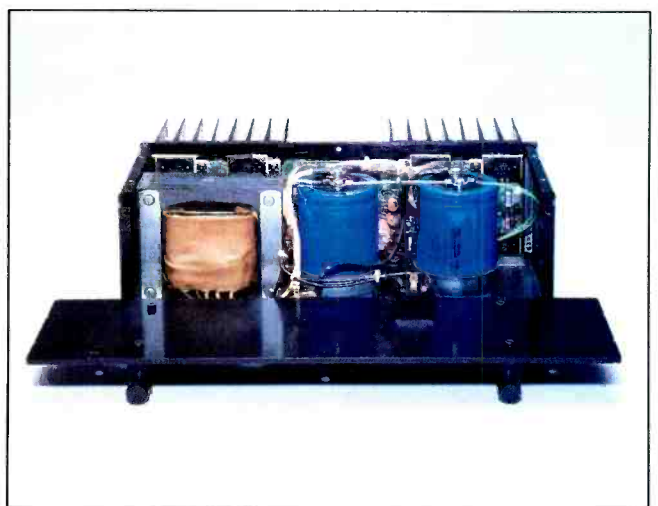
Before we get into the measurements, a word is in order about the Eagle 2's power rating. Its spec sheet doesn't give the standard EIA/IHF rating stating how much power it will deliver, with both channels driven into what load impedance, over what frequency band, at how much distortion. Its rating is simply 120 watts/channel into 8 ohms, 200 watts/channel into 4 ohms. It turns out that the unit clips at 110 watts/channel with both channels driven into an 8-ohm resistive load, and at 200 watts/channel into 4 ohms, for an a.c. line voltage of 120 V. When I called to ask Electron Kinetics about this, they replied that the amplifier would put out at least its rated power into real-world speaker loads with nominal rated impedance of 8 and 4 ohms.

The Eagle 2 was first run at one-third power, or 40 watts/channel, into 8-ohm loads, with a test frequency of 1 kHz. The heat sinks got quite hot to the touch, but the unit did not thermally cycle on and off. With 4-ohm loads and a power level of 67 watts/channel, the heat sinks got hotter yet, and the unit did cycle on and off. As is typical of transistor amps that get very hot during this standard but difficult 1-hour power preconditioning, the Eagle 2 remained quite cool in use even when driving difficult speaker loads to quite loud levels.

Voltage gain, measured into 8-ohm loads, was found to be $25.2 \times$, or 28.0 dB—2 dB higher than the more usual power-amp gain of 26 dB. IHF sensitivity for 1 watt output into 8 ohms was 0.11 V.

Total harmonic distortion plus noise, measured as a func-

Removing the Eagle 2's front panel reveals its massive power supply, which almost hides the audio circuits.



What we have here is a 120-watt, Class-AB design with an enormous power supply and simple yet elegant construction.

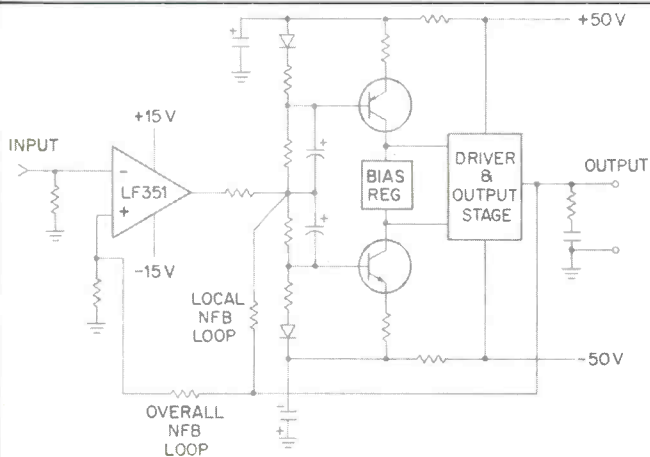


Fig. 1—Block diagram, Eagle 2.

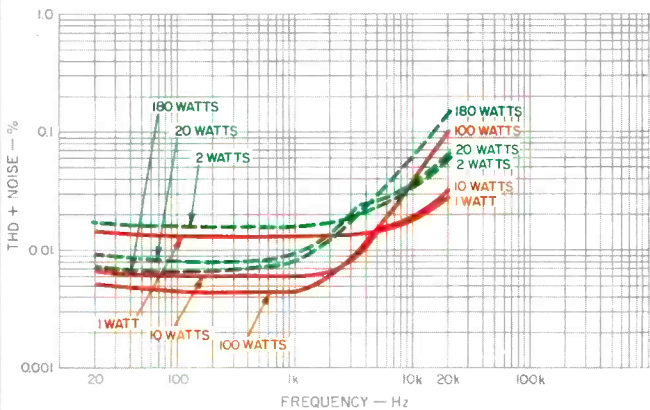


Fig. 2—Total harmonic distortion plus noise vs. frequency and power.

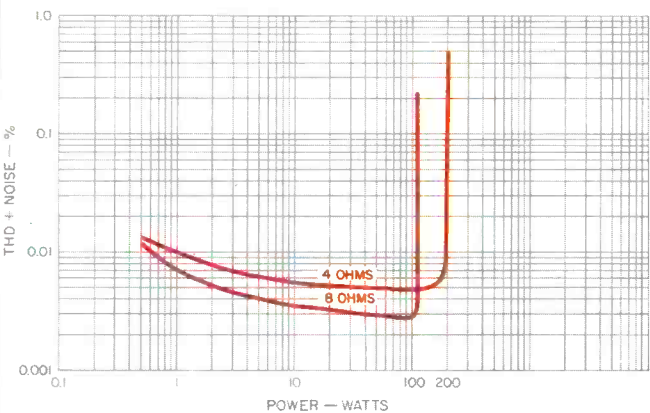


Fig. 3—Total harmonic distortion plus noise vs. power output at 1 kHz.

tion of frequency, power, and load for 4- and 8-ohm loads, is shown in Fig. 2

Total harmonic distortion at 1 kHz, measured over a limited bandwidth (400 Hz to 80 kHz), is plotted in Fig. 3. SMPTE-IM distortion below clipping was less than 0.01% for both 4- and 8-ohm loads.

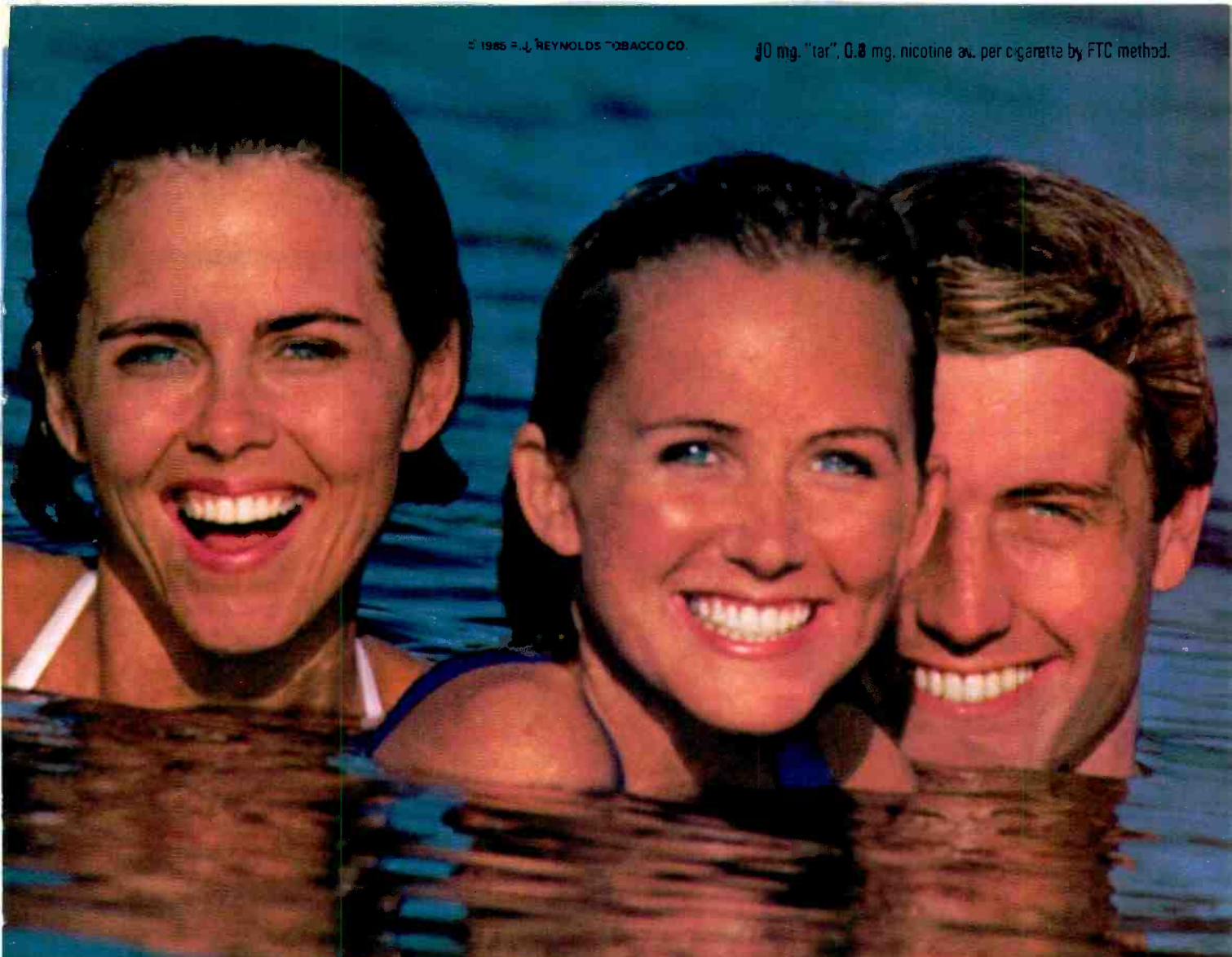
Thermal stability of output-stage quiescent current, or bias tracking with temperature, was excellent. This is indicated by the fact that the Eagle 2's a.c. line current, after running at high power with heat sinks hot, was measured as being only about 10% to 20% higher than the value at idling temperature.

Damping factor, as a function of frequency and channel, is shown in Fig. 4. In the right channel it was higher than the 800 from 20 Hz to 20 kHz which Electron Kinetics claims, but in the left channel it fell below specification above about 13 kHz. One reason the damping factor is high at high frequencies is that the Eagle 2 does not have the output-buffering parallel-RL network usually found in series with the hot output terminal in solid-state amplifiers. In addition, the Eagle 2 is stable with small capacitive loads of 0.01 to 0.5 μ F, which is not always the case with other solid-state amplifiers that omit the parallel-RL network. This design shows the least effect of load impedance on waveshape during the transitions of high-frequency square waves or pulses that I have ever seen. No change is really visible for impedances from open-circuit down to 4 ohms. The consequences of this wideband, low output impedance would be flatter voltage delivery with frequency into speaker systems, especially loudspeakers which have wide impedance variations with frequency.

Rise and fall times into 8-ohm loads were found to be 3 μ s, from small signal levels up to clipping. One-watt frequency response into 8-ohm loads was flat from d.c. up to 20 kHz, down -0.1 dB at 20 kHz, -0.8 dB at 50 kHz, and -2.8 dB at 100 kHz. Square-wave responses of the Eagle 2 are shown in Fig. 5. The top trace is for a 10-kHz frequency, loaded with 8 ohms. The middle trace is also 10 kHz, with a 2- μ F capacitor paralleling the 8-ohm resistive load. Noteworthy here is the low level of ringing and overshoot, compared with most amplifiers. In the bottom trace, a 40-Hz square wave is shown, with an 8-ohm load on the amplifier. There is no low-frequency tilt, because the Eagle 2 is totally direct coupled.

Recovery from clipping is not as good, as in Fig. 6 where a 10-kHz sine wave is shown driving the amplifier into clipping with an 8-ohm load. Considerable "sticking" is in evidence here as the circuit comes out of clipping. Also shown here is the general nature of the amplifier's residual harmonic distortion. The smaller trace is the harmonic residue for a 10-watt output at 10 kHz into 8 ohms. As can be seen, the dominant harmonic component is at twice the fundamental frequency, and since the residue is not a sine wave, evidence of higher order even harmonics is also present in the photo.

IHF signal-to-noise ratio, A-weighted, below 1 watt into 8 ohms, was found to be -90.3 dB for the left channel and -89.8 dB for the right channel. These measurements would have been some 20 dB better if referenced to 120 watts of output into 8 ohms.



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During listening tests, the Eagle 2 showed plenty of power, tight bass, very good spectral balance, and smooth, natural sound without edginess.

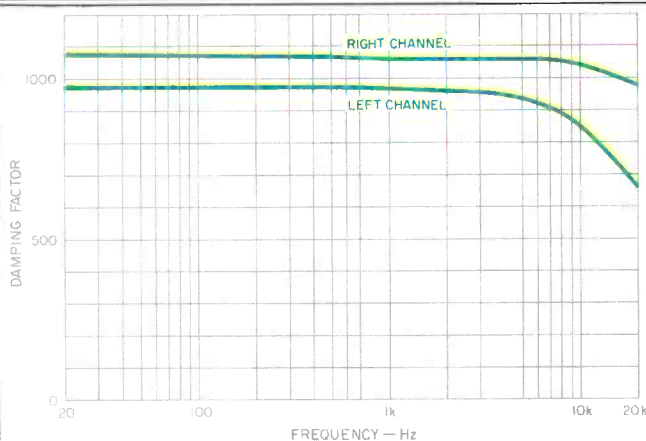


Fig. 4—Damping factor vs. frequency.

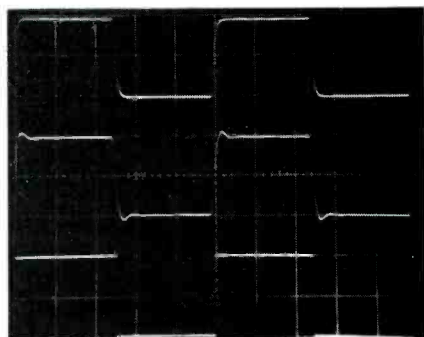


Fig. 5—Square-wave responses at 10 kHz into 8 ohms (top); same measurement with 2- μ F capacitor across the load (middle), and at 40 Hz into 8 ohms (bottom).

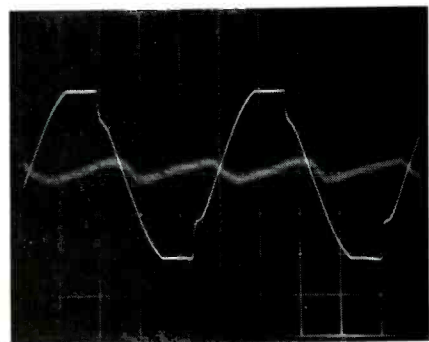


Fig. 6—Recovery from clipping with 10-kHz sine wave and 8-ohm load (tall, thin waveform), plus harmonic-distortion residue at 10 kHz for 10 watts output into 8 ohms.

Crosstalk versus frequency, with the undriven channel terminated in 1 kilohm, was down about 88 dB at low frequencies, rising to -76 dB at 1 kHz, -60 dB at 7 kHz, -50 dB at 20 kHz, and -44 dB at 50 kHz.

On the basis of a rated power of 120 watts/channel into 8 ohms and 200 watts/channel into 4 ohms, IHF dynamic headroom for 8-ohm loads measured 0 dB, and was $+0.63$ dB for 4 ohms. Clipping headroom for 8-ohm loads was -0.38 dB and 0 dB for 4 ohms. (There is a negative number for clipping headroom into 8 ohms because the amp clips at 110 watts.)

In attempting to measure peak available output current, I used a method different from the one used on the last amplifier I reviewed (Streets Electronics Model 950, January 1985 *Audio*). This time, the load was 0.1 ohm and the test signal was the IHF tone-burst signal which is normally used to determine dynamic and clipping headroom. The signal is a 20-mS burst of 1 kHz at one level, followed by a 480-mS burst at a level 20 dB lower, the whole pattern repeating every 500 mS. One slowly increases this input signal until the output across a 0.1-ohm load begins to distort visibly. Peak current (expressed in amperes) is then this maximum undistorted output voltage, divided by 0.1 (the resistance, in ohms). For the Eagle 2, I was able to get a current of about ± 25 amperes peak.

Use and Listening Tests

Equipment used to evaluate the Eagle 2 included an Infinity air-bearing turntable and arm with a Koetsu EMC-1B "Black" cartridge; conrad-johnson PV2 and PV5, Dyna PAS-2 and GC/BHK reference preamps; Acrosound 20/20 and several "home brew" tube power amplifiers, and Snell A/III and Infinity RS IIB speakers. I also used a pair of Stax SR-X/Mk3 headphones.

The Eagle 2 was first auditioned on the Snell A/III speakers using the conrad-johnson PV2 preamp. Even though the amp had been plugged in and left on for about 1 hour, my initial reaction was that its sound was decidedly not nirvana. It sounded somewhat dark and closed-in. However, after playing music for about another hour, it ended up sounding quite good. For best sound, this amplifier should be left turned on all the time; its power draw when idling is low enough to be no problem. In later listening, using a Dyna PAS-2 preamp and the Snell speakers, the Eagle 2 sounded excellent.

Using the Infinity RS IIB speakers and the GC/BHK preamp in combination with the Eagle 2 yielded the following listening notes: "Plenty of power, tight bass, very good spectral balance, had speaker mid- and high-frequency controls set flat with no desire to turn them down, sound quite smooth and natural without edginess. Only criticism is that the sound is not quite as open and spacious as I would like."

Using the little Acrosound tube amplifier gave a better feeling of spaciousness and reality (within its power limitations) than the Eagle 2 on the RS IIB speakers and the Stax headphones.

Summing up, I feel that the Eagle 2 is a good-sounding, powerful little amp, well made and a good value in today's marketplace.

Bascom H. King

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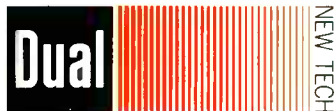
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3

NAD 7130 RECEIVER

Manufacturer's Specifications

FM Tuner Section

Usable Sensitivity: Mono, 10.3 dBf.

50-dB Quieting Sensitivity: Mono, 14.2 dBf; stereo, 34.2 dBf.

S/N: Mono, 82 dB; stereo, 75 dB.

THD: Mono, 0.09% at 1 kHz, 0.2% at 100 Hz and 6 kHz; stereo, 0.09% at 1 kHz, 0.3% at 100 Hz and 6 kHz.

Frequency Response: 30 Hz to 15 kHz, ± 0.5 dB.

Capture Ratio: Less than 1.5 dB.

Image Rejection: 75 dB.

Selectivity: 70 dB.

I.f. Rejection: 75 dB.

SCA Rejection: 70 dB.

Subcarrier Suppression: 60 dB.

AM Rejection: Greater than 62 dB.

Stereo Separation: 50 dB at 1 kHz, 40 dB at 100 Hz and 10 kHz.

AM Tuner Section

Usable Sensitivity: 300 μ V/meter.

Selectivity: 35 dB.

Image Rejection: 50 dB.

I.f. Rejection: 50 dB.

Amplifier Section

Power Output: 30 watts per channel, continuous, into 8-ohm loads, 20 Hz to 20 kHz; clipping power at 8 ohms, 1 kHz, 45 watts per channel; clipping power at 4 ohms, 1 kHz, 48 watts per channel.

Rated THD: 0.03%.

SMPTM IM: Less than 0.03%.

IHF IM: Less than 0.03%.

Dynamic Headroom: 3.0 dB at 8 ohms.

Damping Factor: Greater than 50.

Slew Rate: 15 V/ μ S.

Slew Factor: Greater than 50.

Input Sensitivity: MM phono, 0.45 mV; MC phono, 0.04 mV; high level, 26 mV.

Phono Overload: MM, 170 mV at 1 kHz; MC, 18 mV at 1 kHz.

S/N: MM phono, 76 dB; MC phono, 70 dB; high level, 85 dB.

Frequency Response: Phono, RIAA ± 0.5 dB; high level, 20 Hz to 20 kHz, ± 0.5 dB.

Tone Control Range: Bass, ± 7 dB at 100 Hz; treble, ± 7 dB at 10 kHz.

Bass EQ: +3 dB at 60 Hz; +6 dB at 33 Hz.

Infrasonic Filter: -3 dB at 15 Hz.

Audio Muting: -20 dB.

General Specifications

Power Consumption: 150 watts.

Dimensions: 16.5 in. W \times 4.25 in. H \times 15 in. D (42 cm \times 10.8 cm \times 38 cm).

Weight: 17 lbs., 9 oz. (8 kg).

Price: \$348.

Company Address: 675 Canton St., Norwood, Mass. 02062.

For literature, circle No. 92



NAD has done it again. I have always been amazed at the amount of honest performance that this company crams into its modestly priced components, and the 7130 is another example of that. NAD products have never stressed outward appearance, and, while the 7130 is a bit more stylish-looking than earlier NAD products, it still steers clear of fancy, shiny front-panel layouts and superfluous switches and knobs. The really impressive features are inside. For instance, the power amplifier section has a high-current output stage which delivers unusually high short-term power, far higher than the nominal 30-watt-per-channel rating would suggest. This high-current design also helps when the amp section is driving speaker systems whose impedances drop well below 4 ohms. The amplifier also has an impedance switch which actually alters supply voltage, to optimally interface with either 8-ohm or lower impedance speaker loads. Another interesting feature of this amplifier is a soft-clipping circuit, which permits listening levels to go beyond the rated power or even the standard dynamic headroom limits without subjecting the listener to the hard clipping characteristic of most solid-state power amplifiers.

The 7130's tuner section uses a dual-gate MOS-FET front end followed by a three-section, linear-phase i.f. circuit and a balanced quadrature detector. For signals weak enough to need additional quieting, NAD's useful Dynamic Separation cancels the out-of-phase portion of the high-frequency noise by selectively blending the highs. The discrete-transistor phono-preamplifier circuit can handle either moving-magnet or moving-coil cartridges; a rear-panel switch selects the proper gain and impedance for either type of cartridge.

If I have any quarrel at all with NAD and their claims for the 7130, it has to do with their description of the unit itself. They call the 7130 a "Digital" AM/FM stereo receiver. Presumably, this is in reference to the high-level input, which is now labelled "CD" instead of "AUX," but which is actually no different from any other high-level input pair. I had thought that NAD was beyond such hype.

Control Layout

The upper section of the NAD 7130's front panel is devoted to the tuner section. A display shows the frequencies as well as the band (AM or FM) in use. Also in the display is an indicator showing whether tuning is correct, flanked by arrows showing which way to tune if you're not directly on the station. Nearby are the "FM Stereo" and "Soft Clipping" indicator lights, as well as the five station preset buttons, which memorize one AM and one FM station apiece. An "Enter" button and an "AM/FM" selector button are in the same row. An up/down tuning bar at the upper right of the panel normally tunes in single 50-kHz or 10-kHz steps. However, the tuning bar can be used to seek the next FM station up or down the band, if the "FM Search" button just below it is pressed. (The search function does not work on AM.) Touching the "Enter" button while pressing the tuning bar increases the tuning or searching speed by a factor of about five.

The on/off switch is at the extreme left of the panel, and just below it is a stereo headphone jack. A four-position rotary speaker switch and the bass and treble tone controls

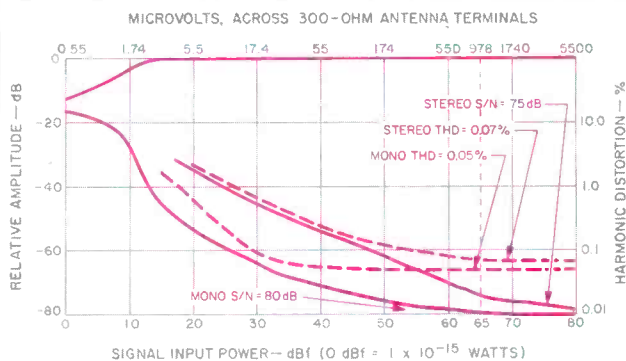


Fig. 1—Mono and stereo quieting and distortion characteristics, FM section.

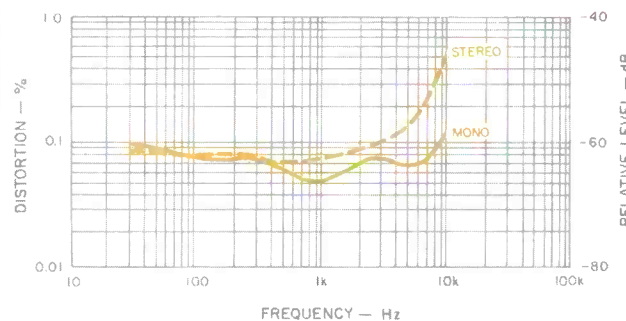


Fig. 2—THD vs. frequency, FM section.

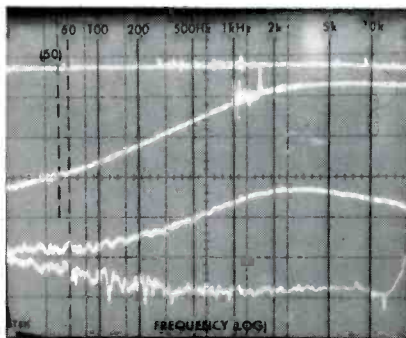


Fig. 3—Frequency response, FM section (upper trace), and separation vs. frequency. For strong signals, Dynamic Separation circuit does not affect separation (bottom trace), but as signal levels fall

the circuit reduces separation, primarily in the treble (second curve from bottom) but eventually somewhat at low and mid-frequencies too (second curve from top, for 20-dBf r.f. input signal).

The FM tuner section was, in many ways, as good as separate tuners costing as much as, or more than, this entire receiver.

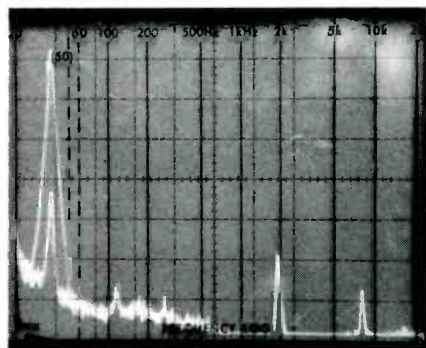


Fig. 4—
Crosstalk and distortion products resulting from 5-kHz modulation in one channel.

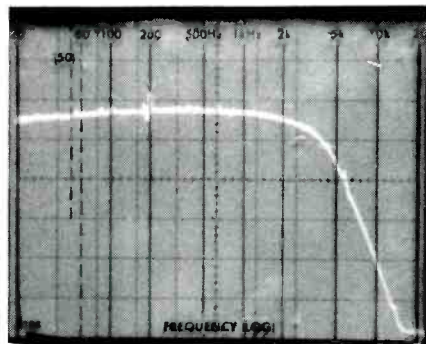


Fig. 5—
Frequency response, AM tuner section.

are located along the lower edge of the panel, as are a rotary selector switch and dual-concentric master volume and balance controls. Secondary functions are controlled by additional small pushbuttons. These include the "Bass EQ" switch (which introduces a moderate amount of fixed boost in the lower bass region), an infrasonic-filter defeat button, a mono/stereo selector, and the Dynamic Separation defeat button. A "Tape Monitor" switch, a muting switch (labelled "Low Level" just to be a bit different) and a "Loudness Comp" switch complete the front-panel layout.

The rear panel has the usual array of input and tape output terminals, two sets of speaker-cable binding posts, 75-ohm and 300-ohm FM antenna input terminals, a pivotable AM rod antenna, a chassis ground terminal, and two a.c. convenience outlets (one switched, the other unswitched). In addition, there are three slide switches. The first of these selects MM or MC operation of the phono preamplifier circuitry, a second turns the "soft clipping" circuit on and off, and the third optimizes the amp section's output impedance and power supply for 8- or 4-ohm loads.

Tuner Measurements

The 7130's tuner section performed, in many respects, as well as separate tuners costing as much as or more than this entire receiver. Usable sensitivity measured 11.0 dBf in

mono and 16.5 dBf in stereo. The 50-dB quieting point was reached with a signal input of 17 dBf in mono and 35 dBf in stereo. Best signal-to-noise ratio, with strong-signal inputs, was 80 dB in mono and almost as great—79 dB—in stereo. The high S/N reading in stereo was obtained with an 80-dBf signal, but even at the standard 65-dBf signal level, the stereo S/N was still an impressive 75 dB. Quieting characteristics of the FM tuner section are shown in Fig. 1, along with plots of harmonic distortion as a function of input-signal strength. THD for mono reached a low of 0.05% with strong signals applied; in stereo, THD measured 0.07%. Both readings were taken with a 1-kHz modulating signal.

Figure 2 shows how harmonic distortion varies with modulating frequencies for both mono and stereo operation of the tuner section. In mono or stereo, THD measured 0.075% at 100 Hz. At 6 kHz, mono THD was 0.07% and stereo THD measured 0.16%.

The action of the Dynamic Separation circuit is depicted in the frequency-response and separation curves of Fig. 3. The top trace in the 'scope photo shows a virtually flat frequency response for the output of one channel that was being modulated with a sweep signal from 20 Hz to 20 kHz. Deviation from flat response was -0.4 dB at 15 kHz. The lower three curves show separation versus frequency for three signal levels, with Dynamic Separation turned on. The lowest of these shows separation with strong input signals; I measured 55 dB at mid-frequencies, a very high 50 dB at 100 Hz, and 46 dB at 10 kHz. At progressively reduced signal strengths, high-frequency separation is reduced so as to cancel the increased noise which would otherwise interfere with enjoyment of the program; to a lesser degree, mid-frequency and low-frequency separation is also reduced. The trace showing most of this high blend was obtained at a signal strength of only about 20 dBf, just above the stereo-switching threshold, which I measured as being 16 dBf.

Figure 4 shows the results of my usual spectrum analysis of the distortion and crosstalk products resulting when a 5-kHz signal modulates one channel of the FM signal. The tall spike at the left is the desired 5-kHz output; contained within it is the 5-kHz signal seen at the unmodulated channel's output. To the right are very small harmonic-distortion components observed at the unmodulated channel's output, as well as a couple of spurious but inaudible output components related to the 19-kHz pilot signal and the 38-kHz suppressed carrier signal. All of these unwanted signal outputs are at far lower amplitudes than I would expect with a tuner or receiver in this price range.

Capture ratio for the FM tuner section measured 1.3 dB, while alternate-channel selectivity was 73 dB, slightly higher than claimed. Image and i.f. rejection each measured 75 dB, exactly as stated by NAD, while AM rejection measured 60 dB, a bit lower than claimed.

Figure 5 shows the frequency response of the AM tuner section. Even here, performance was better than I would have expected from such a moderately priced receiver. Usable output from the AM tuner extended to 5 kHz and beyond; this may not seem great in high-fidelity terms, but it is a higher cutoff frequency than that exhibited by the AM sections of many other tuners and receivers.

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The power amp section produced 35 to 48 watts of continuous power with 8-ohm loads, substantially more than its rating.

Amplifier Measurements

The power amplifier section of the NAD 7130 produced substantially more than its rated continuous power. With 8-ohm loads, the amplifier could deliver 48 watts of power at mid and high frequencies, and 35 watts at 20 Hz. NAD has always designed its power supplies so that, under short-term conditions, its amplifiers can deliver far more than their continuous power ratings. The 7130 is no exception in this

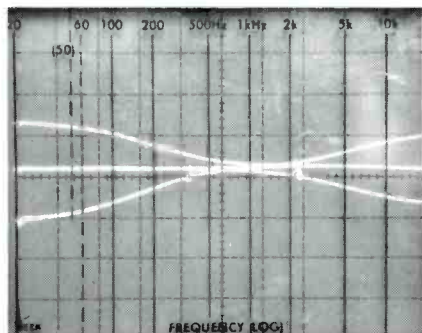


Fig. 6—Range of bass and treble controls.

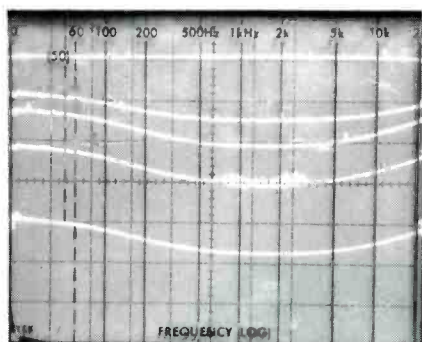


Fig. 7—Loudness-control response at various settings of volume control.

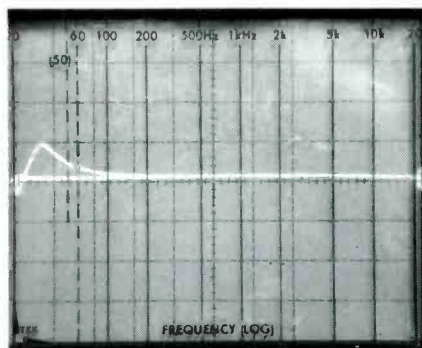


Fig. 8—"Bass EQ" circuit response, compared to flat response.

respect. I measured a dynamic headroom of exactly 3 dB, as claimed, which translates to short-term power peaks of 60 watts per channel, even with both channels driven. If you take into account the fact that, under real-world conditions, both channels are not usually called upon to deliver equal peaks simultaneously, the effective dynamic headroom may be even a bit higher than 3 dB. Table I presents the 7130's amplifier power output as a function of harmonic distortion and input-signal frequency.

Switching to 4-ohm loads, the amplifier delivered 49 watts at mid-frequencies and 42.5 watts at 20 Hz. At lower impedances, all attempts to measure continuous power output were thwarted by the protection circuitry. Nevertheless, short-term power with 2-ohm loads exceeded 80 watts per channel! Damping factor, referred to 8-ohm loads, measured 55, somewhat higher than specified. I measured CCIF (twin-tone) IM distortion as an insignificant 0.0033%, and IHF IM was well below my ability to read it on the spectrum analyzer, which means it was also well below the 0.03% claimed by NAD.

Figure 6 shows the range and characteristics of the bass and treble tone controls of this receiver. The controls' turn-over points have been set so that even when maximum boost or cut is applied the critical mid-frequency response is barely altered. Action of the loudness-compensation circuitry (Fig. 7) is typical of this type of fixed loudness control. The response of the "Bass EQ" circuit is a bit more interesting (Fig. 8). The boost action is enough to help speaker systems which tend to roll off at around 45 Hz, but it turns around quickly and is not a factor at subsonic frequencies, where it would otherwise accentuate turntable rumble or other interference. If problems still occur in the infrasonic region, there is always the switchable infrasonic filter, which rolls-off anything below 15 Hz.

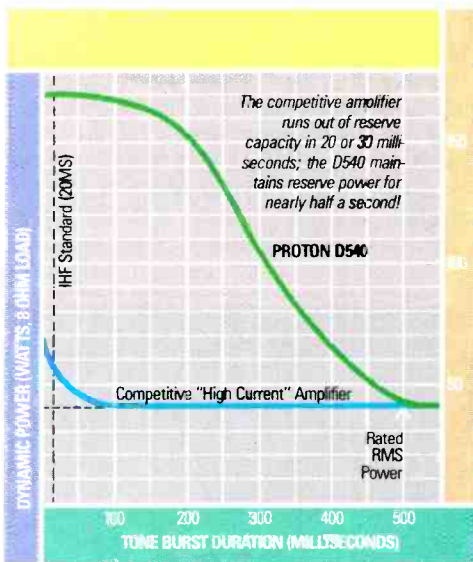
RIAA equalization was accurate to within 0.4 dB all the way down to 20 Hz. Overall frequency response via the high-level inputs was flat within 1 dB from 18 Hz to 30 Hz, and within 3 dB from 15 Hz to 40 kHz. Sensitivity of the high-level inputs measured 24 mV for 1 watt output. For the moving-magnet phono input, 0.45 mV at 1 kHz was required to produce an overall output of 1 watt. At the moving-coil inputs, sensitivity for 1 watt measured 0.04 mV.

Signal-to-noise ratio for the high-level inputs, referred to 0.5 V input and 1 watt output, measured a very high 91 dB, while residual hum and noise with the volume control at its

Table I—Power output per channel vs. THD, at six test frequencies and with an 8-ohm load. Note that this nominally 30-watt receiver was able to achieve 48 watts at middle and high frequencies, but could not do the same at 20 or 50 Hz.

Power, Watts	THD, %					
	20 Hz	50 Hz	400 Hz	1 kHz	5 kHz	20 kHz
1	0.030	0.028	0.015	0.015	0.016	0.020
10	0.025	0.022	0.010	0.012	0.023	0.028
30	0.028	0.027	0.022	0.022	0.028	0.030
48			0.030	0.030	0.035	0.030

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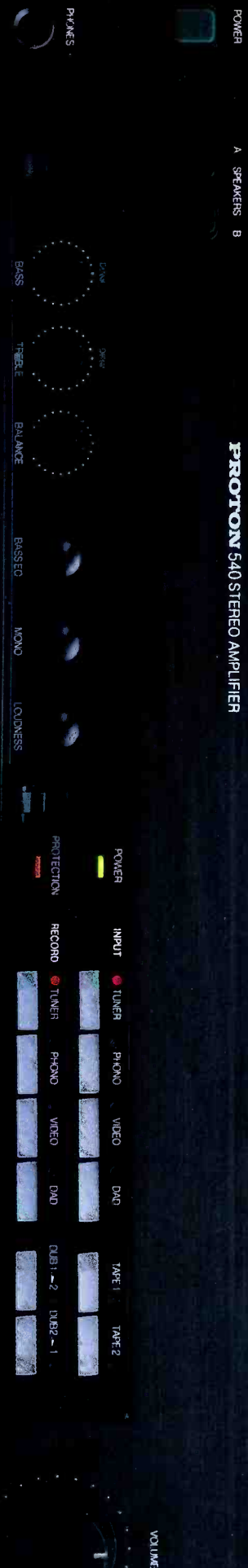
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P R O T O N

I suspect this receiver will find its way into quite a few modestly priced audio systems, and I doubt it will ever be called the limiting factor.

minimum setting was 94 dB below 1 watt output. S/N of the phono preamplifier was even more impressive, compared to the results I usually get. In the MM setting, I measured a signal-to-noise ratio of 87 dB for the phono inputs, using a 5-mV input and adjusting the volume control for 1 watt output. Switching to the MC mode and adjusting the input level to 0.5 mV, with the volume control again set for 1 watt output, the S/N reading was still a very high 81 dB.

Use and Listening Tests

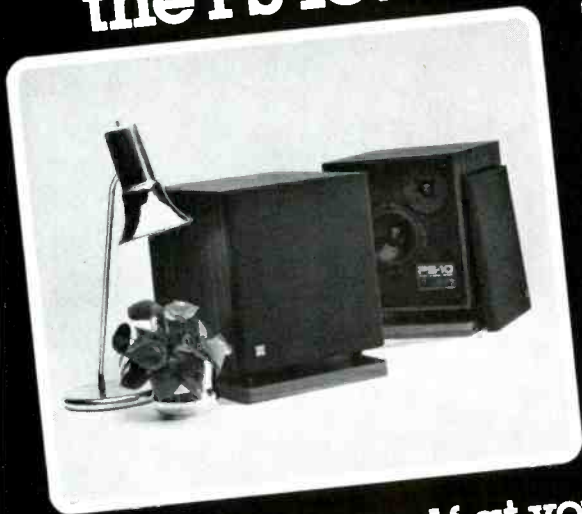
NAD continues to amaze me. These highly reputed products remind me of ugly ducklings that turn out to be swans. The front panel of the 7130 receiver is almost painfully plain: No fancy knobs, no fancy, etched nomenclature, no futuristic panel shapes or slopes, no three-dimensional effects. But beneath that plain exterior lurks superb sound-reproduction capabilities at a price that seems hard to believe. Equally hard to believe is the rather low continuous power rating of the receiver. My KEF 105.2 reference loudspeakers soak up a great deal of power, yet even those low-efficiency speakers delivered respectable levels of sound when driven by the NAD 7130. Not ear-shattering, you understand, but much louder than I would have expected before overload distortion of the amplifier was detected. It's the high dynamic headroom that makes the difference here. I know that there are some purists who will argue against the "soft"

power supplies that make high dynamic headroom possible. Indeed, if we were dealing with a high-powered basic power amp or perhaps even a high-powered integrated amp I might agree that a stiff power supply makes some sense. But when you are trying to deliver the greatest sonic bang for the buck—something NAD does extremely well—anything you can do to keep a component's price down while at the same time keeping its sound quality (and quantity) up is worth doing.

I played everything, from some of my latest CDs to older LPs and cassettes, through the NAD 7130. I connected the receiver to a pair of B & W LM1s that I keep in my office and normally drive from a low-powered set of components. I also drove an old (but efficient) pair of Koss CM-1010 speakers with the receiver to see how the unit would behave with more efficient, vented enclosures. Finally, I hooked this little receiver up to a pair of floor-standing B & W Model DM3000s. The receiver behaved well in all of these circumstances, adapting itself to all of these loads without apparent difficulty. Indeed, adaptability seems to be one of the best characteristics of this little receiver. That's just as well, for I suspect that it will find its way into quite a few modestly priced systems, the speaker component of which could be almost anything. In such systems, I doubt that the NAD 7130 will ever be accused of being the "limiting factor."

Leonard Feldman

Some Critical Comment About the PS-10!



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— The Editors,
High Fidelity

"To these ears they provided a very open and transparent kind of sound, with excellent and **stable stereo imaging.**"

— Len Feldman,
Ovation

"The PS-10 loudspeakers by Design Acoustics could be **the last pair you'll ever buy**... the speakers are able to handle anything you can deliver and provide tight bass and excellent imaging..."

— Paul Terry Shea,
Rolling Stone

"In our listening test, the PS-10s delivered a **smooth, balanced sound**... its compact size and unobtrusive looks should enable it to fit in almost anywhere both aesthetically and acoustically."

— Julian D. Hirsch,
Stereo Review

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Each of the three heads in the K-1020 is specifically designed to maximize its performance. The pure Sendust record head has a 2-micron gap for precise signal recording. The pure Sendust playback head has a 0.7-micron gap for accurate reproduction as high as 23 kHz. And the double-gap erase head has an ion-plated 0.3-micron glass coating to insure that it erases even difficult metal tape formulations completely.

To set the correct bias for not only different

tape formulations, but each individual tape, the K-1020 has an Optimum Record Bias Tuning system. Just press the TEST button and adjust the bias control until the ORBiT tuning indicator shows you the bias is precisely set. Then to prevent saturation, use the variable O-VU recording level indicators to set the level for each tape formulation/noise reduction combination.

Of course, a deck as advanced as the K-1020 gives you a choice of Dolby* B and C as well as dbx** noise reduction. Plus full-time Dolby HX Pro* to increase headroom by as much as 8db at 20 kHz. Along with a full complement of convenience features including a four-digit real-time counter with auto memory.

And the K-1020 is just one in a complete line of new Yamaha cassette decks. Because history has a way of repeating itself.

K-1020 shown with Yamaha YHD-1 Orthodynamic Headphones

*Dolby and Dolby HX Pro are trademarks of Dolby Laboratories

**dbx is a trademark of dbx, Inc.

Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622



4

SONY PCM-501ES DIGITAL AUDIO PROCESSOR

Manufacturer's Specifications

Frequency Response: 10 Hz to 20 kHz, ± 0.5 dB.

Harmonic Distortion: 14-bit format, less than 0.007%; 16-bit format, less than 0.005%.

Dynamic Range: 14-bit format, greater than 86 dB; 16-bit format, greater than 90 dB.

Channel Separation: Greater than 80 dB.

Input Levels: Line, 0.24 V for -10 dB reference level; video, 1 V peak-to-peak.

Output Levels: Line, 0.24 V for -10 dB reference level; monitor, video, and copy outputs, 1 V peak-to-peak; headphones, 0.003 to 0.9 mW into 32 ohms, continuously adjustable.

Power Requirements: 120 V a.c., 60 Hz, 33 watts.

Dimensions: 17 in. W \times 3¼ in. H \times 14⅞ in. D (43 cm \times 8 cm \times 35 cm).

Weight: 13 lbs., 3 oz. (6 kg).

Price: \$750.

Company Address: Sony Drive, Park Ridge, N.J. 07656.

For literature, circle No. 93



The first PCM digital audio processor intended for home use that I ever tested weighed about 50 pounds and cost more than \$5,000. That was back in 1978, when Sony introduced their PCM-1—a massive-looking unit that could be hooked up to a VCR for PCM (digital) audio recording and playback. Back then, a multi-national committee was still at work at setting standards for this kind of product. About a year later the PCM-10 was introduced. It was still just about as heavy and just about as bulky as its predecessor,

but it conformed to the newly agreed-to standards for PCM processors.

More recently, other PCM processors have appeared—all at considerably lower cost—including the renowned PCM-F1 from Sony, a portable, battery-operated unit that became popular with audio professionals and with audio hobbyists. Used with any portable VCR, the PCM-F1 made it possible to record musical events in the field with hitherto unheard-of fidelity and accuracy. Remote recording events, which for-

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long-range on-the-road listening. (Sherwood was the first to introduce AM stereo in separately available car receivers.)

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because this display lets you know what's happening, including time of day, since it even has a **digital clock**.

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LCD display and digital clock. The latest in convenience, a multifunction liquid crystal display (LCD) indicates frequency, preset channel, local/distant, stereo, AM/FM, Dolby, tape direction and more. The CRD-180 is easy to use

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The 16-bit format offers wider dynamic range and less distortion, while the 14-bit mode has somewhat better error correction.

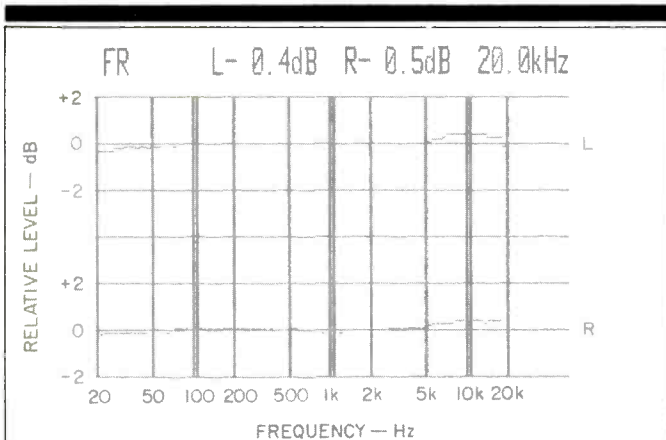
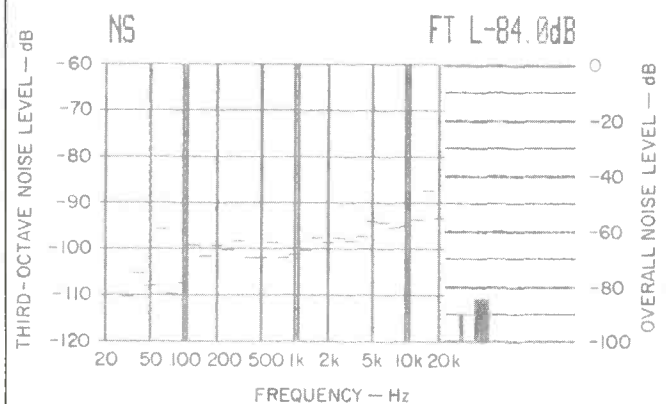
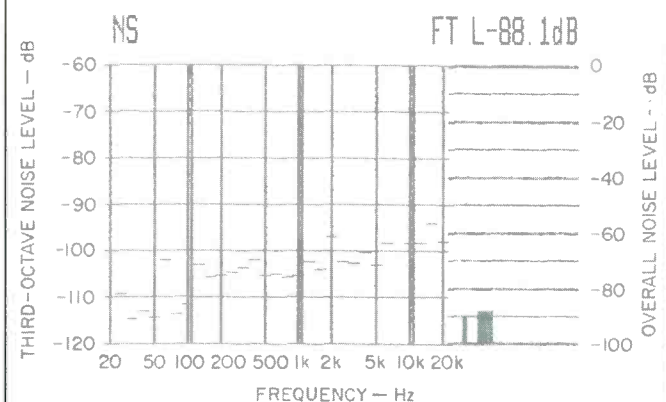


Fig. 1—Frequency response, left (top) and right channels.



A



B

Fig. 2—Unweighted S/N analysis in 14-bit mode (A) and 16-bit mode (B).

merly required hundreds of pounds of reel-to-reel recorders, mixers, amplifiers and mixing consoles, could now be handled with a small VCR plus the tiny PCM-F1 processor and a couple of well-placed microphones. No wonder the PCM-F1 found favor more with the pro audio folks than with the home users for whom it had originally been intended.

Not content with that accomplishment, Sony went on to introduce, a couple of years ago, the PCM-701, a processor which sold for only \$1,200 and which occupied no more space than a typical amplifier. Now, further integration of circuitry plus the experience gained in other digital-audio areas (such as CD and professional digital recording equipment) has enabled Sony to produce the lowest-priced PCM processor ever, the PCM-501ES.

Besides being considerably less expensive than any previous PCM processor, the new PCM-501ES incorporates a host of features that serious recording enthusiasts will find useful. For one thing, the unit offers both 14-bit and 16-bit recording and playback configurations. Both formats conform to the technical specifications of the EIAJ; thus, any tape recorded using another digital processor that conforms to either EIAJ format can be played back using this unit. Furthermore, the PCM-501ES allows you to copy tapes *digitally* without having to decode them first from digital to analog. If a tape recorded in the 16-bit format is duplicated using this digital tape-copy function, the copy can automatically be converted to the more common 14-bit format.

Sony incorporated both formats because the 16-bit mode offers somewhat wider dynamic range and lower distortion, while the 14-bit mode has somewhat better error-correction capability. Specifically, burst errors of up to 32 horizontal video-format lines can be corrected in the 14-bit mode, while the 16-bit mode only allows correction of burst errors up to 16 lines long. As is true of other digital systems, the PCM-501ES can compensate for burst errors too large for it to correct so that the errors are not perceptible. Interleaving disperses dropout errors by changing the sequence of information blocks or "words" in the recording. When restored to the original order during playback, the words containing errors are therefore placed between error-free words, so linear interpolation can mask the errors.

Another new feature found on the PCM-501ES is called Optimum Video Condition (OVC) control. This is used in conjunction with the associated VCR's tracking control and a series of indicator lights on the PCM-501ES, to obtain the optimum relationship between the VCR and the processor regardless of tape speed set on the VCR. Furthermore, when adjusting the VCR's tracking control, one of the processor's level meters can serve the added function of showing when optimum VCR tracking has been attained. Finally, an Auto Playback Mute circuit, when activated, will cause the system to mute in the presence of frequent dropouts or dusty tape.

Control Layout

A "Power" switch and headphone jack are found at the left end of the all-black front panel of the PCM-501ES. A rotary headphone-output level control is next to the phone jack; to its right is the "OVC" control described earlier. Two pushbuttons are used to select either 14-bit or 16-bit digital

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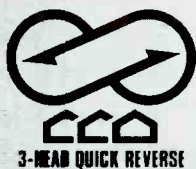
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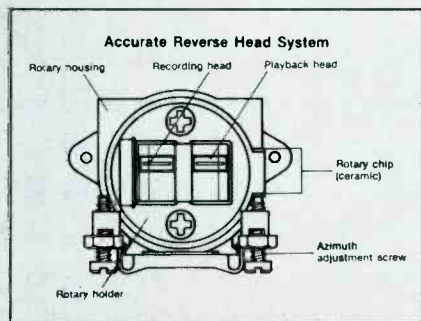
AKAI WILL AUTOMATICALLY REVERSE YOUR OPINION ON RECORDING ACCURACY.



If, as an audiophile, you're of the opinion you can't enjoy the brilliance of sound accuracy in a 3-head system, combined with the long play convenience of a quick reverse deck — we're out to change your opinion.

Case in point: AKAI's Accurate Quick Reverse System.

How quick is quick? Less than a half-second. But the reverse story doesn't end there. To eliminate wear and misalignment, AKAI has introduced the diamond-like ceramic head stopper. A beryllium-alloyed diecast two-inch head housing, with double nut locked stainless steel azimuth screws. For added depend-



ability, *all* moving parts are bonded with a tough Teflon™ casting for permanent lubrication. What does all that mean to you? Simply this: AKAI's total auto reverse design has the distinction and durability, to perform over 200,000 rotations.

Now consider AKAI's Computer Recording Level Processing.

Chances are, the way you've set recording levels in the past has been based on experience, coupled

with critical listening. But that's history. Today, AKAI has successfully developed the ultimate computer system for obtaining a *perfect* setting. Every time. And here's how that perfection works:



First, the tape is analyzed to determine optimum bias and equalization. Commonly referred to as "quick auto timing."

Next, the tape MOL (maximum outlet level) is derived by spectrum analysis at 400 Hz and 8,000 Hz. Note: this step is critical because it



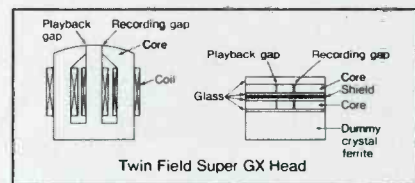
assures maximum tape saturation without audible distortion.

Then the energy content of the music source is sampled for ten seconds.

Finally, when all the data is obtained, the computer sets the recording levels. *And all are mathematically perfect.*

Which brings us to AKAI's Super GX Head.

Nowhere in the industry will you find its equal. With its single crystal ferrite, encased in mirror-polished glass, the Super GX head is so unique in its hardness, it's second only to a diamond. Sonically, it's second to none. With a playback output level as much as 7.8 db better than Sendust heads at 10kHz, it's easy to hear why.

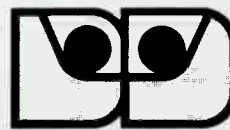


And if all that isn't enough, consider this: the Super GX head is so resistant to wear, it's *guaranteed* for 17½ years of continuous play.

The case is closed: Closed Loop Double Capstan.

By isolating the tape as it travels over the heads with two pairs of capstans and pinch rollers, tape tension and speed are stabilized, significantly reducing wow and flutter, level fluctuations and modulation noise. Result: unparalleled accuracy and highest of fidelity.

It's evident that AKAI's engineering excellence and technology has altered and influenced industry standards on recording accuracy. Which should automatically be reason enough to reverse your opinion. And, see your AKAI dealer.



AKAI
Hi-Fi & Video

You have to get used to the fact that 0 dB is truly the maximum recording level reasonable. Go above it and you'll be in trouble.

resolution; to their right are three pushbuttons arranged in a vertical row and labelled "Copy," "Auto PB Mute" and "Tracking." The "Copy" button is pushed when you want to make a digital copy of a digital tape using two VCRs. The "Tracking" button converts the peak program LED meter into a tracking meter, as described above; the function of the "Auto PB Mute" button has also already been described.

The large, easy-to-read display to the right of these three buttons serves primarily as a dual-channel record-level metering system (or as a tracking-control indicator). To the left and right of the LED banks are indicator lights which denote 14-bit or 16-bit resolution; activation of the built-in emphasis/de-emphasis circuits, playback muting, and the "Copy" feature, as well as activation of a "Rec Mute" button located just to the right of the display area. This button allows you to interject a signal recording level of zero to create blank spaces or pauses between musical selections. Dual-concentric, calibrated control knobs at the right end of the panel serve as master recording level controls.

The rear panel of the PCM processor has stereo pairs of line-in and line-out jacks, video in and out jacks, the "Copy Out" jack used for copying a tape from one VCR to another, and a monitor-out jack. The latter allows you to monitor an ordinary video signal connected to a TV monitor without having to change connections when you want to use your VCR for its primary purpose, watching recorded television programs.

Measurements

In order to determine the difference, if any, between 14-bit and 16-bit operation of this PCM processor I decided to measure all characteristics of the machine in both operating modes. The first thing I discovered is that there was no measurable difference in frequency response when switching from 14-bit to 16-bit operation. Overall record/playback frequency response for both channels, shown in Fig. 1, was well within the ± 0.5 dB tolerance specified by Sony.

Figures 2A and 2B show unweighted signal-to-noise ratios obtained for each digital resolution format. For the 14-bit mode I measured 84.0 dB of S/N, while in the 16-bit mode S/N increased to 88.1 dB. Adding an A-weighting network, the S/N figures improved still further, to 86.9 dB for the 14-bit mode and 90.7 dB for 16-bit operation (see Figs. 3A and 3B). A very slight improvement in harmonic-distortion levels was measured, too, when I switched digital resolution from 14 to 16 bits. For the former mode, I measured a THD of only 0.006%, which decreased to an even lower 0.004% when I switched to 16-bit.

One of the things you have to get used to when using a digital processor for audio recording is the fact that "0 dB" is truly the maximum recording level reasonable. Go above it and you will be in trouble immediately. To illustrate the point, I used the distortion plotting feature of my Sound Technology 1500A tester to see what would happen at higher recording levels. The results for both 14-bit and 16-bit operation are shown in Figs. 4A and 4B: At +2 dB recording level, THD had already jumped up to about 2.7%. Yet, at 0 dB recording level, distortion had been so low that this instrument was incapable of registering a reading. I had

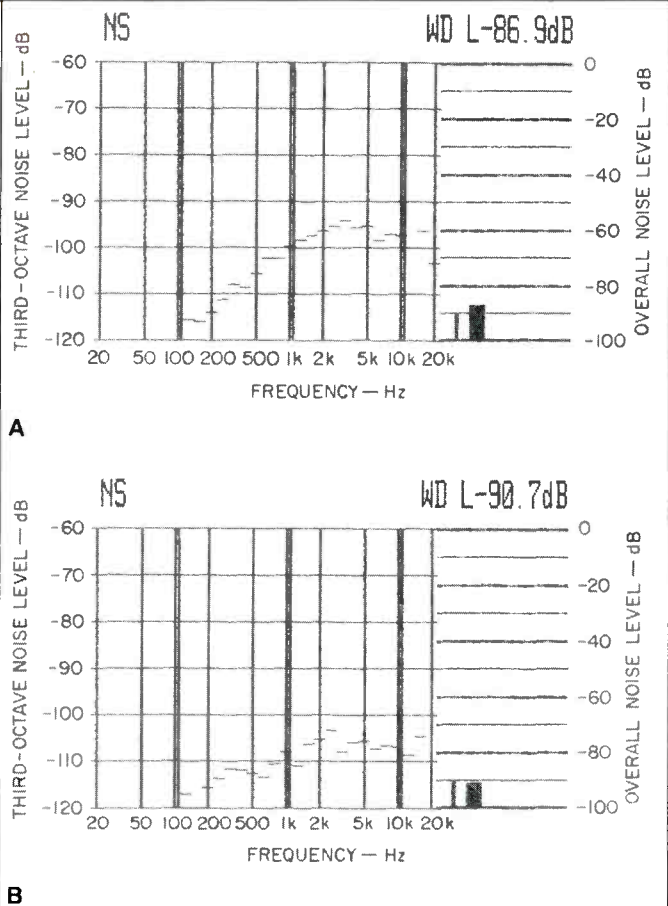


Fig. 3—A-weighted S/N analysis in 14-bit mode (A) and 16-bit mode (B).

to use my dedicated distortion analyzer to read the 0.004% and 0.006% numbers mentioned above.

Channel separation is plotted in Fig. 5. Even at 16 kHz, separation still ranged between 69.4 and 73.7 dB (depending upon which channel was being measured). At mid-frequencies, separation was between 90.6 dB and 92.0 dB, again depending upon whether I measured left-to-right or right-to-left separation.

Use and Listening Tests

One of the problems I have run into with earlier PCM processors is their inability to record signals faithfully when the associated VCR was operated at its slowest tape speed (either Beta III or VHS EP). The first unit to overcome this problem was Sansui's TriCode PCM processor (see *Audio*, January 1984.) The Sony PCM-501ES is the second unit to successfully use the slower VCR tape speeds for digital audio recording. This means that with a Beta VCR you can

Because the PCM-501ES gets good results with the slower VCR tape speeds, you can record from 5 to 8 hours of superb digital audio on a single cassette.

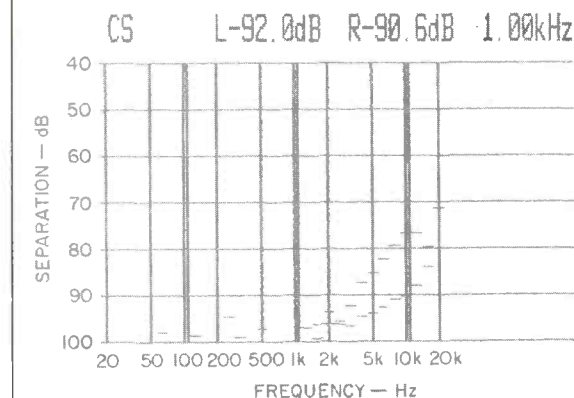
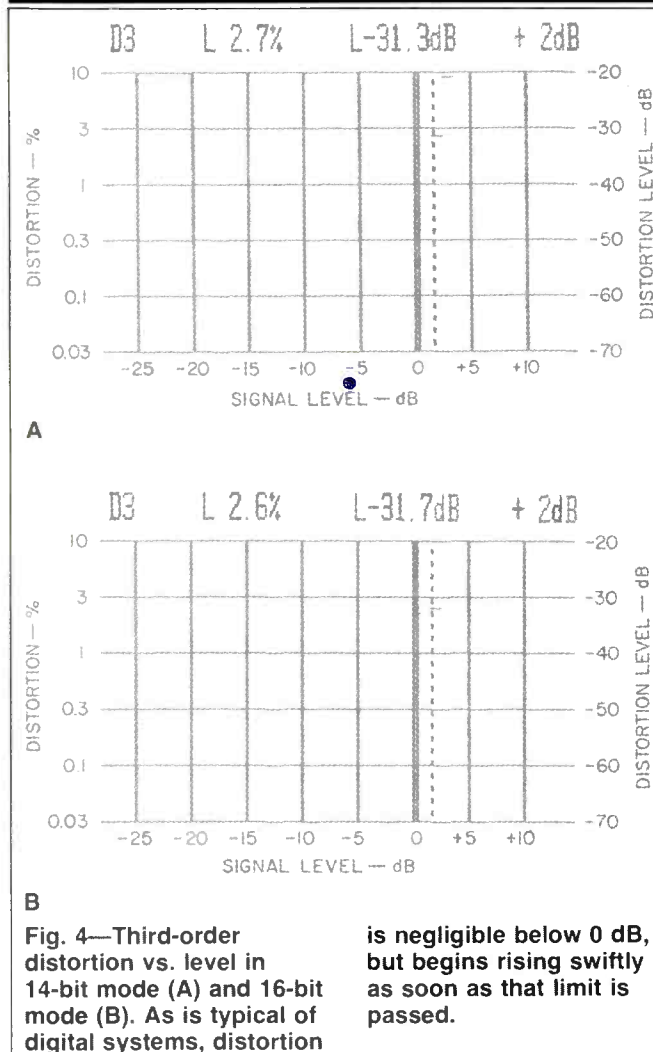


Fig. 5—Separation vs. frequency.

get up to 5 hours of superb digital audio on a single cassette tape and 8 hours' worth with a VHS recorder. Furthermore, the OVC control really lets you optimize performance in these slow-speed modes so that as little interpolation as possible is necessary to fill in for missing data. The tracking indicator is also a great help in optimizing the performance of the VCR in relation to the processor.

The "Copy Out" feature will appeal to audio enthusiasts who want to make copies of their homemade, digitally recorded musical performances. Since there doesn't seem to be a great deal of prerecorded software available for use with PCM processor/VCR combinations, I don't yet see the present need for this feature.

In my own experiments, I transcribed sample selections from some of my favorite CDs, both in the 14-bit and 16-bit formats. During certain soft passages, I was able to detect a slight difference in residual noise levels, but only when I turned up listening levels to unrealistically loud settings. As for tonal quality, in A-B tests between the original CD and its digitally recorded equivalent on VCR tape, I confess that I could not tell the difference. The only time I thought I heard a difference was when I deliberately experimented with some off-brand, "bargain" videotape I had lying around the lab from an earlier experiment. Some of this tape was so bad that, with the Playback Mute Control activated, I did hear moments of muting when error rates exceeded the error-correction capabilities of the system. With playback muting off, under the same conditions, there was no audible muting, but I did detect occasional changes in timbre when making direct comparisons with the CD source material. I can only attribute these changes to a relatively large number of interpolations which the system was being called upon to perform.

After becoming accustomed to using high-quality, three-head reel-to-reel and even cassette tape decks, it's a bit frustrating to have to wait for playback to find out how well a recording came out, but that's the way all PCM processor/VCR combinations work. Just as you can't monitor a video recording using any home VCR, so too is it impossible to monitor a PCM audio recording made on VCR tape. Under these conditions, it's especially important to stay below that 0-dB indication on the level meters of the PCM-501ES. Exceed that point and you are going to hear horrendous levels of distortion during playback, since you will have come up against the insurmountable level limit imposed by any digital audio recording system—the point where you run out of "numbers" to describe the loudest sample of the music you are recording. That's the point when the sample you record consists entirely of ones—14 of them in the 14-bit mode or 16 of them if you use the higher resolution format.

Perhaps some day, when standards are agreed upon for a dedicated Digital Audio Tape (DAT) recording system, provision may be made for the kind of as-you-record monitoring system that many of us enjoy with our analog recorders. Until that day comes, if you have a need or desire to record music and speech digitally, the least expensive way is with a VCR, and a PCM processor such as Sony's beautifully engineered and produced PCM-501ES.

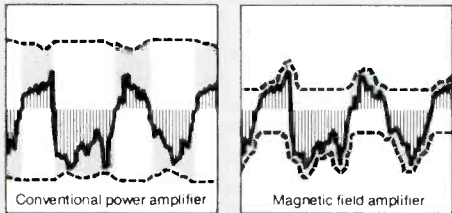
Leonard Feldman

MOBILE MUSICALITY.

THE CARVER CAR AMPLIFIER introduces Magnetic Field Amplifier technology to automotive high fidelity. Finally, the traditional weak link between car stereo decks and modern speaker design has been replaced with Carver technology. Into 1/10th of a cubic foot, Bob Carver has engineered a complete 120 watts RMS per channel amplification system with the fidelity, accuracy and musicality demanded by the most critical reviewers and audiophiles.

ESSENTIAL POWER. Even before the exciting advent of car Compact Disc players, an abundance of power has been necessary to reproduce, without distortion, the frequency and dynamic range produced by modern decks.

Unfortunately, conventional amplifier technology is particularly unsuited to delivering this needed power to the specialized car interior environment. Like their home stereo counterparts, traditional car designs produce a constant high voltage level at all times, irrespective of the demands of the ever-changing audio signal—even those times when there is no audio signal at all! Because automotive amplifiers must, obviously, derive their power from the host vehicle, such an approach results in substantial drain to delicately balanced automobile electrical systems.



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

The Carver Magnetic Field Car Amplifier is signal responsive. Highly efficient, it produces only the exact amount of power needed to deliver each musical impulse with complete accuracy and fidelity. Thus the Carver Car Amplifier not only reduces overall long-term power demands, but produces the large amount of power necessary for reproduction of music at realistic listening levels without the need for oversize power supply components. Important considerations in the minuscule spaces which quality car design allocates to add-on electronics.

INTELLIGENT POWER. A hallmark of all Carver amplifiers is the careful integration of sophisticated speaker and amplifier protection circuitry. The Carver Car Amplifier is no exception.

Speakers are protected with a DC offset internal fault protection design which turns off the power supply at first hint of overload. An overcurrent detector mutes audio within microseconds of a short circuit, as does an output short circuit monitoring circuit. Together, these three circuits eliminate the potential need to replace fuses, revisit your autosound installer, or worse yet, replace expensive speakers due to a moment's indiscretion with your deck's volume control.

ASSIGNABLE POWER. Integrated bi-amplification and bridging circuits, along with The Carver Car Amplifier's compact configuration make it ideal for multiple-amplifier installations.

The built-in 18dB/octave electronic crossover allows use of two amplifiers in a pure bi-amplification mode without addition of extra electronics. Or, at the touch of a button, one Carver Car Amplifier can become a mono amplifier for subwoofers while the other Carver Amplifier handles full range. Or, for astonishing dynamic and frequency response, two Carver Car Amplifiers may be operated in mono mode into 8 ohms for a 240 watt per channel car system which will truly do justice to digital without taxing your car's electrical generation system.

INNOVATIVE POWER. Can 1/10th of a cubic foot of space hold yet more innovations? Yes.

Carver has addressed the ongoing problem of head-end/power amplifier level matching: Output of current car decks varies widely from brand to brand and model to model. The result can be a less than perfect match. The Carver Car Amplifier incorporates circuitry which compensates for variations in head-end output, reducing noise and optimizing signal-to-noise ratio. In addition, Carver has added a subsonic

filter which removes inaudible power-robbing infrasonics before they can tax the amplifier and speakers. Finally, a delayed turn-on circuit activates the Carver Car Amplifier after your head-end unit has powered up, to eliminate starting pops and thumps.

ACCURATE POWER. It goes almost without saying that a product Bob Carver designs for the road carries the same superb electronic specifications that his home audio products are known for.

The Carver Car Amplifier is flat from 20Hz to 20kHz, down -3dB at 16Hz and 30kHz. Not coincidentally, the usual specifications given for Compact Discs. A signal-to-noise ratio of over 100dB means that, in even the most quiet luxury sedan, you will never be annoyed by hiss. The other specifications are equally as impeccable. You may peruse them in our literature or in independent reviews soon to appear.

ACQUIRABLE POWER. The remarkable Carver Car Amplifier is currently available for audition at Carver dealers across the country.

It is worth the journey. Whether you have a car system in need of the sonic excitement possible with abundant power, or are in search of the perfect complement to a new high-performance automobile, you owe it to yourself to experience the logical extension of Carver technology—the Carver Car Amplifier M-240.

Power Output Stereo Mode: (continuous RMS power output per channel, both channels driven, at 13.8 VDC input). 120 W into 4 ohms, 20 Hz to 20 kHz with no more than 0.15% THD.

Power Output Bridged Mono Mode: (Referenced to 13.8 VDC input). 240 W into 8 ohms, 20 Hz to 20kHz with no more than .15% THD.

Input Sensitivity: Variable 250mV to 4V

Signal to Noise Ratio: (Referenced to 120 W. A weighted into 4 ohms) Greater than 100 db

Crossover: 115 Hz, 18 dB/octave

Weight: 4.7 lb.

The Carver Car Amplifier



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AmericanRadioHistory.com

WEST SIDE GLORY

Leonard Bernstein: *West Side Story*.

Kiri Te Kanawa, soprano; Jose Carreras, tenor; Tatiana Troyanos, mezzo-soprano; Kurt Ollmann, tenor; Marilyn Horne, mezzo-soprano; Leonard Bernstein conducting. **On the Waterfront.** The Israel Philharmonic Orchestra, Leonard Bernstein conducting.

Deutsche Grammophon DG 415 253-2, two-disc set.

Leonard Bernstein's new recording of *West Side Story* sizzles and pops with all the extroverted energy that characterizes Broadway musicals. The unusual twist is his use of operatic voices. But why not? After all, this is one of the greatest of all American operas, masquerading as musical theater. Or is it the other way around?

Jose Carreras and Kiri Te Kanawa make an outstanding Tony and Maria, projecting the qualities of youthful innocence convincingly. Carreras gives Tony's first song, "Something's Coming," an aching, searching quality that captures a teenager's outlook on life. His treatment of "Maria" is both tender and strongly affirmative.

The balcony scene is especially moving. Carreras and Te Kanawa respond to each other musically and dramatically so well you forget the performance and are absorbed by the story and the music.

In "I Feel Pretty," Bernstein's tempo

is slower than is customary in stage presentations. Originally, he conceived it as a lyrical, elegant song, rather than the excited, up-tempo version used in the theater. After ending the first act with two dead bodies on stage, directors want something bright and cheerful to open Act Two. But for a recording, the original conception is perfect. Kiri Te Kanawa sings it with the peaceful contentment of a young princess aglow with the joy of new-found love. The girls mock her "delusion" with gentle teasing rather than the sarcasm created by a faster tempo. It works beautifully.

Kurt Ollmann is not well known to American audiences, but his portrayal of Riff should help to correct that. Listen to his macho, streetwise singing in the "Jet Song" and "Cool" and his unmistakably powerful, confident leadership of the Jets in the "Tonight" ensemble.

Anyone who has been through music school will recognize all the academic devices Bernstein cleverly turned into highly expressive musical ideas. Throughout the score, the forbidden melodic interval of the tritone (augmented fourth) is important. Known as the "devil's leap" because it is difficult to sing, it becomes the germinal motive of Tony's big solo, "Maria." The Jets' street signal motive is a tritone leap, too. The device also fig-

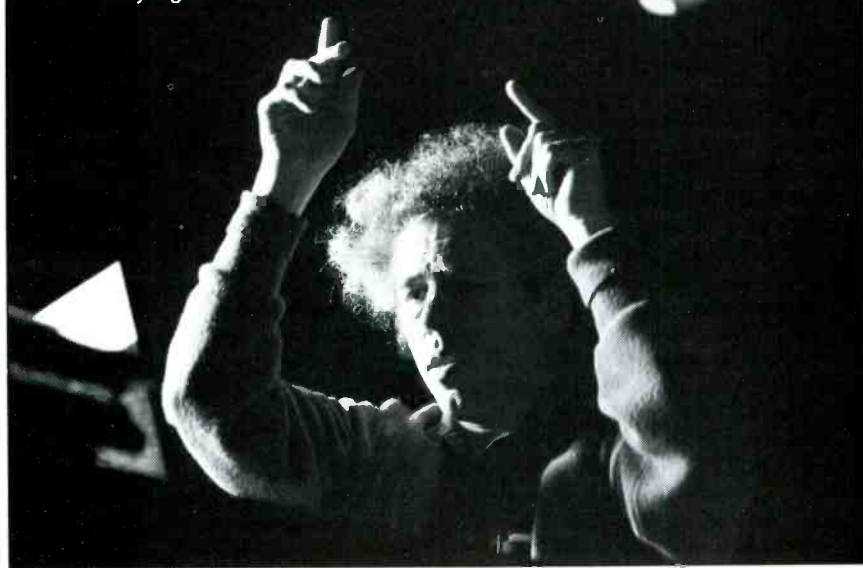
ures prominently in the harmonic structures, and is responsible for those ghostly chords at the end of the second act.

Rhythms are another challenge for the singers. Riff's "Jet Song" has passages where the melody is slightly off the beat for an entire phrase at a time—not easy to perform. In "America" the medieval rhythmic device called hemiola becomes, strangely, a jazz reference. You can hear it on the word America. The previous bar has the normal grouping (for 6/8 meter) of two beats with three subdivisions (1-2-3, 1-2-3). But the second bar is the surprise: Three beats, each with two subdivisions (1-2, 1-2, 1-2). Every time the word America occurs, so does this unexpected syncopation, slashing across the beat.

Just before the rumble scene, the ensemble piece based on "Tonight" features five-part counterpoint. Every character has different expectations about the evening's events, so each one sings about them with different melodies, all intertwined. It's an extraordinary passage musically, but it also succeeds in making an important dramatic point in exactly the right way.

The two comic songs, "America" and "Gee, Officer Krupke," are absolute gems. To hear Kurt Ollmann doing the voice of the social worker in falsetto is hilarious.

Lincoln Mayorga

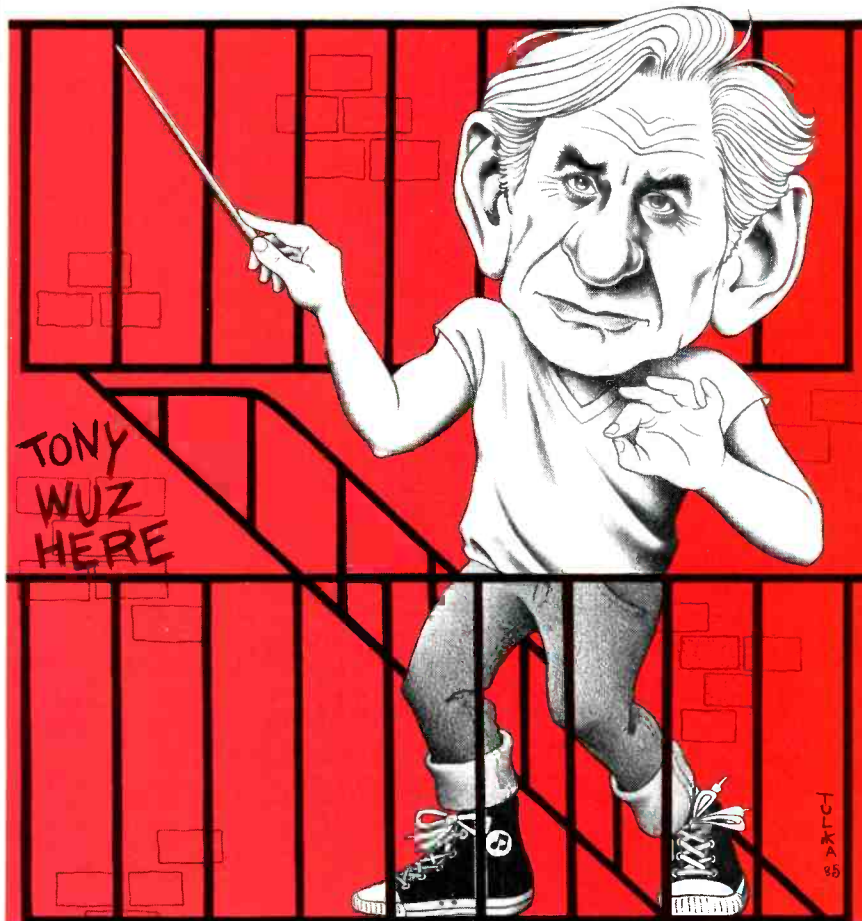


The Missing Linc: Lincoln Mayorga & Distinguished Colleagues Sheffield Lab CD-S10.

Missing Linc, Vol. 2, Sheffield's second direct-to-disc recording, was largely responsible for establishing the company as a major factor in high-quality sound reproduction.

Now we have the CD recording, which was derived from the analog reference tape that was made simultaneously with the direct disc. Listening to it now, it is easy to perceive why its musical and sonic values caused such a stir. Tape hiss reminds you of its analog origin but it is not at all obtrusive, and the many high-level passages mask it completely.

I compared my original *Missing Linc* direct-to-disc recording with this CD. I'm bound to say that while the CD's sound is quite clean, the LP sounded



Near the end, the duet between Anita and Maria ("A Boy Like That" and "I Have a Love") is one of the most intense moments of the Broadway stage. By combining the two songs contrapuntally, Bernstein expresses the dramatic conflict between Anita and Maria with soul-shattering power. Tatiana Troyanos (Anita) sings with bitter, vitriolic feelings against Te Kanawa's gently innocent pleading. When they reconcile their feelings at the end, I feel my eyes watering.

John McClure, a long-time friend and associate of Bernstein, produced this recording. It is multi-miked and multi-tracked, and is an outstanding example of how good that production style can be. This recording is so clear and detailed that you don't need to follow the score—everything in it is audible. (In the BBC documentary on the sessions, shown here on PBS, you can see Bernstein actively participating in the mixdowns.)

By turns passionate, introspective, lyrical and energetic, this recording of *West Side Story* bubbles over with a great deal of good, old-fashioned American energy.

A bonus for CD listeners is the inclusion of Bernstein's symphonic suite from *On the Waterfront* performed by the Israel Philharmonic. It's a powerful, imaginative score from an outstanding film.

Steve Birchall

cleaner still, in spite of its wear, with better transient response, more (and better defined) bass, and a more extended high-frequency response. Nonetheless, for those who can't afford the \$450(!) being asked for a mint-condition, unused *Missing Link* direct disc, the CD will serve quite well to explain its landmark significance.

Bert Whyte

Stravinsky: Symphony of Psalms; Poulenc: Gloria. The Atlanta Symphony Orchestra and Chorus, Robert Shaw; Sylvia McNair, soprano. **Telarc CD-80105.**

Serene and glowing, this new recording of Stravinsky's "Symphony of Psalms" is an excellent addition to the CD repertoire. Coupled with it is Poulenc's "Gloria."

Both works are Robert Shaw special-

ties, and these new performances admirably reflect his long association with them. For instance, in the "Symphony of Psalms" the intricately woven lines of the second movement's double fugue have a clarity and definition I have never heard in a recording before. The room quality is reverberant without covering up the detail.

If you have the impression that the highs are missing, remember that Stravinsky omitted violins, violas, and clarinets from the orchestra. He wanted a less bright sound for this work. The beginning sounds especially dull because Stravinsky wanted to plant that sonic character in the listener's mind.

Robert Shaw reveals the rhythmic momentum of the "Symphony of Psalms" in just the right ways. Choral accents and slight spaces between notes help to give the music an almost danceable lift and forward motion. In



Robert Shaw



Tunnel is utterly clean, with sound that is highly defined and transients that are razor sharp.

Flim & The BB's

Tunnel: Flim & The BB's
Digital Music Products CD-447.
 (Available from Digital Music Products, Rockefeller Center Station, P.O. Box 2317, New York, N.Y. 10185.

This CD is another stunning example of recording engineer Tom Jung's digital wizardry.

Tom worked with the multi-talented Flim & The BB's on the great *Tricycle* recording. And way back in his Sound 80 studio days in Minneapolis, Tom made a pioneering digital recording with this same group.

There are 11 original compositions on this CD, ranging from hard, driving rock to expressive, less athletic, elaborately scored pieces. In all of them, Flim & The BB's display great virtuosity, and they create an astonishingly big sound considering that the group consists of just four musicians. The arrangements are complex and brilliant, and the sonorities—produced from synthesizers, saxes, flute, clarinet, piccolo, Fender Rhodes guitar, acoustic piano, and electric bass—plus tympani and an elaborate percussion battery, are of breathtaking realism.

This group has been recording in the digital format for a long time, and they have learned to use the medium in their music making. A case in point is their exploitation of dynamic range, which in this case is extremely wide. The synthesizers explore subterranean bass and, along with piccolo and high percussion, the stratospheric extremes of high frequencies.

All is utterly clean, clothed in clever and selective reverberation, with a highly defined sound and razor-sharp transients. Even if you have amplifiers and speakers that can handle sound of enormous energy, this recording will tax them to their limits. *Bert Whyte*

Bruckner: Symphony No. 7 in E Major. The Staatskapelle Dresden, Herbert Blomstedt.
Denon 38C37-7286.

Bruckner's monumental Seventh Symphony is given a quite convincing performance by Herbert Blomstedt conducting the excellent Staatskapelle Dresden.

The recording was made in the spacious acoustics of the Lucaskirche in

Dresden, with a pair of overall spaced omni mikes plus a minimum number of discrete sweetener mikes. The sound exhibits a distant perspective but still maintains good detail. First violins are fairly smooth, brass is properly massive and well projected, and percussion is quite clean with good impact.

The fine Staatskapelle Dresden and the splendid acoustics of the Lucaskirche provide a quite compelling musical experience. Blomstedt does not attain the level of inspiration of a von Karajan in this great music, but his performance is more than adequate.

Bert Whyte

Ravel: Orchestral Works. Orchestre Symphonique de Montreal, Charles Dutoit.
London 410 254-2.

All of the Charles Dutoit/Montreal Symphony Orchestra recordings are marvelous, but this CD's rendition of Ravel's wondrously orchestrated "Mother Goose" ballet is a masterpiece—a near miracle.

Every element that contributes to a great recording is here in abundance on the "Mother Goose" (and also on the other Ravel works, which are equally well played and superbly recorded). Dutoit's performance is quite simply the best I have ever heard, and he has his Montreal orchestra playing like a world-class ensemble.

The sound is ravishing. If ever there



Charles Dutoit

the last movement, these accents give the effect of large tolling bells overlapping each other.

Shaw's chorus sings the words *laude* and *alleluia* in the last movement with beautiful control, creating the peaceful, tranquil effect Stravinsky wanted. Every nuance of tone quality and phrasing seems exactly right. The movement opens with a crescendo/diminuendo effect, accomplished mainly through Stravinsky's calculated orchestration, but also by the Atlanta Symphony's good playing. The chorus answers it with a perfectly controlled dynamic swell, a sudden drop in volume, and a final tapering-off (on the word *alleluia*). Near the end, Stravinsky's glowing choral/orchestral chords, with their widely spaced intervals, are balanced to perfection.

The Poulenc "Gloria" receives a lively, playful performance. Shaw and the Atlantans obviously enjoy this work and their enthusiasm makes the performance memorable. Soprano Sylvia McNair sings with elegance and clear, ringing tones.

The "Gloria" benefits from a more successful recording than the "Symphony of Psalms." The pickup seems to be a little closer, and more like other Telarc recordings with the Atlanta Symphony. The sound quality in the Stravinsky is a bit unsettling in isolated places, possibly because of a mike placement that didn't quite work. Everything sounds fine until the level goes up; then the chorus begins to sound harsh. Also, the chorus covers up certain instruments in the tutti just enough to confuse the ear into perceiving the combined sound as distortion.

Perhaps strong and slightly out-of-phase reflections from the room boundaries interfered with the direct sound at the mikes, causing this distortion. But even if Telarc didn't quite hit the mark, the sound is still good, and the performances are beautiful.

Steve Birchall

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SEPTEMBER

BILLY JOEL
GREATEST HITS
VOLUME I & VOLUME II

6

WHAM! UK

FANTASTIC

8

12

2-Record Set

J.S. BACH
SONATAS FOR FLUTE
BWV 1020, 1030-1035

JEAN-PIERRE RAMPAL
Flute

TREVOR PINNOCK
Harpichord

ROLAND PIDOUX
Cello

DIGITAL

Dan Fogelberg

The Innocent Age

15

JEFF BECK **FLASH**

CHOPIN
Impromptu, Fantaisie Op. 75
Barcarolle, Berceuse

MURRAY PERAHIA

21 JUST RELEASED!

CAFLY SIMON "Spoiled Girl"
CHEAP TRICK "Stand ng On The Edge"
AL DI MEGLA "Casino"
SIMON AND GARFUNKEL "Parsley, Sage, Rosemary And Thyme"
BRUCKNER Symphony No. 3
Bavarian Radio Orch./Kubelik
PRCKOFIEV "Classical" Sym.; "Love For Three Oranges" & "It Kije" Suites
Orch. Nat. de France/Maazel
MUSSCRSKY: Pictures At An Exhibition ("Two-Piano Arr.), Etc.
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22

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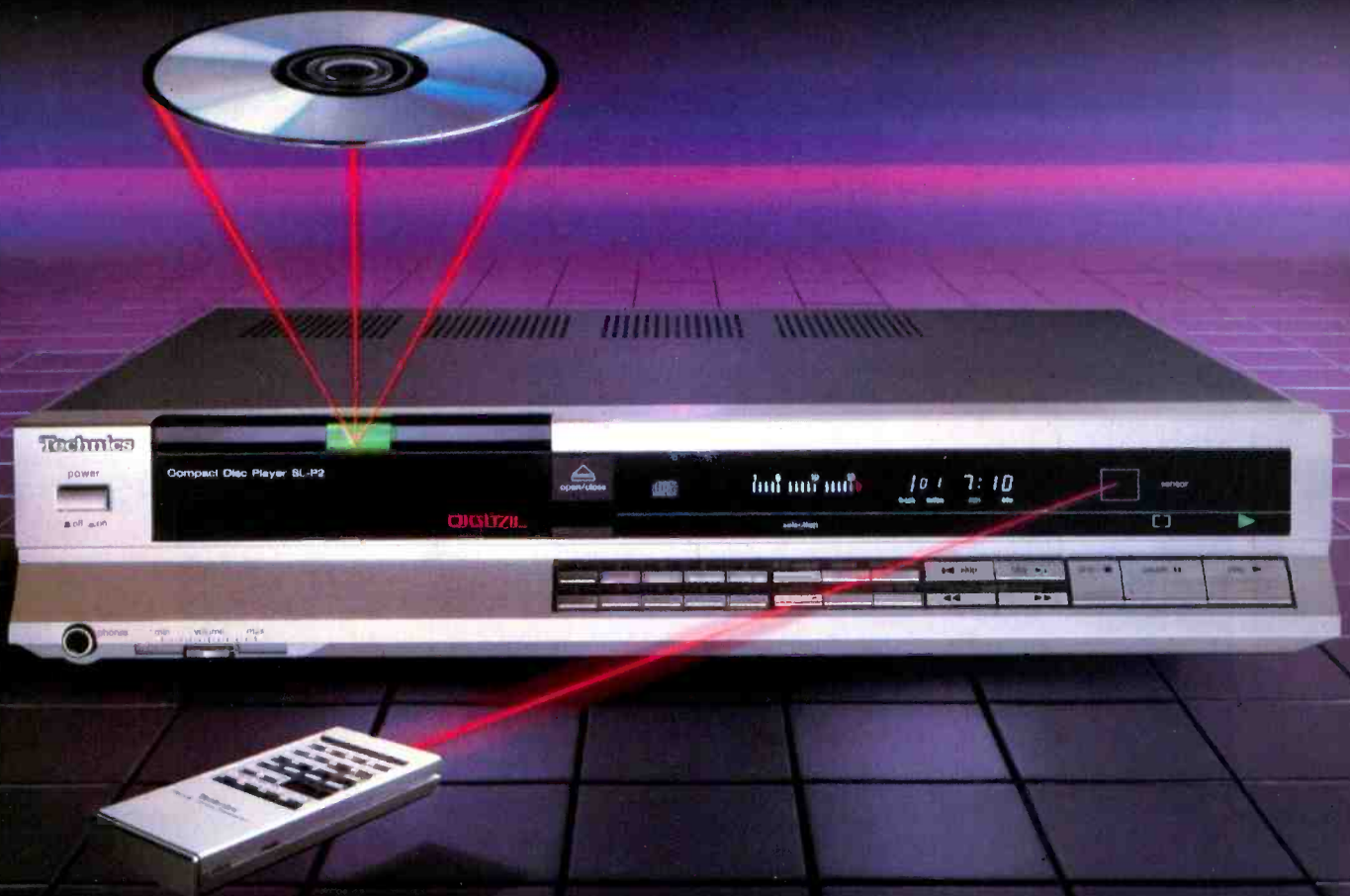
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Itzhak Perlman's violin on the Prokofiev CD sounds beautifully burnished, and is nicely complemented by a balanced orchestra.

was a recorded sound to completely document and delineate the advantages of the digital recording process, this is it! Even with an anti-digital bias, no rational, open-minded person with normal hearing acuity could possibly fault this recording.

On a recent trip to London, I was a guest at the Decca Records complex and had the pleasure of meeting John Dunkerley, the engineer who records these superb Montreal performances. He told me that the St. Eustache Church, the recording locale between Montreal and Quebec City, has a virtually ideal interior balance of stone and wood which gives the sound its wonderfully natural warmth and character.

Make no mistake: Played back on an audio system of the highest quality, this recording imparts a realism to the music that can be bettered only in live performance. This CD is an absolute must!

Bert Whyte



Itzhak Perlman

Serge Prokofiev: Concertos for Violin and Orchestra, No. 1 in D Major and No. 2 in G Minor. The BBC Symphony Orchestra, Gennady Rozhdestvensky; Itzhak Perlman, violin.
EMI CDC 7 47025-2.

From the start, Prokofiev's mordant and angular writing has tended to dominate his brooding lyricism. The "Concerto No. 1 in D Major" was premiered in 1923, and it probably was his first large work in which the lyric strain was dominant. It was composed

at the same time as the advanced (and often noisy) "Scythian Suite" and "Chout" ballet. The outer movements are slow, and the wistfulness of the violin writing seems to have been matched only by Walton, in his violin concerto of 1939. The middle movement, a contrasting scherzo, is the ideal tonic.

Perlman is probably the best romantic player among today's younger violinists, and his efforts are perfectly complemented by Rozhdestvensky and the BBC Symphony Orchestra. The violin sound is burnished and the orchestra well balanced.

The second concerto on this disc dates from the mid-'30s and reflects the advancing times. The movements are in the more usual fast-slow-fast plan, with lyricism a lesser ingredient.

A beautiful CD, and highly recommended.
John M. Eargle

Berlioz: Hungarian March; Ravel: Pavanne for a Dead Princess; Dukas: Sorcerer's Apprentice; Saint-Saëns: Danse Macabre; Debussy: Afternoon of a Faun; Chabrier: Joyeuse Marche. Academy of St. Martin-in-the-Fields, Neville Marriner.
Philips 412 131-2.

Neville Marriner and his splendid Academy of St. Martin-in-the-Fields have given new life to this potpourri of tired old warhorses. All the selections receive brisk, spirited performances, without any slighting of their lyrical elements.

This is a multi-mike recording that offers a big, clean sound with plenty of power, couched in a fairly spacious acoustic ambience. Recorded a bit close up, it has plenty of detail, and an oversized bass drum has great impact in the highly dynamic climaxes. If you like these works, this fine recording will delight you.
Bert Whyte

Chopin: The Nocturnes, Volumes 1 and 2. Artur Rubinstein, piano.
RCA RCCD 106 and 107, import.

These are legendary performances recorded in the RCA Italiana studios in the mid-'60s. Little needs to be said about Rubinstein's playing, except that he performs these works as well as anybody possibly could.

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This disc, one of RCA's better efforts, captures perfectly Dylana Jenson's smooth, sweet tone.

What does need to be said is that the recording quality is absolutely stunning. During the bulk of the '60s, RCA's classical activities centered on three-channel recording at 30 ips. After a brief bout with Ampex Master Equalization (AME) in the late '50s, RCA's recording department developed their own playback curve for the

higher speed, and they beefed up the record stages of their tape recorders. The results were master recordings of exemplary quality with excellent time-base stability and quite low noise. Only when multi-track recording came in did RCA convert to Dolby A.

In making the digital transfers, producer Max Wilcox went back to the

original half-inch masters and rebalanced them, mixing in a little less of the center channel than in the earlier issues of these recordings. The result is a sense of greater space, with a little more left/right delineation. What is utterly surprising is how quiet everything is; you have to listen at higher than normal levels to hear any tape hiss. They really had their technical act together back then. *John M. Eargle*

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Sibelius: Violin Concerto; Saint-Saëns: Introduction and Rondo Capriccioso. The Philadelphia Orchestra, Eugene Ormandy; Dylana Jenson, violin.

RCA RCD14548.

Dylana Jenson, a violin virtuoso, made quite a splash when, at the age of 17, she won the Silver Medal at the 1978 Tchaikovsky Competition in Moscow. She was also acclaimed for her 1980 performance of the Sibelius "Violin Concerto" with Ormandy conducting the Philadelphia Orchestra. Since then, she has performed widely here and abroad. In spite of this promising launch to her career, she has not made the impact nor gained the prestige of other violin *Wunderkinds* of the Tchaikovsky Competitions.

More is the pity, for on this CD, documenting her 1980 appearance, it is clear why her performance of the Sibelius "Violin Concerto" was such a triumph. Not only has she a formidable technical armamentarium, but she plays with great expression and lyricism, with a lovely, smooth, sweet tone that is captured perfectly here.

My former RCA colleague, Paul Goodman, knows how to cope with the acoustics of the Scottish Rite Cathedral in Philadelphia. He has struck just the right balance between orchestral detail and the hall reverb. He has Miss Jenson ideally placed just in front of the orchestra, and her violin sound is always completely articulate. The late Eugene Ormandy always had a way with the music of Sibelius, and his accompaniment is entirely sympathetic. Needless to say, the Philadelphia Orchestra plays with its usual élan.

Smooth, clean sound in general marks this as one of RCA's better CDs. The Saint-Saëns piece is a pleasant, well-played filler. *Bert Whyte*

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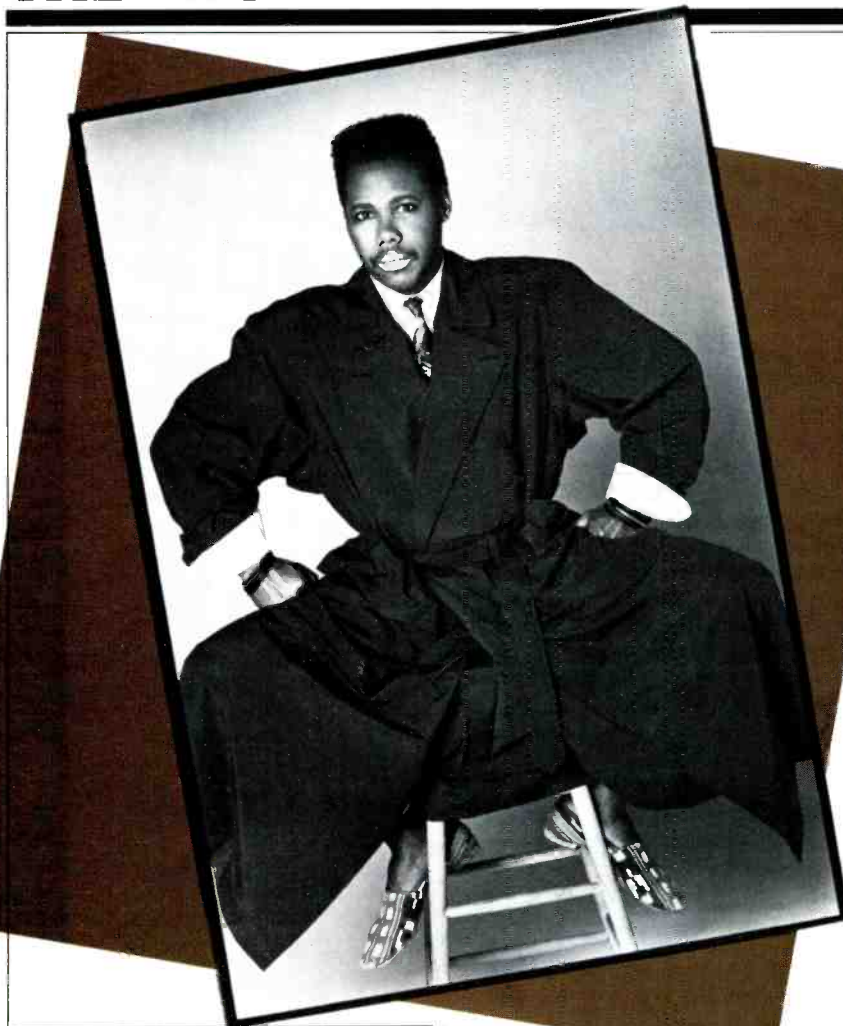
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MICHAEL TEARSON
JON & SALLY TIVEN

THE MIGHTY NILE



B-Movie Matinee: Nile Rodgers
Warner Bros. 25290, \$8.98.

Sound: B Performance: B+

Nile Rodgers is a groovemaster. If he couldn't play guitar, sing, or write songs, he'd still be able to make people dance and thassa fact. He sings about this on the album's first cut and on several others. The guy (he of the production credits for the last Madonna, Duran Duran, and Jeff Beck records) doesn't have a whole lot to sing about; he hasn't got a whole lot of anguish on the material side of things. So we're stuck listening to a lot of inane lyrics which hurt his case for being taken seriously as an artist. You can't gripe about his tracks. It's what he throws on top of them that leaves something to be desired. But even so, *B-Movie Matinee* is a very hot dance record.

As a producer and guitarist, Rodgers has a million-dollar style. The record has a spacious sound that enhances the impact of the drum machine, and special effects that are tastefully featured amidst a field of rather dull arrangements. Songwriting is the one aspect of the Wonder Boy's musicality that hasn't yet found its stride, so if it weren't for the refreshing guitar work we'd have nothing to marvel over. The fact is that Nile's seesaw rhythm figures, executed with aplomb and oftentimes a sense of humor, are enough to keep Ray Parker, Jr. on a daily practice schedule. The guy has a signature attack that's as recognizable as, for instance, Keef's, and his jazzy leads are enjoyable meanderings for the listener as well.

Mr. Ubiquitous Producer, we know you haven't had a lot of time off to woodshed this year, but you've got to

start saving up your best bits for your own records. The songs you supplied for the Jeff Beck LP beat the pants off the stuff here, and you sang better, as well. Perhaps Nile Rodgers is the hottest producer around but as an artist he might end up selling only as many records as, say, Todd Rundgren. To hit the top, Rodgers might have to find—care we say it?—a producer. He's hiding on *B-Movie Matinee*. All the guy's got to do is put his talents on proper display and we'd all get our rocks off—know what we're talking 'bout?

Jon & Sally Tiven

No Jacket Required: Phil Collins
Atlantic 81240-1, \$9.98.

Sound: B Performance: C+

Phil Collins' third solo album comes at a time when his profile has never been higher. "Easy Lover," the duet he did with Earth, Wind and Fire's Philip Bailey from Bailey's *Chinese Walls* (which Collins produced), recently was No. 1. His movie theme, "Against All Odds," has harvested Grammys, and his production work on Eric Clapton's *Behind the Sun* is just hitting the marketplace.

For his own album, Collins has chosen to play it safe. *No Jacket Required* doesn't break new ground or try anything startling. It is content to serve up no more than solid pop music with a heavy dose of the upbeat. Bouncy, peppy songs like the Phoenix horn-pumped "Sussudio" and "Who Said I Would" are the hallmark of the album, although Collins' sure hand with a ballad surfaces in the lovely "One More Night" (the album's first single) and "Long Way to Go."

The album really jumps out at you with its sound. Percussion is mixed way up, but don't forget that Collins is a drummer as well as singer, writer and producer. Hugh Padgham is coproducer and engineer, as he has been for several Genesis albums and for both of Collins' previous solo jobs.

One last note: The song from these sessions I like most is "Man with the Horn," about a street musician. It is not on *No Jacket Required*; in the U.S., it only appears as the flip side of "One More Night." Evidently, its subject didn't fit in with the boy/girl themes of the rest of the album. *Michael Tearson*



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Unlikely as it may seem, *Willie & the Poor Boys* is an unqualified success, and you can consider your money well spent on it.

Willie & the Poor Boys: Bill Wyman & Friends

Passport PB 6047, \$8.98. (Available from Jem Records, 3619 Kennedy Rd., South Plainfield, N.J. 07080.)

Sound: B Performance: A-

As unlikely a vehicle for greatness *Willie & the Poor Boys* might seem at first glance, this album is an unqualified success, surprising most listeners and record-industry experts alike. The Honeydrippers set the scene for the success of a project like *Willie & the Poor Boys*, and if chart action counts for anything, yet another "old rock 'n' roll" project seems headed for the profit zone.

Face it—Bill Wyman's projects have never meant much here in America, and although the cast of characters has a worthy pedigree, one would never expect the kind of performances found here. For instance, the team of Jimmy Page and Paul Rodgers was rather lackluster on The Firm's LP, but backed by Charlie Watts and Bill Wyman they toss off versions of "These Arms of Mine" and "Slippin' and Slidin'" that have the fire and brimstone that only The Firm's laser show usually supplies. Unknown contenders like Mickey Gee and Geraint Watkins (both ex-members of the Dave Edmunds backing unit) deliver the goods with consistency and taste throughout the album, and the little-known Andy Fairweather Low sings up a storm. Mr. Wyman sings a few songs in his usual monotone, and though he's not Mick Jagger, fortunately he knows enough to stick to melodies he can handle (and only a few at that).

No, there are no musical trails blazed here, and yes, these are all old fogies playing songs they didn't write. But it works, and all the proceeds are going to the A.R.M.S. charity (Action Research into Multiple Sclerosis), so you can consider your money well spent on this little numero.

Jon & Sally Tiven

Empire Burlesque: Bob Dylan
Columbia FC 40110.

Sound: B- Performance: C-

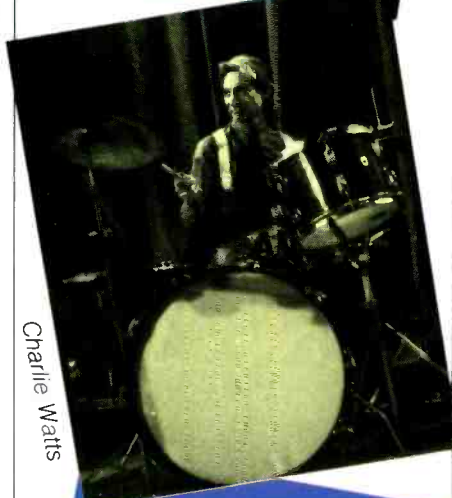
For many of his long-running fans, the best thing about the "We Are the World" single was seeing and hearing



Geraint Watkins



Bill Wyman



Charlie Watts



Andy Fairweather Low

Bob Dylan as an active force in the music world again. With that in mind, anticipation for his new *Empire Burlesque* album ran high.

This is the first album that Dylan has ever produced for himself—though he did enlist the hot remix man Arthur Baker (fresh from his Bruce Springsteen 12-inch remixes) to oversee the album's final sound. He assembled a musical cast that shifts from song to song. Benmont Tench and Mike Campbell from Tom Petty's Heartbreakers appear on organ and guitar. The ace Jamaican rhythm section of Sly Dunbar and Robbie Shakespeare is eminently present. Former and current Rolling Stones guitarists Mick Taylor and Ron Wood each take a lead-guitar turn, and Alan Clark of Dire Straits contributes some synthesizer. Don Heffington of Lone Justice, New Yorker Anton Fig, and L.A. session ace Jim Keltner all rotate with Dunbar on drums. With musicians this good the playing had better be first rate, and indeed it is.

Baker has delivered the most contemporary sound Dylan has ever enjoyed. He brings Dylan kicking and screaming into the 1980s with that big backbone beat punching away. He has infused *Empire Burlesque* with a big, bouncy, generally pleasing sound, but this sound just doesn't match the lyrics.

When it gets down to the words, Dylan doesn't have much new to say. Songs like "Trust Yourself," "Emotionally Yours," "Tight Connection to My Heart (Has Anybody Seen My Love?)" and "I'll Remember You" are shallow. The "Clean Cut Kid" lyrics read like they want to be the "A Hard Rain's A-Gonna Fall" for the '80s, but on record the point is made with one verse and chorus; after eight choruses it gets very thin. Still, Bob sounds very committed to his new material.

I've got a weird feeling that time has passed Bob Dylan by. With what he is writing now and how he has always sung he might be well advised to retire from the rock wars where he fits uncomfortably, if at all, and recast himself perhaps as a country artist. He sure wouldn't be the first to do so. His current songs and his style might be better appreciated in that context.

Michael Tearson



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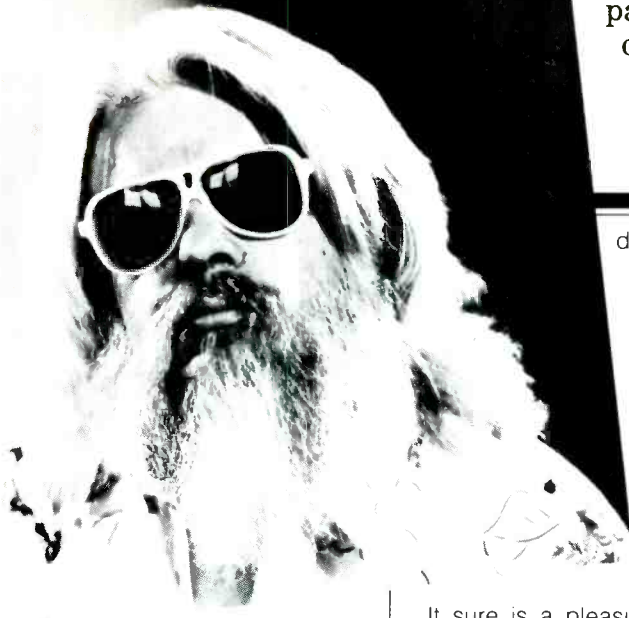
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American Radio History Corp.

Leon Russell is back with a pair of very different LPs—one typical Russell, the other full of classic C&W chestnuts.



Solid State: Leon Russell
Paradise PRL-001, \$8.98.

Sound: C+ Performance: C-

Hank Wilson, Vol. II: Leon Russell
Paradise PRL-002, \$8.98.

Sound: C Performance: B

After an absence of several years, Leon Russell has reactivated his Paradise label and released a pair of very different, brand-new albums. *Solid State* is a typical Russell album with a modern, often danceable sound; *Hank Wilson, Vol. II* has a dozen classic country-and-western chestnuts played straight as an arrow, a follow-up to the album Russell released under the Wilson name over a decade ago.

Solid State contains slick, up-to-date Russell originals plus a cover of Danny O'Keefe's "Good Time Charlie's Got the Blues." While the playing is very fine, the album never quite lights a spark in me. Part of the blame must lie with the songs themselves, as they are not a powerhouse lot. Not bad, just not exceptional. The overlong "Rescue My Heart" is so ordinary it flat-out frustrates me, while "The Rock 'n' Roll Part of My Heart" is just dumb.

The recording styles of these two disparate albums are not as different as one might expect. Naturally, *Solid State* has a shiny sheen to the sound. Coproducer Douglas Snider, who also cowrote the songs, and engineer Rex Collier have done a solid, workmanlike job. However, they recorded the Wilson album too much the same way. With the relative simplicity of the old C&W songs and their many acoustic instruments, Snider and Collier opted for a creamy kind of sound with lots of echo on the vocals. The result is pretty

dense, with layers of rhythm guitar, while piano, steel guitar and fiddle get most of the solo spots. I think a drier, crisper sound would have enlivened the same performances and energized the album a bit.

It sure is a pleasure to have Leon Russell, once known as The Master of Space and Time, back in action. These albums may not be his best ever, but each has its charms. *Michael Tearson*

Suzanne Vega
A&M SP6-5072, \$6.98.

Sound: B Performance: B-

Suzanne Vega's moody acoustic music begs for comparisons. Two that come quickly to mind are post-*Court and Spark* Joni Mitchell, and Laura Nyro's guitar-based (instead of piano-based) music. But the comparisons don't quite stick, and they aren't quite fair, either. They don't give the artist the chance to work out her own style.

Suzanne Vega explores the search for self and fulfillment in her songs. Musically they seem right at home alongside the music that is becoming known as New Age, the kind of music made by such artists as Mark Isham and Darol Anger on their Windham Hill albums. Both appear here as well. The sound is airy, what with whooshing synthesizers on most tracks, delicate percussion by Sue Evans, and the constant underpinning of Vega's own acoustic guitar. While she leans toward gently swaying, trance-like ideas, she is still trying to master tunefulness.

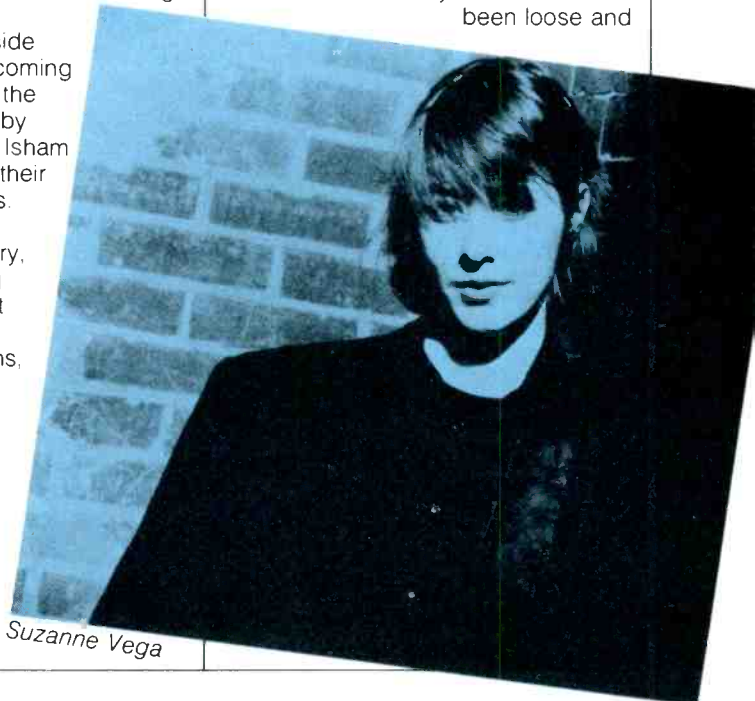
Lenny Kaye, formerly of Patti Smith's group, coproduced *Suzanne Vega* (with Steve Addabbo) with admirable restraint. They might have tried to dress up her songs in standard pop-music arrangements, but that would have destroyed what makes them different. Indeed, "Neighborhood Girls," the only song here remotely close to rock 'n' roll, is placed last on the album. *Suzanne Vega* is an album of very cerebral songs whose cerebral arrangements require the tenderness that has been brought to bear here.

I've been listening to Vega's album a lot as a late-night tonic to the pressures of the day; the album works well that way. She is a young artist who appears waif-like in her songs, swept up in things larger than she is. It is obvious that she still has a lot to learn and a lot of musical maturation to go through, but I'm beginning to like Suzanne a lot. *Michael Tearson*

Flash: Jeff Beck
Epic FE 39483.

Sound: B Performance: B+

The Jeff Beck legacy has always been the most impressive when Beck was doing battle with form. The guy screams the loudest when he's trapped within the confines of musical structure, but recently his albums have been loose and



Suzanne Vega

"Frighteningly close to perfect"



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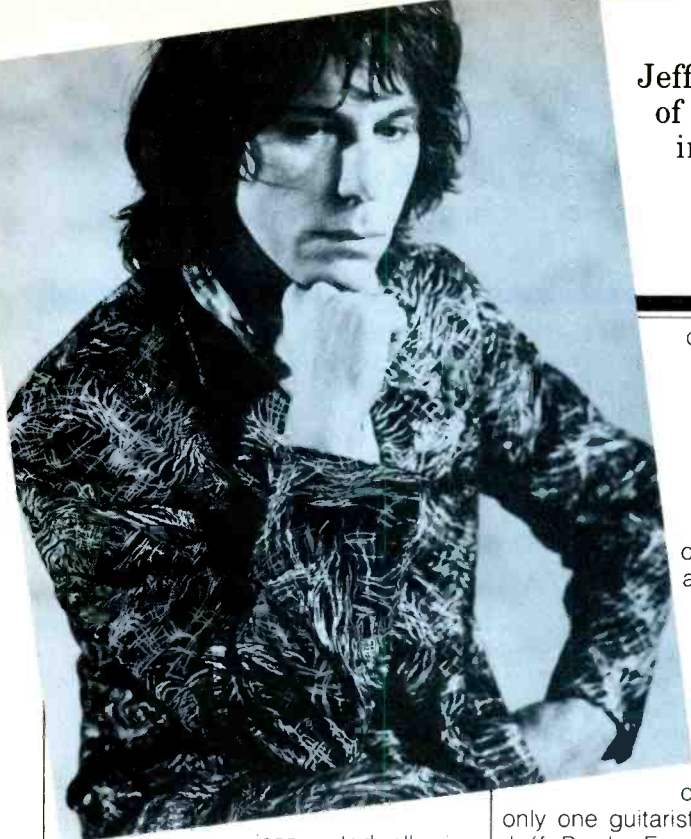
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The new ADS CD3.



Jeff Beck has stepped out of his self-indulgence and into some New Wave dance shoes with *Flash*.



jazz-rooted, allowing Beck the freedom to solo as he wishes. Although his playing has often been brilliant, the result has been less than completely satisfying, and his record sales have reflected this. He peaked with the *Blow by Blow* record—his first all-instrumental effort, highly improvisational and yet loaded with very calculated songs. His "Yammer with Jan Hammer" records (Hammer is the synthesist responsible for the *Miami Vice* soundtrack) have been less than memorable. Now Beck is back in the studio making *Flash*, a quote/unquote rock record, with singers, produced by Nile Rodgers and Arthur Baker. The results are uneven—moments of sheer brilliance and some of sheer nonsense—but the good news is that Beck is stepping out of his self-indulgent '70s work and into some New Wave dancing shoes. He's forging a sound that is heavily in debt to the contemporary chartbusters of the '80s (Bowie's *Let's Dance* and Run-DMC) yet carries Beck's distinctive energy, melodic sense, and unmistakable voice.

You read right—Beck actually sings a bit on *Flash*, or rather intones in his self-conscious I-can't-sing-I'm-a-guitar-player-but-who-wants-to-put-up-with-a-Rod-Stewart-personality way. He even convinced producer Nile Rodgers to write a great new tune, called "Ambitious," which conjures up images of what the Mick Jagger album could have sounded like if Mick had remembered to write it before he recorded it. And speaking of Rod Stewart, old knobby-nose sings a very un-

derproduced "People Get Ready" and manages to sound more like his old self than one would think possible. That is to say, it's very good. Even tasteful, a word one would never think applicable to the man who bludgeoned "All Right Now" into the charts just months ago. As for Beck's playing, the guy is seven stories above criticism—if there was

only one guitarist in rock it would be Jeff Beck. Every player who has emerged since is acutely conscious of Beck's work, and seven out of 10 steal from his book of licks every chance they get. He resorts to gadgetry and trickery more than he needs to, when with one little hammer-on he can jab you in the soul. He is the one guitarist from his place and time who has not fallen victim to the evils of chemical indulgence. While his peers grow stale, Beck not only keeps pace with the new breed but hones his technique further with each successive album.

And he plays with a sense of humor! *Beck Ola* indeed. *Jon & Sally Tiven*

Like *Avalon*, the songs seem to float and flow one into another, although "Slave to Love" does leap out from the rest of the pack each time I listen to the album.

The support cast here is large and illustrious—so much so that I wish the personnel had been listed cut by cut, to eliminate the who-played-what guessing game. It seems unnecessarily coy. Even so, the guitars of David Gilmour on "Valentine" and Dire Straits' Mark Knopfler on "Stone Woman" each are signature-clear and beautifully played.

Engineer Rhett Davies, named as coproducer, has done a lovely job with the sound here, creating an ethereal tone on which the music can glide. Bob Clearmountain's mix is excellent, too. I especially enjoy the funky-plus-cello sound mix which he achieved on "Sensation."

That *Boys and Girls* is a very classy album comes as no surprise at all. Bryan Ferry has been one of the genuine class acts in the rock world from the first notes of the first Roxy Music album. He is one of the few who have real style of their own and know exactly how to use it.

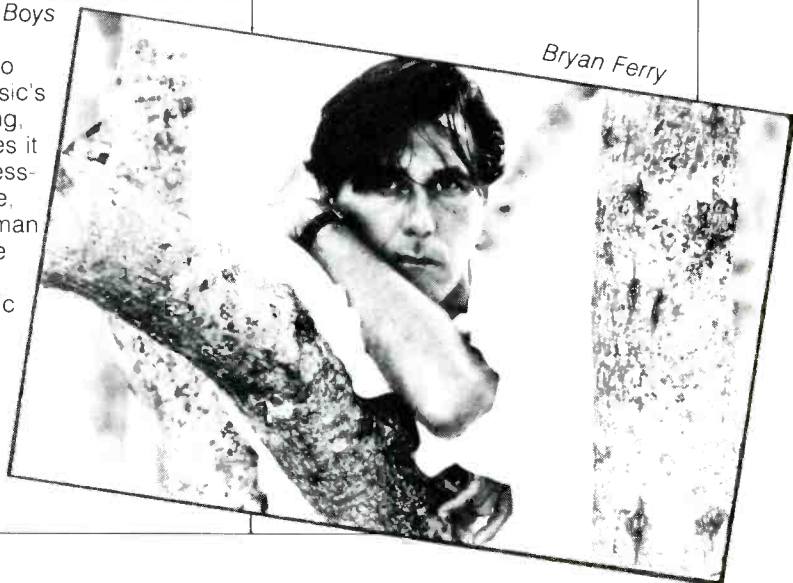
With his GQ looks, Ferry has, from his first appearance, been one of the sexiest, most charismatic men in rock. *Boys and Girls* can only enhance his stature. It is his best solo album, and one of the best he has ever been involved in. Highly recommended.

Michael Tearson

Boys and Girls: Bryan Ferry
Warner Bros./EG 25082-1, \$8.98.

Sound: B Performance: A-

Bryan Ferry's *Boys and Girls* mines territory similar to that of Roxy Music's studio swan song, *Avalon*, and does it almost as successfully. The urbane, smooth Englishman still makes some of the coolest passionate music being made. Clearly he has taken his time to ensure the quality of *Boys and Girls* as adult entertainment.



Bryan Ferry

Brothers in Arms is a lovely, elegant work, with strong melodies and performances as solid as anyone could hope.



Dire Straits

Brothers in Arms: Dire Straits
Warner Bros. 25264-1, digital, \$8.98.

Sound: B Performance: A

Brothers in Arms, the first studio album from Dire Straits since 1982, is a lovely, elegant album. Mark Knopfler, head Strait, still writes cinematic tableaux for songs, usually from viewpoints not his own. "Money for Nothing," for instance, is sung by a kid watching MTV and thinking out loud about what a neat and easy way of life it is to be playing in those videos with all those gorgeous babes hanging all over you. Sting, of The Police, cameos here, chanting, "I want my MTV." Conversely, "Walk of Life" is about an aging rocker who never made it big and still plugs away in the bars, a rock 'n' roll version of the "Sultans of Swing" concept. "So Far Away" is about being on the road far from family and loved ones. All these songs are from side one of *Brothers in Arms*, and quite clearly a unifying thread connects them. Knopfler has constructed a song cycle here about the reality of the rock 'n' roll life.

Side two is also bound by a theme. Here it is the toll of war on men, one by one. "Ride Across the River" is about a young soldier just going off to fight, while "The Man's Too Strong" is sung by a war criminal nearing death and looking back at what he has done. The title song, which closes the album, is a sermon that sums up the side's message about the sheer futility of war.

Throughout, Knopfler's melodies are strong. Like his music for the soundtrack of *Local Hero*, some of it sounds hundreds of years old, notably the title track and "The Man's Too Strong."

Performance is as solid as anyone

could hope. Not a note is wasted or out of line.

It is a genuine team effort. Best of all, repeated listenings only deepen the experience of

Brothers in Arms. I must give special mention to Mark

Knopfler's guitar playing, which only gets better on each album, and to Alan Clark for the lovely synthesizer effects he generates, including thunder and crickets.

The recording quality here is stunning. Digital from start to finish, from raw tracks to mixing, the sound is as clear as it can be. Only the availability of Compact Disc keeps my grade as low as it is, for the album really sounds beautiful. I can't find anything to quibble with—and I've tried.

Speaking about the CD version, I must note that there is about 8½ minutes more music on the CD, as all but one of the album's side-one songs are presented in extended versions. The short version is still a generous 47-minute program.

I find no reason to pussyfoot here. Writing as I am at the year's midpoint, Dire Straits' *Brothers in Arms* already holds a firm spot on my list of best records of 1985. *Michael Tearson*

Songs from the Big Chair: Tears for Fears

Mercury 821 300-1 M-1, \$8.98.

Sound: B Performance: B-

Tears for Fears has taken 2½ years to make their second album, but they've done well. *Songs from the Big Chair* is a pretty classy piece of work, highlighted by the English and American hit, "Everybody Wants to Rule the World," and the Canadian No. 1, "Shout," which has nothing to do with The Isley Brothers' oldie.

TFF makes fashionable, smart, decidedly modern music with catchy melodies calculated to bounce around your brain as you go about your day. Good, lightweight stuff.

Chris Hughes' production is sparkly and the sound really shines, from the tinkling bells at the beginning of "Shout" to the strong drums and guitars of "Everybody Wants to Rule the World" and the rhythmic, pounding "Mothers Talk." A high standard is quickly set. The stereo is excellent—*Big Chair* is a great album for headphones. Here is a case where the production makes the album come alive and gets more than I would have thought from these songs.

With their modern, danceable sound, it is obvious that Tears for Fears works to a formula. The key is that *they* work it, rather than the reverse. This allows them to rise above the usual sludge in the pile. *Michael Tearson*

Behind the Sun: Eric Clapton
Duck/Warner Bros. 25166-1, \$8.98.

Sound: C- Performance: C

Behind the Sun is a warm, friendly album, not nearly as fiery or bluesy as last year's *Money and Cigarettes*.

It is not easy to pick standout tracks because the music flows by very smoothly, with less impact than I had expected. It is better as background sound than for hard, up-close listening. Still, the album's first single, "Forever Man," one of three Jerry Williams songs included, is catchy and hummable. The ballad "Never Make You Cry," with its lovely guitar synthesizer solo by Clapton, is very sweet, an achingly



Tears for Fears



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Wall Matthews' album does not have the whip-sharp snap of digital sound, but it does have a roundness that is very pleasing.

pretty song. Eric shows his authority when he finally does some blues on "Same Old Blues," but the track goes on for a minute or two too long. He covers "Knock on Wood" nicely, but it doesn't quite catch fire; it holds to the original Eddie Floyd arrangement very carefully and never cuts loose.

Album production is split between Ted Templeman and Lenny Waronker (three tracks, including "Forever Man") and Phil Collins (eight tracks). There is surprisingly little difference in style between producers, but I do have some trouble with what Collins did with the drums on his tracks. Here they sound

somehow disembodied from the rest of the arrangement, as if they were grafted on separately. In addition, Collins seems to have been trying for a modern drum sound, which is not necessarily all that appropriate. The pieces don't always fall together.

Still, *Behind the Sun* makes fine, easy listening; it works best when you're not paying attention to it. I was sort of hoping for a bit more than that.

Michael Tearson

What has four motors, three heads...and three brains?

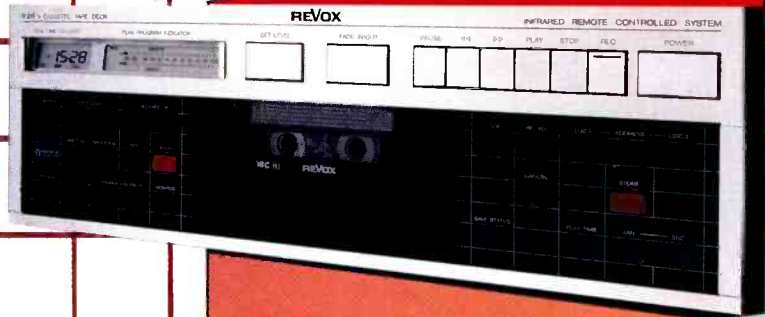
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Solo Piano and Guitar: Wall Matthews
Clean Cuts CC 708, \$8.98. (Available for \$10 from Clean Cuts, Box 16264, Roland Park Station, Baltimore, Md. 21210.)

Sound: B Performance: B+

Wall Matthews' album is uncommonly rich in melody for a collection of solo compositions. His material fits nicely into the Windham Hill ballpark, with warmth as its strong suit. This warmth is mirrored by the sound. While it doesn't have the whip-sharp snap of digital sound, it does achieve a roundness that is very pleasing—a nice, woody sound.

The sides fly by too rapidly, they are that pleasant. A highlight is Matthews' rendition of "Across the Universe," which brings nuances out of the melody I hadn't previously realized were there. This is a winning, winsome album.

Michael Tearson

Katrina and The Waves
Capitol ST-12400, \$8.98.

Sound: B Performance: B

Katrina and The Waves is a Southern California band that apparently went to England to record this album. Their music is bright and summery, fun without frills, and their songs are sharp and well defined with the strength of simplicity. They sound to me something like Tom Petty and The Heartbreakers with a girl singer out front—in this case, Katrina Leskanich, who has a fine, full-throated voice and delivery.

The strong suit of this record is how well it captures the youth and exuberance of the band. It has a bright sound, with an aggressiveness that kept bringing smiles to my face. Katrina and The Waves sound like a winner to me.

Michael Tearson

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CREAM OF WHEAT



Illustration: Rick Tulka

Turning Point: Buckwheat Zydeco
Rounder 2045, \$8.98.

Sound: B Performance: B+

In contemporary music, it's difficult enough to take any accordion player seriously, but it's twice as hard when that cumbersome instrument is wielded by a black, French-speaking rhythm-and-bluesman known as Buckwheat Zydeco. Maybe it's the album's cover photo of Buckwheat straining to keep his back straight under the burden of his accordion, or maybe it's the oversized crown on his head, but this album looks like the product of a satirist rather than of a creative musician—until you hear it.

Buckwheat Zydeco (born Stanley Dural) is in the forefront of the new generation of zydeco players who've followed in the wake of Clifton Chenier's success. Zydeco, the secret ingredient at dances throughout the Gulf Coast, is the winning offspring of the marriage of Cajun music and R&B.

At its best, *Turning Point* is a throw-back to the glory days of Stax Records' crack studio rhythm section. The heart of this album isn't melodies but rather rhythmic licks: A groove is set, and the six-piece band pounces on it with a

vengeance, the drummer crazily flailing away until the track seems ready to explode. At the center stands Buckwheat and his accordion. His instrument cries out to the heavens to let loose thunder, and each time the muscular rhythm section responds with a burst that nearly obliterates the beat.

This sort of dynamics may leave listeners breathless, but it has little to do with zydeco. In fact, the few traditionally styled tracks on this album seem more a nod to Buckwheat's past than a part of his future.

What has influenced Buckwheat on accordion and organ can be traced to the regionally successful funk band he fronted in the '70s, which featured as many as five singers and 16 musicians. Buckwheat turned to zydeco, the sound of his youth, only after a stint backing Clifton Chenier alerted him to renewed interest in the music. Being younger than other zydeco stars, however, Buckwheat filtered the music through his own history to bring it to a new generation.

Buckwheat (his childhood nickname stems from the Little Rascals character) is here to stay, and with any luck *Turning Point* should be just that in his promising career. Roy Greenberg

High Compression: James Cotton
Alligator AL 4737, \$8.98. (Available from Alligator Records, Box 60234, Chicago, Ill. 60660.)

Sound: B Performance: B+

Harp player James Cotton is the rarest species of bluesman: A traditionalist with impeccable credentials who has won an audience composed as much of rock fans as blues lovers. That kind of broad appeal usually has its price; in this case it meant Cotton gradually distanced himself from his blues constituency by releasing albums that emphasized urban funk rhythms over his own roots.

When the major record labels abandoned the blues, Cotton disappeared from the limelight along with his contemporaries. Now he's back with *High Compression*, an attempt to please all of his fans through an expedient as simple as it is satisfactory: Half of this disc features Cotton leading his regular funk-style band, but the other puts him in charge of a potent Chicago blues quintet.

Cotton has few rivals as a blues harpist, and none can boast his background: An apprenticeship as a teenager with harp wizard Sonny Boy Williamson, a stint with the great Howlin' Wolf, and a 12-year stretch with a quintessential Chicago blues band led by Muddy Waters in the late '50s and

James Cotton



Stevie Ray Vaughan
and Lonnie Mack



Strike Like Lightning is an authentic, no-bull workout of an album, with excellent guitar sound at its center.

early '60s. On the blues cuts, Cotton is joined by guitarist Magic Slim (outstanding work on "Sunny Road") and fellow Waters band alumnus Pinetop Perkins on piano. Cotton breaks little new ground on these tracks, quoting from seminal harp man Little Walter Jacobs and others. Yet Cotton plays

with such authority and demonstrates such intimacy with his material that these tracks are surprisingly fresh and very pleasing. His harp work is never less than commanding and often a model of restraint.

The funk cuts have been toned down from Cotton's similar work for Buddah Records, and aren't the least bit jarring alongside the blues tracks. In fact, they seem more an extension of modern electric blues than a purely commercial concession to changing tastes.

If this album isn't overwhelming, it's a strong, carefully produced example of a first-rate harp man in his prime. In these days when bluesmen can't get record deals, let alone radio play, that's a notable achievement.

Roy Greenberg

Strike Like Lightning: Lonnie Mack **Alligator AL 4739**, \$8.98. (Available from Alligator Records, Box 60234, Chicago, Ill. 60660.)

Sound: B Performance: A-

If you like blues guitar and solid songs to go with it, be sure to get *Strike Like Lightning*, the first new Lonnie Mack album in eight years. The first clue that this is a winner is the line crediting Stevie Ray Vaughan as producer. That signals an authentic, no-bull workout of an album. It does not disappoint.

Recording in Austin, Texas, Stevie assembled a sympathetic band of players who join him in his admiration of Lonnie's stinging guitar sound and his gutsy singing. The band includes bassist Tim Drummond, who has played on most of Lonnie's records for a 20-year stretch, Lonnie's brother Bill McIntosh alternating with Stevie Ray on second guitar, Stan Szelest on piano and organ, and Dennis O'Neal and engineer Gene Lawson splitting the drumming. On *Strike Like Lightning*, each of the band members plays lean and tough at every turn.

The recording is really lively, with a good sense of studio ambience. Naturally the centerpiece is the guitar sound, and that is excellent.

Strike Like Lightning is one very solid album that clearly conveys the atmosphere of friendliness and respect in which the recording was made.

Michael Tearson

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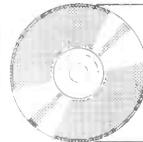
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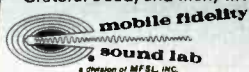
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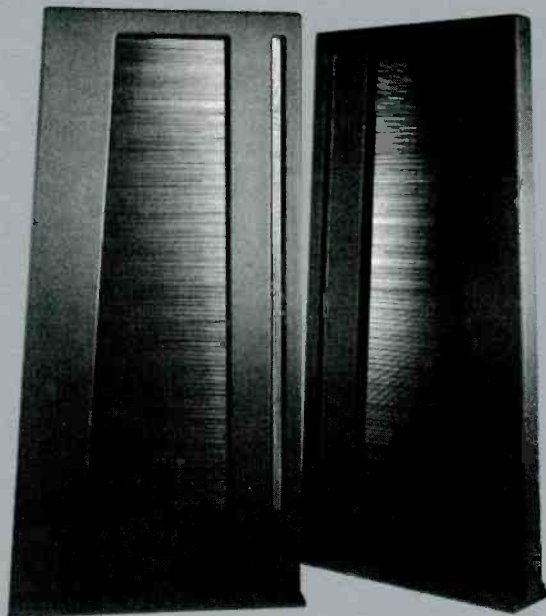
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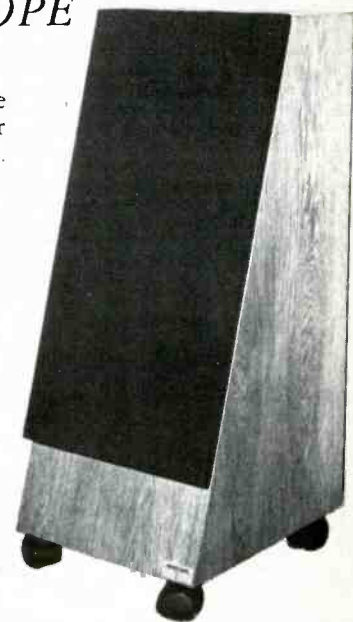
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