


Audio

Scenes—
Consumer
Electronics Show

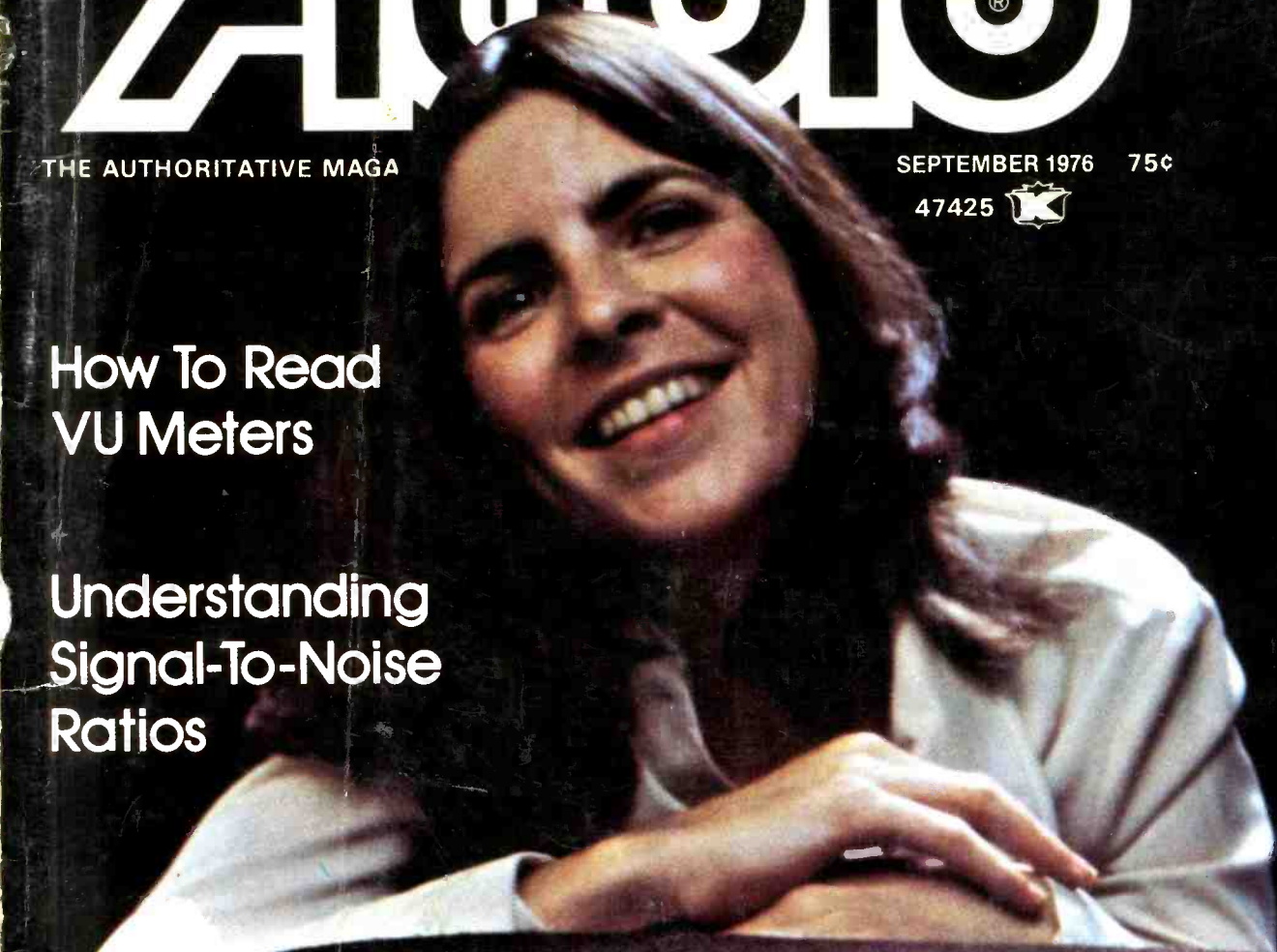
THE AUTHORITATIVE MAGAZINE

SEPTEMBER 1976 75¢

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Understanding
Signal-To-Noise
Ratios



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now own the direct-drive PL-510.



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Pioneer has
conquered the one
big problem of
high-priced
turntables.



The best way to judge the new Pioneer PL-510 turntable is to pretend it costs about \$100 more. Then see for yourself if it's worth that kind of money.

First, note the precision-machined look and feel of the PL-510.

The massive, die-cast, aluminum-alloy platter gives an immediate impression of quality. The strobe marks on the rim tell you that you don't have to worry about perfect accuracy of speed. The tone arm is made like a scientific instrument and seems to have practically no mass when you lift it off the arm rest. The controls are a sensuous delight to touch and are functionally grouped for one-handed operation.

But the most expensive feature of the PL-510 is hidden under the platter. Direct drive. With a brushless DC servo-controlled motor. The same as in the costliest turntables.

That's why the rumble level is down to -60 dB by the JIS standard. (This is considerably more stringent than the more commonly used DIN "B" standard, which would yield an even more impressive figure.) And that's why the wow and flutter remain below 0.03%. You can't get performance like that with idler

drive or even belt drive. The PL-510 is truly the inaudible component a turntable should be.

Vibrations due to external causes, such as heavy footsteps, are completely damped out by the PL-510's double-floating suspension. The base floats on rubber insulators inside the four feet. And the

turntable chassis floats on springs suspended from the top panel of the base. Stylus hopping and tone arm skittering become virtually impossible. (Even the turntable mat is made of a special vibration-absorbing material.)

But if all this won't persuade you to buy a high-priced turntable, even without the high price, Pioneer has three other new models for even less.

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None of these has a rumble level above -50 dB (JIS). None of them has more wow and flutter than 0.07%.

So it seems that Pioneer has also conquered the one big problem of low-priced turntables.

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Turntable:

- Direct drive
- Brushless DC servo-controlled motor
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3. It sounds better than preamps costing up to twice as much, so some dealers are afraid of it.



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Audio

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Publisher Jay L. Butler

About the cover: Two very important performance indicators on cassette and cartridge machines, the signal-to-noise ratio and the VU meters, sometimes have "soft" parameters to the neophyte. We thought therefore that a soft-sculpture cassette machine would illustrate this idea nicely. Sculpture: Mary Ellen Hubbard; model, Ann Baker.

AUDIO (title registered U.S. Pat. Off.) is published monthly by North American Publishing Co., Irvin J. Borowsky, President; Frank Nemeyer, and Jay L. Butler, Vice Presidents; R. Kenneth Baxter, Vice President/Production, Vic Brody, Promotion Director; Mary Claffey, Circulation Director.

RATES—United States only: 1 year for \$7.00, 2 years for \$12.00; 3 years for \$17.00; outside the U.S.: 1 year for \$9.00, 2 years for \$16.00, and 3 years for \$23.00. Printed in U.S.A. at Columbus, Ohio. All rights reserved. Entire contents copyrighted 1976 by North American Publishing Co. Second class postage paid at Philadelphia, Pa. and additional mailing office. Back issues, \$2.00 each. **World Library Congress Number:** ISSN 0004-752X. **Dewey Decimal Number:** 621.381 or 778.5.

REGIONAL SALES OFFICES: Jay L. Butler, Publisher and Sanford L. Cahn, Marketing Director, 545 Madison Ave., New York, N.Y. 10022, telephone (212) 371-4100.

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REPRESENTATIVES: Europe, V. B. Sanders, International Publishers Advertising Service, Raadhuisstraat 24, P.O. Box 25, Graft-de-Ryp, Holland; telephone, 02997-1303; telegrams, Euradteam—Amsterdam.

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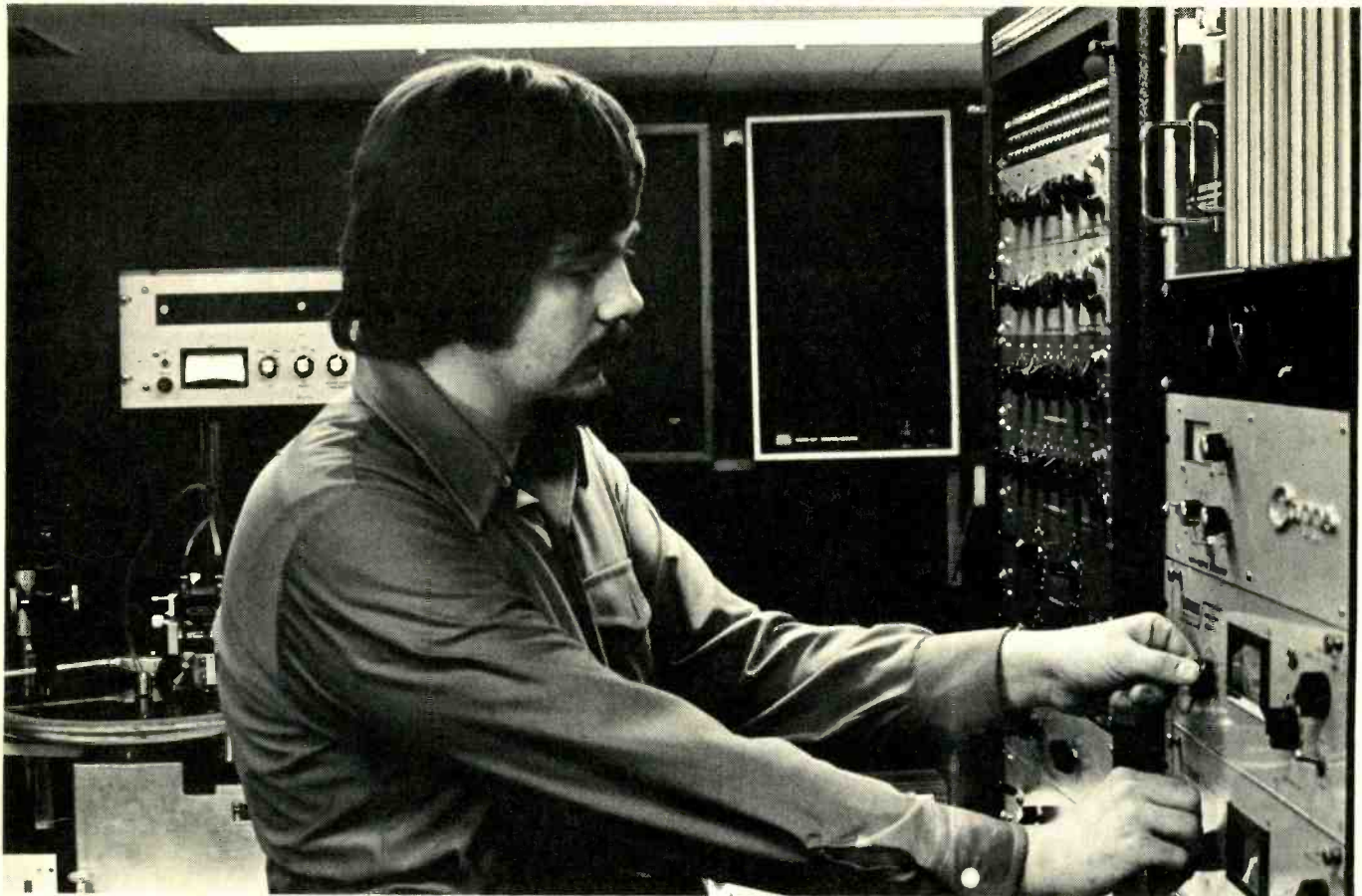
Japan: Japan Printing News Co., Ltd., No. 13-2 Chome Ginza Higasi, Chuo-ku, Tokyo, telephone 541-5795.



AUDIO Editorial and Publishing Offices,
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Postmaster: Send Form 3579 to the above address.



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“Carl Rowatti, Chief Engineer, adjusting the Program limiters prior to cutting a master lacquer”.

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They make test cuts and play them back, using the Triple-E for reference, as high as 15 kHz all the way down to 30 Hz. Carl Rowatti says “We use the Stanton Calibrated 681 series as our total point of reference in our disc master-

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Lou Rowatti inspects a master lacquer, Adrienne checks the lathe.



Carl Rowatti adjusts the pitch computer on the mastering lathe.



Carl installs the Stanton Calibrated 681 Triple-E on the playback table.



Lou Rowatti (The Prez) adjusting the high frequency limiter in his cutting room.

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Audioclinic

Joseph Giovanelli

Phonograph Cartridges and Cable Capacitance

Q. Some cartridges appear to be particularly sensitive to the amount of shunt capacitance into which they are connected. I am using a Shure V-15 III, which requires "400-500 pF total capacitance per channel" for optimum results. I understand that this total is made up of the capacitance within the arm and interconnecting cables, as well as that in the preamp circuitry. I know that the value of capacitance for my AR arm and connecting cables is 145 pF per channel.

Is there a way by which I can determine the shunt capacitance my preamplifier presents to the cartridge utilizing either a VOM or a VTVM? I have no other test equipment.—Dr. Leonard Drasin, Liberty, N. Y.

A. With the test equipment you have on hand, there is no way I can think of whereby you can determine the amount of capacitance in the phonograph input section of your preamplifier. This capacitance value will be only a few pF at most, however, and, for your purposes, can be ignored. You can consider the capacitance of the leads within your tonearm and that of the interconnecting cables to be the total amount of capacitance your cartridge "sees."

The additional capacitance needed in your case—using your figures—will be about 250 pF per channel. This will provide you with 400 pF. This additional amount of capacitance can be added by obtaining the correct capacitors and soldering them into the preamplifier. One capacitor will be required for each channel. It is wired between the "hot" and ground terminals of the phono input connector.

An alternative solution is to obtain a small metal box. Mount appropriate input and output connectors on it, so arranged that the box can be connected between the preamplifier input and the phono cables. Such a device will eliminate the need to make internal modifications to your equipment.

The input and output connectors on the box are wired "straight-

through," so that when the box is added, the phonograph will operate as before. The next step is to wire the appropriate capacitor values between the "hot" and ground terminals of the input connector—just as was done for the preamplifier.

The use of this little box will probably require the use of some additional cable, which will have capacitance of its own and which must be taken into account when calculating the values to be wired into the box.

Tuning Accuracy of FM Receivers

Q. A tuner whose frequency is determined by a crystal-controlled oscillator is precisely tuned to the desired frequency. This is fine, but is it not possible that the desired station is not broadcasting precisely on its assigned frequency? Can an FM station control its broadcast frequency accurately enough to match the frequencies tuned in by a crystal-controlled oscillator? If there is an error in the broadcast station's frequency, it follows that a receiver tuned with more conventional means but equipped with an accurate tuning meter can be adjusted more accurately than a crystal-controlled tuner. Is this correct?—Dr. Leonard Drasin, Liberty, N. Y.

A. An FM station must broadcast on its assigned frequency with an extremely high degree of accuracy. Therefore, any crystal-controlled tuner whose crystals are properly trimmed and whose i.f. and detector systems are properly centered, must be properly tuned. In any case, slight inaccuracies of tuning cannot be normally detected, especially with today's wide-band detectors.

Even a tuning meter will have a certain amount of offset, in that it is not a completely accurate device—right down to the cycle. Fortunately, such accuracy is not required. **A**

If you have a problem or question on audio, write to Mr. Joseph Giovanelli, at AUDIO, 401 North Broad Street, Philadelphia, Pa. 19108. All letters are answered. Please enclose a stamped, self-addressed envelope.

AUDIO • SEPTEMBER, 1976



4

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Tape guide

Herman Burstein

Deck Specs

Q. I am planning to buy a Sony tape deck but have some apprehension because its signal-to-noise ratio is specified as only 50 dB. I would appreciate any information you can supply.—B. Greenberg, Manlius, N.Y.

A. If the S/N of a tape recorder is 50 dB based on 1 per cent harmonic distortion, this implies that the ratio is in the range of 56-58 dB at 3 per cent harmonic distortion, which is quite good. I don't know whether the Sony's 50 dB spec is based on 1 or 3 per cent distortion. If on 1 per cent, then it would appear to be a good performer in terms of S/N.

Rebiasing

Q. (1) I have two Sony two-head tape recorders. Using low-noise tape, the treble seems overly bright. I've been told that two-head machines are very difficult to rebias. Can they be rebiased? If so, how? (2) What is cupped tape? (3) If a 7-inch reel of 1-1/2 mil tape holds 1,200 feet, wouldn't the double-play tape be 3/4 mil rather than 1/2 mil?—David Rowland, Geneva, N.Y.

A. (1) Two-head machines can be rebiased, although the procedure is more tedious than in the case of a 3-head machine. Using the latter, the tape can be monitored as it is recorded, so that the result of bias (and other) adjustments can be immediately checked. With a 2-head machine, it is necessary to change bias, record audio signals, rewind the tape, and check the result of the bias change in playback. If the result is not satisfactory (flat response being desired), one has to go through the foregoing procedure several times until it is accomplished. When shifting from conventional to low-noise tape, an increase in bias is required; otherwise treble is exaggerated.

(2) Cupped tape has a curl in the long direction. If laid on a flat surface, the tape does not lie flat but is U-shaped.

(3) The terms 1-1/2 mil, 1 mil, and 1/2 mil as applied to tape refer to the thickness of the base of the tape. Adding the thickness of the magnetic

coating, the so-called 1-1/2 mil tape has a total thickness of about 2 mils, while the total thickness of so-called 1/2 mil tape is about 1 mil.

Tape Hiss

Q. I have an Ampex tape deck and have the following three problems:

(1) When the machine is on but the tape is stationary and the tape monitor switch is depressed, there is a noticeable hissing sound. The hiss increases when the tape is moving and decreases somewhat when the tape equalization switch is set to 7-1/2 ips rather than 3-3/4 ips. How can this noise be eliminated? (2) When the tape is running, the deck makes a sound much like a fan, which is quite distracting and drowns out low volume passages of music. (3) When I record using microphones, the playback sound has very heavy bass.—Garry Ballek, Chicago, Ill.

A. (1) It appears that the playback hiss is due to the playback amplifier in the tape deck. If the tape hiss, which comes up when the tape is moving, appreciably increases the total hiss, this suggests that the electronic hiss is at a reasonably low level and will be swamped by the audio signal and tape hiss. If the total hiss in playback is substantial, this suggests that you are recording at too low a level or playing back at an exaggeratedly loud level. To reduce electronic hiss would require redesign and/or use of a noise-reduction unit such as the Dolby B. Perhaps some improvement can be achieved by introducing low noise resistors in the first stage of the playback amplifier. (2) Consult Ampex about a suitable method of reducing mechanical noise. Perhaps seating the deck on a soft pad might help (but be careful not to block any air passage required beneath the deck in order to afford ventilation). (3) The heavy bass response may be due to the particular microphones you are using, or the way you use them. The proximity effect of bass accentuation occurs if you are too close to the mikes. Perhaps you don't have the mikes directly facing you, so that they don't pick up

enough high frequencies. There may be a fault in your method of connecting the mikes to the deck; a long length of cable when using high impedance microphones will attenuate treble, causing a bassy effect. There may be a fault in the input circuit of your tape deck.

What Bias Frequency?

Q. A question on Tandberg biasing. I understand that bias frequency should be set to about five times the highest audio frequency to be reproduced. Using a cross-field head, the Tandberg 3000X and 5000X decks can reproduce to about 26 kHz, but the bias is only about 85 KHz. Why wasn't a higher bias used? Also, won't the FM multiplex carrier beat with the bias?—Jeffrey Ahl, Ithaca, N.Y.

A. There is very little in the way of audio signal above 15 kHz. So, as a practical matter, Tandberg has probably found that bias frequency raises problems of loss of bias current due to head inductance and winding capacitance. Also, with increasing frequency, bias assumes the properties of a radio wave and gets into places where it isn't wanted. As for the bias beating with the FM multiplex carrier, this is taken care of by filtering out the carrier.

Demagnetizer Warning

Q. My head demagnetizer carries a warning that the demagnetizing poles should not come into contact with the surface to be demagnetized. Is this warning solely due to the damage possible by physical contact or does touching the surface to be demagnetized negate the demagnetization? Can a head demagnetizer be used to degauss a color TV?—Ronald Slakie, Tacoma, Wash.

A. The warning has in mind physical damage. The usual head demagnetizer is too weak for color TV. Δ

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 401 North Broad Street, Philadelphia, Pa. 19108. All letters are answered. Please enclose a stamped, self-addressed envelope.

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Audio etc.

Ralph J. Perk, Mayor, on behalf of the Citizens of Cleveland, invites you to attend the REDEDICATION CEREMONY of the Cleveland Municipal Organ in the Music Hall. . . .

The Mayor, as it turned out, never made it to the big show, but I did. I wanted to hear that organ "live" because it is one of the few left intact of those grand E. M. Skinner Romantic-style organs which once were the pride of many an American city, not to mention such places as the Wanamaker department stores in New York and Philadelphia. Cleveland's huge instrument, with 150 stops, more than 10,000 pipes, made its debut in 1922 to an enormous audience. But,

I had a further motive, as you will guess. I already knew the sound of Michael Murray's organ records on Advent, which have been reviewed in *Audio's* pages. Public radio wanted a tape of Murray's rededication performance; if the sound turned out OK, there might be an LP record, and I could be in on both aspects, live and recorded versions of the very same performance. Could be instructive.

Municipal Music Hall

So I went out to Cleveland and loved every minute of it, especially the Rededication concert itself, which surprisingly drew almost 4,000 people. They sat, stood, and lounged in every

like, say, a super hi-fi recording. And so I went all-out, along with the crowd, for the remarkable sound effects of this ultimate Romantic instrument. Even if the thing was enveloped in a disconcertingly muffled, deadish hall. More of that later.

The Cleveland organ was built in 1921-22. In those days, at the end of the Romantic age and pre-electronic glorification of mechanical ingenuity, the big pipe organ was still King of Instruments, the very embodiment of man's highest skills. Every American city had its Municipal Organ (and Organist), and the bigger the burg, the bigger the organ. Pipes in the thousands, stops in the many hundreds, a sound to bewilder with its variety and stun in its potency. On the very hot September day in 1922 when this organ was dedicated, more than 20,000 Clevelanders turned out—with no air conditioning—to hear Edwin Arthur Kraft put his big new machine through its paces. It was that kind of an age.

But this was only moments before radio, the talking film, and then TV. In a sadly short time, the huge organs were forgotten and fell slowly into decay. Who wanted big noises when little ones could be amplified? Cleveland's managed to hold out, barely, until after the War. But from the 1950s on, it was dead, silent, and unplayable. Luckily, the Music Hall remained intact (probably because of the much larger Public Auditorium in the same building) and so, unlike the other organs which were rebuilt or junked, this one was merely left to rot. Just in time, it has been saved. If the precious tin required could now be gotten for its pipes, which is doubtful, a new duplicate might cost a half million dollars.

Cosmopolitan Comraderie

After New York, that Rededication was so middle-American that I was enchanted. No ordinary concert audience, I guess that most of those people seldom (if ever) had been to a concert. Everybody got there early, and when I arrived, 10 minutes ahead of time, the place was mobbed, and such a roar of good-humored conversation you never heard. It's a big city, Cleveland, but also very much a small



with changing styles, it was gradually forgotten and for years remained silent and decaying. Now, with the ardent help of Michael Murray, young Cleveland organist, plus the Kulas Foundation, the organ has been restored to its authentic sound, and Murray is Cleveland's official Municipal Organist.

available Music Hall space, a happy, cheering, whistling municipal mob (the concert was free), who managed to pry five encores out of Murray. Heartening! Even for me, whose organ heart, I must whisper carefully, really belongs to the Baroque organ. I also thrill to the sound of the Mighty Wurlitzer when the occasion is right,

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Baton Rouge, LA	WFME	102.5	Wednesdays	10 PM	Princeton, NJ	WPRB	103.3	Fridays	11 PM
Baltimore, MD	WTKT	105.7	Mondays	12 MID.	Richmond, VA	WGOE	1590 AM	Sundays	3 PM
Boston, MA*					Rochester, NY	WCMF	96.5	Mondays	10 PM
Chicago, IL	WXFM	105.	Thursdays	11 PM	Sacramento, CA*	KZAP	98.5		
Cleveland, OH	WMMS	100.	Sundays	8 PM	St. Louis, MO*				
Dallas, TX	KZEW	97.9	Sundays	12 MID.	San Bernadino, CA*	KOLA	99.9		
Dayton, OH	WVUD	99.9	Sundays	10 PM	San Diego, CA*				
Denver, CO	KADX	105.1	Saturdays	10 PM	San Francisco, CA*	KYA	93.3		
Detroit, MI*					San Jose, CA*	KOME	98.5		
Erie, PA	WMDI	102.3	Wednesdays	9 PM	Seattle, WA	KYAC	96.5	Mondays	11 PM
Fargo, ND	KIDA	99.9	Saturdays	11 PM	Santa Barbara, CA*	KTYD	99.9		
Fresno, CA*	KFIG	101.1			Santa Maria, CA	KXFM	99.1	Sundays	6 PM
Houston, TX*					Sarasota, FL	WQSR	102.5	Tuesdays	11:30 PM
Los Angeles, CA	KBCA	105.1	Sundays	7 PM	Utica, NY	WOUR	96.9	Wednesdays	11 PM
Miami, FL	KBUS	93.9	Tuesdays	11 PM	Washington, DC	WHFS	102.3	Tuesdays	9 PM
Milwaukee, WI*					Wheeling, WV	WOMP	100.5	Sundays	12 MID.
New York, NY	WRVR	106.7	Saturdays	7 PM	Yankton, SD	KQHU	104.1	Sundays	11 PM

* Consult your local newspaper for time and station.

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town; you'd think everyone knew everybody else. And such a cross-section, from blue jeans to blue blood, babyhood to old age. (I know of one segment of tape that won't appear on the LP. A small child let loose a series of loud wails right in the quietest place of all.) We began with *The Star Spangled Banner* after a series of dedicatory speeches and "please stand up's," to enthusiastic applause—such a booster town! Wayne Mack, local radio announcer, boomed a welcome through the PA, loud enough to knock the walls down. "GLAD TO SEE WE HAVE AN ABSOLUTELY FULL HOUSE!" (Cheers.) Dignitaries sounded off on behalf of the Mayor, and the Kulas Foundation and the Greater Cleveland Growth Assn. (more cheers)—"the little city that has EVERYTHING!" (shouts of joy)—"it might even be the Greatest City the World has Ever Seen" (more applause)—all as nice as applesauce and nobody minded the rhetoric. Good to hear that kind of sentiment again. We can use it.

The shorter, the more agile, is all I can say in this case.

This was indeed a Show, for the organ itself, however, highly bred, is definitely a show instrument for the virtuoso Romantic music which it projects best, by such 19th century masters as César Franck, Widor, Vierne, Karg-Elart, Guilmant, and Murray's own teacher, the famed late Marcel Dupré. I liked this carnival atmosphere because it clearly put aside the too-familiar tradition that organ music means *church*. Church—yes, often enough. But that does not necessarily mean stuffiness, our common mistake. This reviving tradition of the Municipal Organ, you see, has much of the impact of that unchurchlike organ, the Mighty Wurlitzer, but at the same time it stems from an impeccably "classical" tradition going back a century, mostly in France, where the famous Cavallé-Coll originated the Romantic type of organ in the 1830s, an enlarged instrument to parallel and equal the sonic virtuosity of the new Romantic sym-

Mechanical Monster

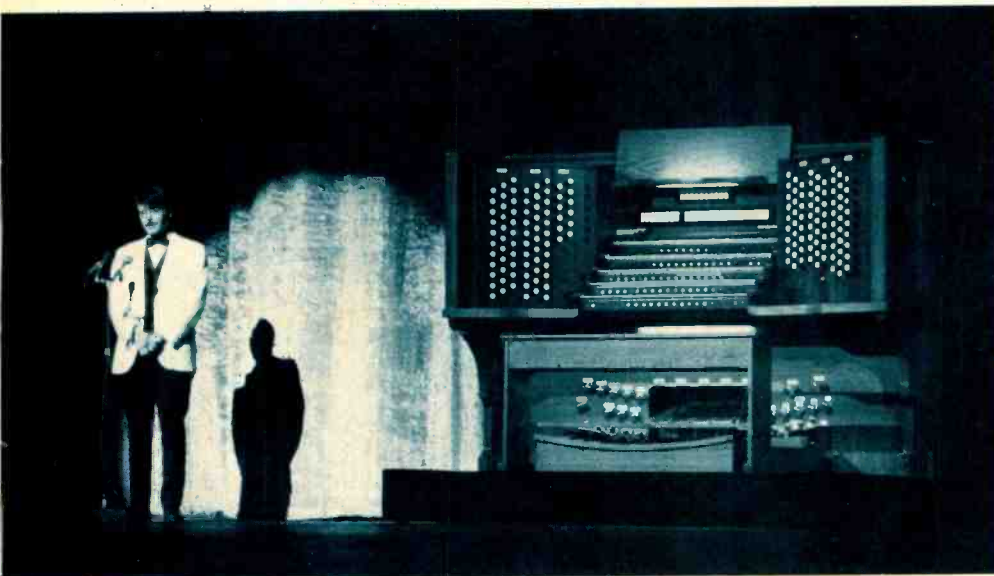
Today, we have electric air pumps. But that imaginative picture that many musicians still cherish of mystical old César Franck playing alone, high up in his Paris organ console, hour after hour, improvising great paens to the Lord, is fine and dandy if you understand that it took five sweating men below, working bellows by hand and by leg, to produce those hours of heavenly sound. That was in the Nineties; the last French organ to convert the air supply to electricity was in Paris as late as the mid-Twenties. Electricity, electro-pneumatic action, the all-electric console, these refinements in truth came after the definitive high point of Romantic organ building, though electricity did bring a final ease and versatility to a type of organ which would and did get along without it.

In fact, the Mighty Wurlitzer was the end-result and all-out extreme product in respect to electrical control; but that's another story. The pure traditional Romantic organ is all pipes, or nearly, and all wind. The Wurlitzers (thanks to electricity) went in for every imaginable and outlandish sound effect that could be operated from a keyboard, including drums, cymbals, chimes, piano, and Heaven alone knows what other delectable items. Classical organists do not approve; Wurlitzer fans definitely do, including myself.

Ancient PA

I must say, there was at least a hint of television showbiz in all this, what with the glad-handing introductions and Michael Murray's own informal remarks through a stage mike and a monster PA system, two huge early Voice of the Theater speakers halfway up each side of the proscenium arch. But again, why not? Let two eras meet, a nostalgia show and a bit of the tube, all in one package. Which proves that organ music can be Fun, a message that is a very important one if we are to restore others of those now-silent monsters.

Murray made one interesting mistake, from the audio viewpoint. He introduced the *piece de resistance* (applause), the Bach *Tocatta and Fugue in D minor*, and forgot to turn off his stage mike. Such a caterwauling of sound, and Murray, stage-rear out of the speaker's range, didn't hear a thing. The right hand speaker was straight in front of me, maybe 40 feet away, and the most hideous squawks of overload blasted forth from that



Then—darkness, a sudden spotlight, and the curtains rolled back to disclose the Great Console at the back of the stage, blindingly lit. Michael Murray, who is a bit over five feet tall, appeared dramatically in a white coat and black pants, followed by more spots as he climbed aboard. You could see his feet under the organ bench, which was good—such agility! That had the audience fascinated, as did the great arrays of knobs, sliders, and pushbuttons on every side, as well as the five big, white keyboards. Fortunately for Murray, the pedals of Skinner organs are laid out in a concave arc so that the end pedals aren't beyond the reach of short legs.

phony orchestra. Bigness—of course, the theme of the 19th century! And inventive ingenuity. A new device called the Barker lever, for instance, made it possible to add stop on stop, simultaneously played from the organist's keyboard, without increasing the mechanical force needed at the keys, the touch. As the power of sound increased, the vital wind supply was built up too, so that the demands of thousands of pipes could be met at the finger's tips. All this, though, was before the age of electricity. The entire development of the Romantic organ was *mechanical*—and don't think that didn't apply to the wind supply.

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		S/N Ratio Weighted in dB	Output @ 3% THD	S/N in dB (re: 3% THD)	THD at 0 dB (%)
TDK	SA	66.5	+4.2	66.0	0.9
AMPEX	20:20+	56.4	+1.9	—	—
FUJI	FX	60.0	+2.3	—	—
MAXELL	UD	—	—	58.5	1.1
MAXELL	UDXL	62.5	+2.7	—	—
NAKAMICHI	EX	60.0	+2.3	55.0	1.1
SCOTCH	CHROME	—	—	64.0	1.3
SCOTCH	CLASSIC	62.5	+2.0	—	—
SONY	FERRICHROME	64.0	+2.1	64.0	1.8

Decks used for tests: Magazine A-Pioneer CT-F9191 (cross-checked on DUAL 901, TEAC 450); Magazine B-NAKAMICHI 1000.

11

Two leading hi-fi magazines working independently tested a wide variety of cassettes. In both tests, TDK SA clearly outperformed the other premium priced cassettes.

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Put these facts and figures together and TDK SA adds up to the State of the Art because it provides greater dynamic range. This means cleaner, clearer, crisper recordings, plain and simple. Sound for sound, there isn't a cassette that can match its vital statistics.

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unlovely source, completely drowning out the organ. My fingers were in my ears in a moment, and if the noise had continued, I would have walked straight out—I cannot endure loud distortion. But a chorus of uninhibited shouts broke in at the end—"TURN OFF THE MIKE! CUT THE PA!" Murray heard and did the deed. I'm wondering whether that PA system also dates from Nostalgia Days. In any case, it is from the time when PA was accomplished via a few large and loud speakers, up-front, instead of the distributed sources and natural low levels we use in the best newer installations, today.

Muffled Music

Muffled? Deadish? Yes, and thereby hangs an interesting tale. As one slightly waspish lady music critic wrote the next day, "Soupy, mushy, and muffled! Oh, that organ!" Technically, she had something. I heard it too. The big organ just did not project its full power and color into the Music Hall. The sound was surprisingly dead, as we heard it. But the reason for this is part and parcel of the very era in which the organ was built, along with the Hall itself.

First, as was the style, the Public Auditorium and Music Hall was one big

building of marble, the two halls sharing a doublet stage in the middle, the Music Hall in the small end, and the much vaster Auditorium the other end. Separating the two halls are fire curtains which can be rolled back to expose both to the in-between stage. The organ had to be mounted on one side, above the big stage area, so that it could be used to play into either hall. Thus, no fancy frontal towers and pinnacles of pipes, and an indirect, 90-degree sound entangled in too many curtains and fly spaces. On the stage itself, the sound is gorgeous. Out in the Music Hall, most especially on the floor, it is underpowered and muffled.

But there is something else. The authorities assured me that the acoustics would soon be improved; the hall, it seems, boasts a large installation of what was the latest miracle of the 1920s, soundproofing, carefully disguised to look like stone, though it sure isn't. This material will not be replaced by more suitable reflective surfaces, to bring out the natural liveness of a well-shaped hall. Ahh—but should it be?

A neat question! For you must understand that this deadened hall sound is just as authentic to its own time, 1922, as is the organ itself. Dead

sonics were a great new discovery. At last, the blur and confusion that had hampered us for centuries in public halls and churches could be eliminated. Now, we had crystal clarity, both for music and for voices! You could hear every last detail. All the new churches and auditoriums of that day got the modern sound treatment, though it was always disguised as stone or wood work.

"Stone" Soundproofing


Well, the fake-stone soundproofing is architecturally authentic. And we in audio know that, in truth, the preferred sonics of many early electrical recordings now seem to us remarkably dead. It was the style—remember Toscanini's famed studio 8H at NBC? As nearly an anechoic chamber as any large studio has ever been and absolutely lethal for music! However, in 1937, they didn't think so. They even contrived to make Carnegie Hall and Symphony Hall in Boston sound much deader than on our present recordings in the same places.

On the other hand, the Cleveland organ itself is the culmination of a great school of organ building, the late American arm of a European tradition which took for granted the acoustic delay systems of the old-world cathedrals and buildings. The organs themselves and the music composed for them assumed a large reverberation as normal.

From this viewpoint, you see, the 1922 Cleveland soundproofing was a momentary aberration from traditions that go back centuries. Therefore—go ahead and rip out the stuff, so that the sonic truth may be heard! After all, in architecture it's looks that count, not sound. (Now, I suppose, the stone-work will be reflective plastic.)

P.S. I got to hear the stereo tape of that concert the very next day. Superb! Astonishingly, there was all that vast sonic power and the spacious reverberation which was missing in the live performance. How come?

Recording versatility! The stereo mikes were placed up on the stage opposite the sidewise organ. *Within that stage area*, plenty big in itself, there is a remarkably fine reverb. And all the sonic power the organ can produce was picked up.

So, fittingly enough, it was the recorded sound of the organ which in the end gave me a true idea of what E. M. Skinner's fine instrument could do. How's that for a commentary on our art? Keep an eye and an ear out for the record, maybe some time next year. 

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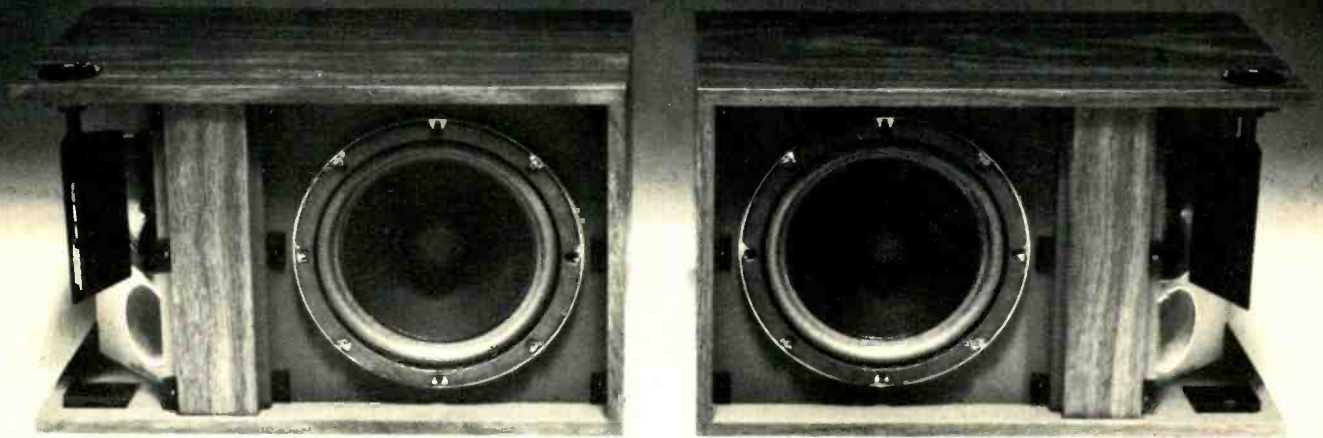
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AUDIO • SEPTEMBER, 1976

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Odd Couple.



This is a pair of Bose Model 301 Direct/Reflecting® bookshelf speakers with their grilles removed.

What's odd about them might not be immediately obvious, but it's very significant. Unlike most pairs of speakers, they're not identical. Instead, the left-hand speaker is a mirror image of the right-hand speaker.

Bose goes to the extra trouble and expense of making the two speakers of the pair you buy different to provide the proper proportion of reflected and direct sound at high frequencies, a feature unique among bookshelf speakers.

To accomplish this, each speaker is of an "asymmetrical"

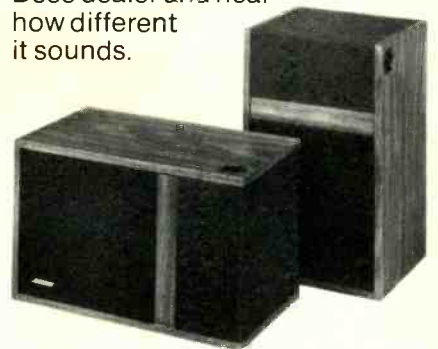
design. As a result, a pair of Model 301s has woofers pointing straight ahead and tweeters angled outward. A large proportion of the high frequency energy is reflected off the side walls and then into the center of the listening room, rather than being aimed directly at the listener. As in a live performance, the listener is surrounded with a balance of reflected and direct sound. This is the same principle used in the Bose 501 and in the legendary Bose 901® Direct/Reflecting speaker system. The result is extraordinarily open, natural, and spacious sound.

In addition, the Model 301 Dual Frequency Crossover™ network causes the woofer and tweeter to operate simultaneously for more than an octave, providing exceptionally smooth midrange response and an open spatial quality.

With the unique Direct Energy Control, the Model 301 provides excellent performance in a wide variety of rooms, including small apartments and dormitory rooms. And it is truly small enough to fit in a bookshelf.

These features make the Model 301 an unusual speaker with unusually fine performance. Its suggested retail price—less than \$100 per speaker—makes it an extraordinary value.

You already know the Model 301 looks different from other bookshelf speakers. Now visit a Bose dealer and hear how different it sounds.

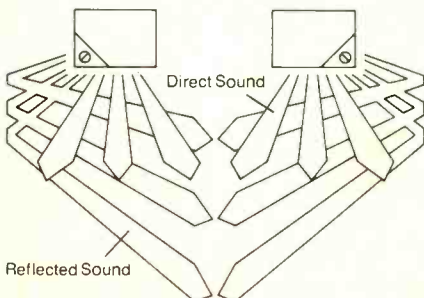


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Dear editor

Stylus Velocity and Making Records

Dear Sir:

I read your June, 1976 issue of *Audio* and would like to clarify the question and answer sequence in "Audio-clinic" referring to measurement specifications for phono cartridges and to add some data to Mr. Cousino's article, "Making Records."

Inasmuch as "stylus velocity" as a concept applies equally well to either a cutting stylus or a playback stylus, I would like to refer to a system of standards in daily use by the disc-cutting profession in the U.S. In the early days of long playing microgroove recording for home consumption, RCA Victor developed a set of record-reproduce frequency response equalization curves known simply as "new orthophonic" recording characteristics. There was, and still is, in the recording mode bass cut and treble boost, with a matching bass boost and treble cut in the reproduce mode.

Since how much bass cut and treble boost had to be specified against a known reference point, 1000 cycles per second was chosen (1 kHz in modern "audio-ese"). Just why 1 kHz was selected is not too important here; the importance lies in the fact that a standard reference frequency was selected and is still adhered to.

RCA Victor recorded, pressed, and distributed a 10-inch "new ortho-

phonic" frequency test record which was designed to assist users in adjusting phonograph record reproducers to the proper response for playing the "New Orthophonic" records. The records commercially released using this scheme of equalization were a big success, and soon other record companies were interested in adopting this scheme. In fact, it was so successful that the whole concept was adopted by the recording industry and is now the famous "RIAA curve."

In 1964, the NAB (National Association of Broadcasters) issued its NAB Test Record, which was the same as the RCA disc with a few important additions, some of which follow.

First, and most important of all the new features, is the statement that the 1 kHz, 0 VU reference level tone is lateral modulation (we're now in the stereo era of 1964) and generates a peak stylus velocity of 7 cm/sec.

Other additions and changes from the original RCA disc have to do with cutting in the stereo mode: Left channel only (channel "A" or "1"), right channel only (channel "B" or "2"), both channels together in phase (lateral modulation or mono), and both channels together with 180° phase reversal (vertical modulation, first used in cylinder phonograph records).

Another feature of this disc is that the overall recorded level is 2 dB higher than the RCA disc, due primar-

ily to improvements in cutterhead technology.

Now, let's return to the first of the new features of the NAB test record—the business about the 7 cm/sec. peak velocity, lateral modulation. An interesting sidelight of this discussion is that there is no mention of any kind of stylus velocity anywhere on either the record jacket or label of the RCA disc. The 0 dB, 1 kHz level is 2 dB lower than the NAB standard and is 5.5 cm/sec. peak velocity and is, of course, pure lateral modulation, having been cut with a mono cutterhead.

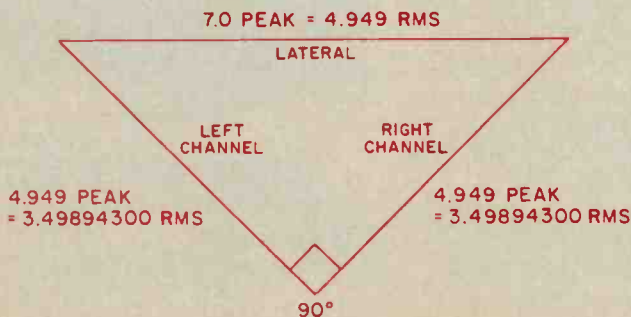
Now, let's look closely at the words and symbols contained in the expression "7 cm/sec. peak velocity, lateral modulation," and analyze the parts of that expression bit-by-bit.

In dealing with the sine wave tests, which both records contain, two terms normally come to mind—"peak" and "rms" (root mean square). The term "peak" or highest has to be self-explanatory, but not all readers know how to calculate rms values. Rms is the product of peak value x 0.707, which when dealing with the 7 cm/sec. peak velocity, lateral modulation, comes out to be 4.949 cm/sec. rms velocity, lateral modulation. This figure is commonly rounded off to 5.0 in most literature.

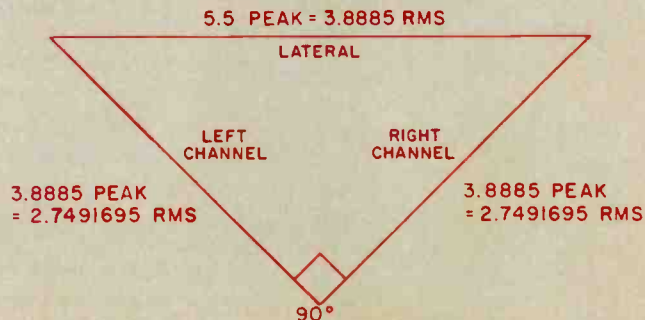
Lateral modulation is mono modulation, parallel to the surface of the

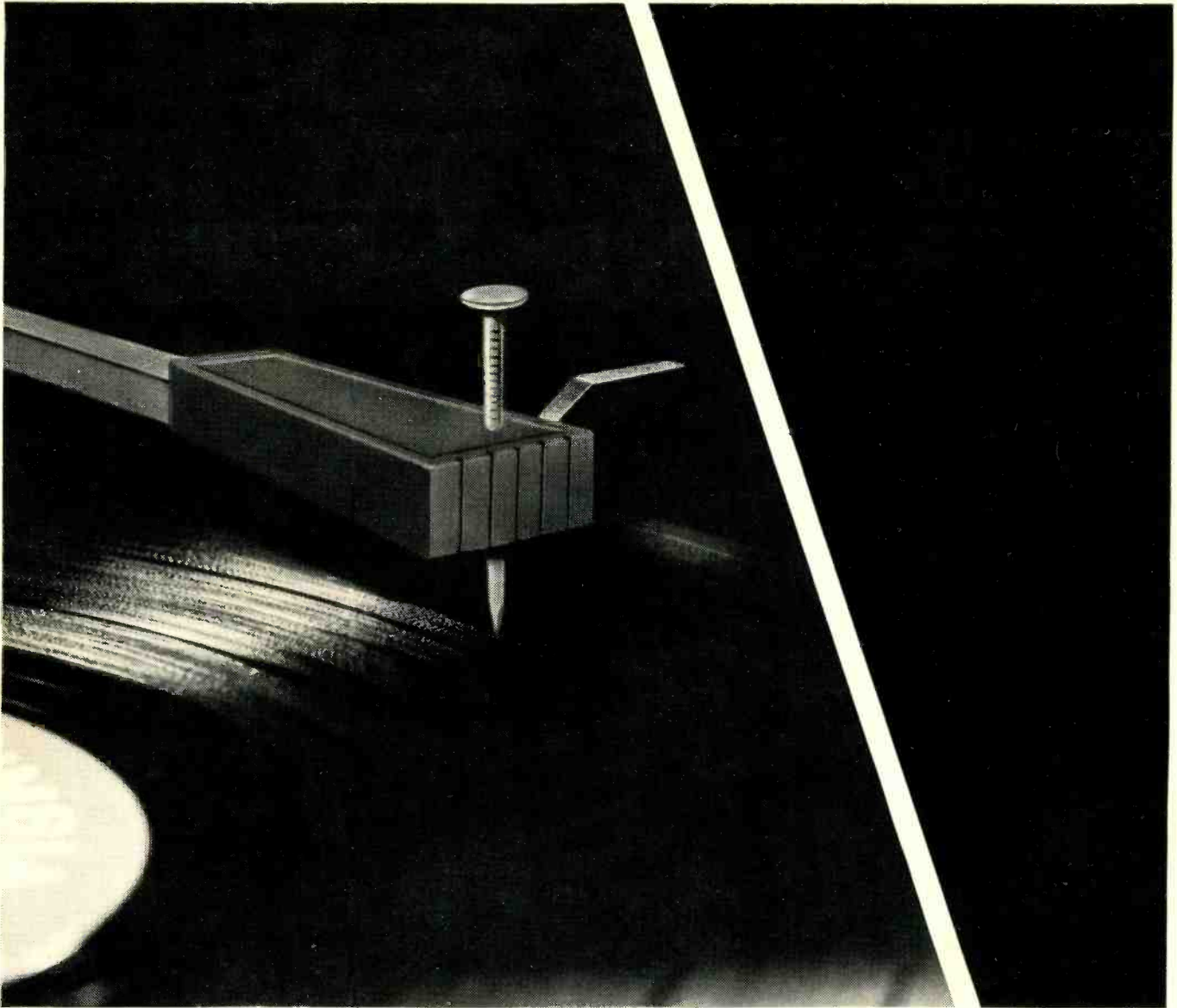
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**NAB 7.0 CM/SEC PEAK VELOCITY STANDARD
"0" REFERENCE LEVEL**



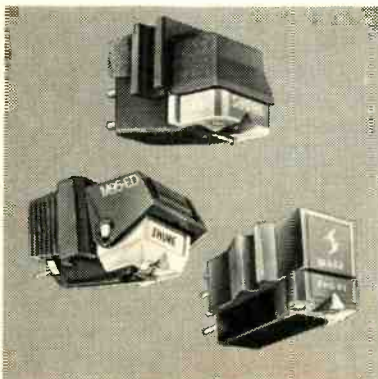
**RCA 5.5 CM/SEC PEAK VELOCITY STANDARD
"0" REFERENCE LEVEL**





15

This is no way to nail down a hi-fi bargain.



Some stores think that one of their cost-cutters in assembling a "bargain" stereo system is to install a run-of-the-mill, inexpensive cartridge. After all, who's going to notice a tiny cartridge when it's surrounded by powerful speakers and a dynamite turntable? Unfortunately, some shoppers are reluctant to insist on a better cartridge when buying one of these package specials. But *you* are made of sterner stuff! And if you insist on a Shure cartridge, "better" doesn't have to mean more expensive. Time and time again, consumer magazines have rated Shure cartridges the best in their price category. As the source of sound for the entire system, that tiny Shure cartridge and its critical stylus determine what you'll ultimately hear. And as bargains go, that's the best tip you'll hear today—or any day!

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record and, as such, indicates that both channels of the cutterhead are driven equally in all respects. Seen in this light, it follows that mono is a special case, with both channels doing the same thing at the same time. Another special case of stereo is the situation when one channel does nothing at all, and the other channel is driven. In the case of the NAB test record, the remaining channel is driven at 0 reference level at 1 kHz. Due to the basic design of stereo cutters and playback cartridges, wherein the two planes of modulation, as well as the two groove walls are at right angles (90°) to each other, it then becomes possible to solve an isosceles right triangle (shades of high-school Geometry!) for either leg, with the hypotenuse equal to 5.0 cm/sec. rms (or 4.949 to be more accurate). Using 4.949, the value equals 3.49894300 cm/sec. rms, usually rounded off to 3.5 cm/sec. rms. This value represents the rms velocity for each channel. If a person chooses to compute the per-channel velocity using an already rounded-off hypotenuse value (rms lateral modulation) of 5.0, instead of the more accurate 4.949, the per-channel velocity is 3.535. At this point, some of the numbers alluded to in the original question in "Audioclinic" begin to look somewhat familiar. In order to more clearly illustrate the values, both rms and peak, there is included here a set of isosceles right triangles, one with RCA values and the other with the NAB values. In today's mastering, the NAB 7 cm/sec. peak velocity, lateral modulation, is the most widely used.

I think one can see from this discussion that a few standards need to be clearly recognized, stated, and adhered to by phono cartridge manufacturers, printers and proofreaders of phono cartridge advertising literature, phono cartridge reviewers, testing facilities, technical writers, and all other of us who influence the thinking and reasoning of the many readers who are searching for a little bit of the truth. I hope that the cartridge "numbers game" of velocity vs. output may now be a bit easier to work with when comparing differing devices.

I would also like to comment on a portion of the article "Making Records" by Ralph Cousino of Capitol Records, appearing under the sub-head "Master Disc." I'm sure he knows the facts, probably better than I, but the wording can lead the reader astray. Quoting R.C. now,—

"Because it will adhere to the lacquer surface, silver is used as

the first agent. On top of the silver goes a thin coating of nickel, deposited by dipping the silver-coated disc into a nickel solution."

While it is necessary that the silver adhere to the lacquer surface, so would peanut butter or motor oil. The primary reason for the silver to be there is to make the lacquer's surface electrically conductive. Without the silver, the nitrocellulose, of which the lacquer is made, would present an insulator in the latter steps in the electroplating.

After being sprayed with the silver solution and being made very conductive, "the lacquer is dipped"—to use R.C.'s wording—"into a nickel-sulphamate solution." The inference to be drawn here is that somehow some of these little "nickels" in the solution walk over and hop onto the silver coating on the lacquer. It just ain't so! The silver becomes uniformly covered with metallic nickel by means of an electroplating process wherein a low, carefully controlled d.c. voltage of opposite polarity is applied to the nickel metal chips present in either cloth or plastic bags a few inches away.

The resulting flow of electrons (amperage) through the nickel-sulphamate electrolyte causes nickel ions to migrate and deposit onto the silver surface of the lacquer. The amperage is closely controlled to minimize the heat buildup at the surface of the lacquer. The first stage of plating is extremely important as too much current, which generates too much heat, can cause all kinds of failures on the lacquer master original. Ticks, pops, groove echo or "ghosting," loss of high frequencies, and total destruction of the lacquer coating on the master are all possibilities caused, at least partially, by inattention or carelessness in the preplating sequences. Because it is such a critical stage in production of the final product, I feel it should not be glossed over too lightly.

Stan Ricker
Chief Engineer,
Disc Mastering,
JVC Cutting Center,
Los Angeles, Calif.

Cheap Shot

Dear Sir:

On your comment to M.J. Martis, I say "cheap shot." He was only pointing out that he does not agree with your reviews, which did not need an explanation of his intelligence, but it does show yours.

I am in complete agreement with this gentleman that artistic style is being oppressed in the record industry, and the "dollar" determines the artists and the critics. As far as I'm concerned you are all commercial whores.

Gary Lahmers
New Philadelphia, O.

Critical Purpose

Dear Sir:

Mr. Martis, you must be reminded that a critic's job is to write down his opinion on how he views a particular record. Certainly his critique of a particular album is not going to condemn it to eternal damnation, nor is it going to boost it to superstardom. He is merely there to give you his opinion, and whether or not you use that opinion to your advantage is up to you. I don't agree with the critics all the time and I don't like the top 40 ideals either, but I'm not cutting off my subscription to *Audio Magazine* over so trivial a complaint.

I personally do not feel that *Audio* limits itself to top 40 records. It covers a wide variety of areas and does it well. One thing that amazes me is that after reading only one issue, you automatically know that the critics are all writers with delusions of grandeur, that the editor is afraid of his readers and certain letters, and that *Audio* is the most narrow-minded magazine published.

I think your letter was totally uncalled for, and I am tired of people complaining about critics doing their jobs. They have a purpose and you don't have to listen to them if you don't want to.

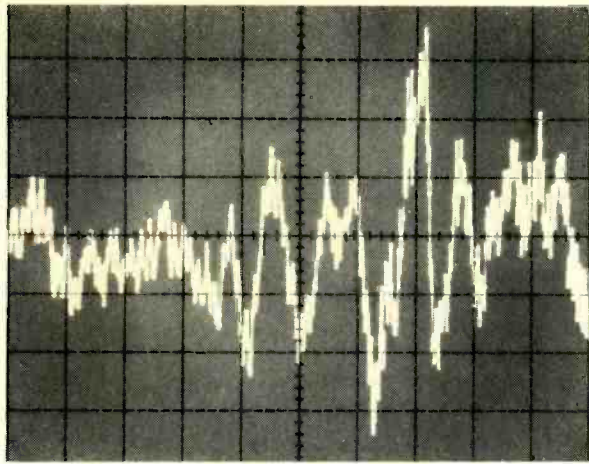
Richard Colvin
Bethel Park, Pa.

Mike Update

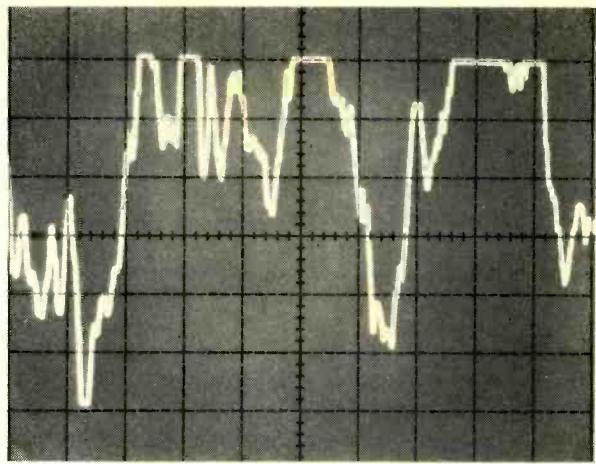
Dear Sir:

The article, "Build A Binaural Mike Set", in the May 1976 issue contains two technical errors. First, the input attenuator in Fig. 3 is a 40 dB pad, not 20 as the article states. The 10 K resistor should be replaced with a 1 K (1000 Ohms) to produce a 20 dB pad.

Also, it is conceivable that some users may have trouble due to the -9 V d.c. output of the unpadding microphones, possibly reverse biasing the input capacitor of their recorders. A series capacitor eliminates this problem and can be used also to roll-off the low end as the author suggests. My diagram below shows the 20 dB attenuator with a 50 Hz roll-off achieved by adding a 3 μ F/15-V ca-



This is an oscilloscope picture of amplifier output showing perfect reproduction of a complex musical passage.



This is a picture of amplifier output for the same sound output level. It shows severe transient response distortion.

This is the same amplifier. The only difference is the B·I·C VENTURITM speaker.

17

That's a fact! The speaker you use with an amplifier will significantly affect the performance of the *amplifier*. Amplifiers can be driven into severe distortion by heavy symphonic passages or the electronic instrumentation of "rock" music, in many instances with the volume control setting turned up only half-way! The flat-topped picture shown above is known as amplifier "clipping", and it results in highly distorted sound similar to speaker "break-up".

Clipping occurs when the power required to drive a loudspeaker leaves insufficient reserve in the amplifier to handle musical peaks that can be as high as 200 times the average program level!

The combination of exceptional sensitivity and high power handling capability of B·I·C VENTURI speaker systems can however, make an amplifier behave as if it has power output many times its actual rating. The result is clearly superior performance. So, whether you

want to get the most out of low and medium power amplifiers, or to make the most of high power amplifiers that can provide very wide musical dynamic range... B·I·C VENTURI is the logical choice.

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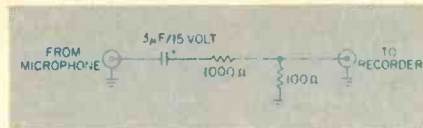
Because their unique Open-Aire[®] design lets you enjoy your music with more comfort and less listener fatigue than any other style of headphone... in fact, it's easy to forget you've got them on.

Your dealer has the new Model HD-400 now. But don't confuse it with imitations or 'look-alikes.'

They may have our great sounding new price tag, but not our great Sennheiser sound.

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pacitor. Delete the capacitor if the roll-off is not desired. The pad will reduce the d.c. level in that case.

Alan Feierstein
New York, N.Y.

Critic's Reply

Dear Sir:

Please don't change your music critics. I usually find myself in total agreement with their reviews.

Perhaps Mr. Martis should consider why young musicians imitate their heroes so often. Almost any Junior High School musician can, given the resources, duplicate their music, even the aura of Crosby, Stills and Nash. As for the top forty ideals, this person is obviously on the outside looking in.

But he's right in the fact that it takes a lot to be a "superstar"; like perfect teeth, symmetrical ears, or conversely,

a readily identifiable costume or 9,000 watts of twelve-bar, three-chord change, heavy metal garbage.

John B. Hamblin
Quartz Hill, Cal.

Burwen System

Dear Sir:

Richard S. Burwen's system (April) has got to be the most fantastic home sound system I've yet seen. Just reading and looking at the article seemed to make my system cringe out of embarrassment—and for some unexplainable reason it just doesn't sound the same anymore.

Just out of curiosity, what is the total dollar value of the whole "thing?" This wasn't mentioned in the article.

C. Engebretsen
Port Reading, N.J.

Editor's Comment: We're sorry that your system doesn't sound the same anymore, and we don't think it's possible to put an accurate dollar value on the Burwen system—let's just say it's expensive.

Circuit Revision

Dear Sir:

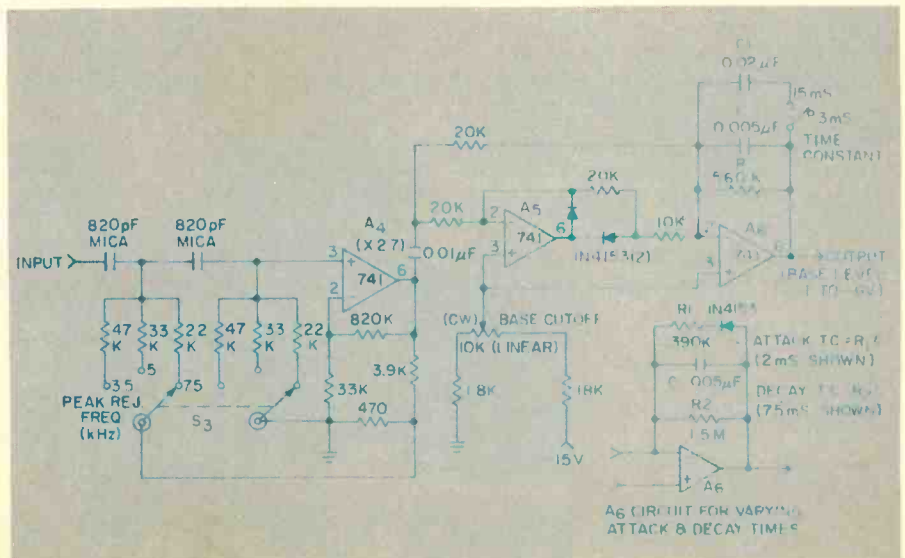
Several readers have called attention to an error in my dynamic noise filter circuit revision (Dear Editor, Sept. 1975). The 470 Ohm and 3.9 K resistors at the output of 4A in Fig. 6 were omitted. These provide the stated closed-loop gain of 2.7 in 4A; without them it will oscillate. The corrected circuit is shown below.

Some had trouble selecting the FET's required for the circuit of Fig. 8 in the original article. For new construction I recommend an inherently matched dual FET, National Semi-

conductor type J410, which should be available at distributors in July at under \$2.00 each. Using my samples of this new FET, I have found the following value changes desirable in the circuit of Fig. 8: R4 = 20 K, R5 = 4.7 K, C1 = .047 µF and C2 = .015 µF.

This filter is under consideration for marketing as a single-channel kit. It effectively boosts the S/N of acoustic records, 78s and tapes by at least 8 dB. I shall be glad to send complete literature, when available, to anyone interested.

Maxwell G. Strange
11710 Wayneridge Ct.
Fulton, Md. 20759



PART TWO: THE END OF THE DOUBLE STANDARD.

In the frequency range where you find most music, our least expensive speaker offers virtually the same flat frequency response and freedom from distortion as our most expensive speaker.

Until recently, you could consider the selection of speakers an act of faith.

Because of the lack of industry standards and the resulting confusion in the marketplace, the speaker buyer had to depend almost totally on personal taste and subjective evaluation.

But no longer.

At Yamaha, before we designed a new line of speakers that would equal the revolutionary standard of our electronic components, we first defined our goal:

High accuracy across the musical spectrum. One of the few objective criteria for rating speaker performance.

Then we proceeded to make all Yamaha speakers to a single revolutionary standard of accuracy:

A frequency response curve that varies by no more than ± 3 dB from 100 Hz to 15,000 Hz. With typically no more than 1% harmonic distortion.

But since the frequency range of all our speakers extends well below 60 Hz to beyond 15,000 Hz, why do we even bother mentioning this figure?

Because, with the exception of the very deepest rumblings of a pipe organ, all music is produced within this range. In fact, few if any commercially available stereo pressings have frequencies below 100 Hz and above 15,000 Hz.

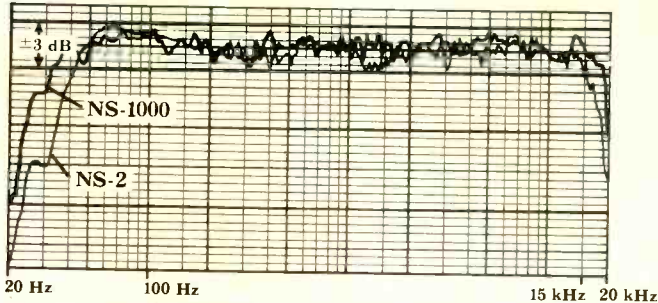
Yamaha's success in achieving a single standard of accuracy in all our speakers is confirmed in the chart above.

Unlike the frequency response curves of other speaker manufacturers which indicate unnatural booming in the bass, added sparkle in the treble, and extreme loudness level variations of as much as 10 dB, Yamaha's frequency response curves show a relatively straight line, which indicates uncolored, natural sound.

Yamaha's musical heritage.

Yet, in spite of Yamaha's objectivity in design, the perception of sound remains subjective.

That's why Yamaha speakers aren't designed to meet objective standards alone, but to meet a higher standard: the ears of the people who make Yamaha's world-famous musical instruments.



While many manufacturers offer accurate reproduction only in their top-end speakers, Yamaha brings you an extremely high degree of accuracy in all models throughout the line.

The above curves, comparing the NS-1000 with the NS-2, were recorded under the following conditions: 1. **Equipment used**—Bruel & Kjaer (B&K) 4133 microphone, 1022 oscillator, 2118 spectrometer, and 2305 recorder. 2. **Input**—A "pink" noise source was used with an input level of 3 watts (significantly higher, more rigorous, and more closely corresponding to actual home listening levels than the commonly used industry standard of 1 watt). 3. **Measurement**—Each loudspeaker was placed in a "free field" (off the floor and no closer than 5 feet to any wall boundary in an average size listening room). A multiplicity of curves were taken at various points in the listening room and averaged, to produce the total energy curves pictured.

Since 1887, Yamaha has been making some of the finest musical instruments in the world. Pianos, organs, woodwinds, guitars, and brass.

With our musical instruments, we've defined the standard in the production of fine sound. And now, with our entire line of speakers and electronic components, we've utilized not only our studio engineers, but also our musical instrument designers to define the standard of music reproduction.

It's called Natural Sound. And it's totally unique to Yamaha.

Five different speakers, built to one standard.

Yamaha offers five different speaker models, ranging in price from \$1,350 a pair down to \$200 a pair.

At the top, the revolutionary beryllium dome NS-1000 Series, offering the ultimate in state-of-the-art performance. Following the NS-1000 are our

other three-way types: the NS-690, NS-670, and NS-3. Our least expensive, but still highly accurate, is the two-way NS-2.

Since each is built to the same high quality standard, you're probably wondering what those extra dollars are buying.

It's very simple.

To satisfy the most demanding audiophiles, those extra dollars buy extended response at the frequency extremes. Higher sound levels with equal or lower distortion. More power handling capacity. More tone controls to contour the tonal balance of the speakers with the characteristics of the room.

More specifically, on our model NS-670 and above, Yamaha offers die-cast speaker frame baskets to eliminate potential resonance. Luxurious wood enclosures (even rare ebony wood!). Tangential-edge

suspension for midrange and tweeter domes to provide smooth response. Acoustic equalizers on tweeters to flatten frequency response and enhance dispersion. Diagonally edge-wound voice coils for greater diaphragm control and increased transient response. Plus thick felt lining inside the cabinetry to isolate rear sound waves for distortion-free bass response.

But regardless of how much you pay, every Yamaha speaker is built to the same essential construction criteria and tonal accuracy.

Proven acoustic suspension design. Dome drivers for better high frequency dispersion. Carefully matched crossover networks. And heavily reinforced, extremely rigid enclosures.

The End of the Double Standard.

The single standard of performance found throughout the entire line of Yamaha speakers is a demonstration of product integrity that no other manufacturer can claim.

But in the final analysis, only your ears can be the judge.

That's why we invite you to visit your Yamaha audio dealer soon. His knowledgeable salesmen and extensive demonstration facilities can save you time and trouble in selecting the speaker that's right for your budget. And right for your ears.



 **YAMAHA**

International Corp., P.O. Box 6600, Buena Park, Calif. 90620

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Behind the scenes

The 1976 Consumer Electronic Show in Chicago was held a bit later than usual... June 13 to 16... and as a consequence we suffered from the infamous Chicago summer weather, with temperatures over 90° F. and awful, energy-sapping humidity. Compounding this misery were the difficult logistics of covering this show. Oh yes, the official headquarters for the CES still is the cavernous McCormick Place, which more than ever reminds me of a misplaced hangar for B-52 bombers. All of the big guns in the industry were there... Pioneer, Kenwood, Sansui, Panasonic/Technics, Superscope/Sony/Marantz, and a host of barely lesser lights. But, as usual, the cacophony in McCormick Place precluded any meaningful audio demonstrations, so it was off to the myriad hotel demonstration suites scattered all over town. Even with a stout constitution and plenty of taxi money, it is well nigh impossible to cover all of the suites, thus I freely acknowledge the assistance of several trustworthy surrogates in compiling this report.

What might be called the "hit" of the show was the Elcaset, the new large format cassette system, which I previewed in the July issue of *Audio*. Teac showed a prototype Elcaset recorder, but gave few indications of price or date of production. Technics displayed a very elaborate Elcaset unit, obviously a "high end" model, but here again had little information on price or on production. Sony/Superscope seems to have really jumped on the Elcaset bandwagon. They were showing two front-loading Elcaset recorders. Model EL-7 is the top of the line unit, priced at "under \$900," and the EL-5 model is priced at \$630. Both are slated for introduction into the U.S. market in September of this year. Both models feature solenoid-operated logic control mode change systems and Dolby-B noise reduction, including an FM Dolby position. The EL-7 has a three-motor, closed-loop, dual-capstan tape drive system, with three ferrite heads for "off tape" monitoring. The EL-5 is a

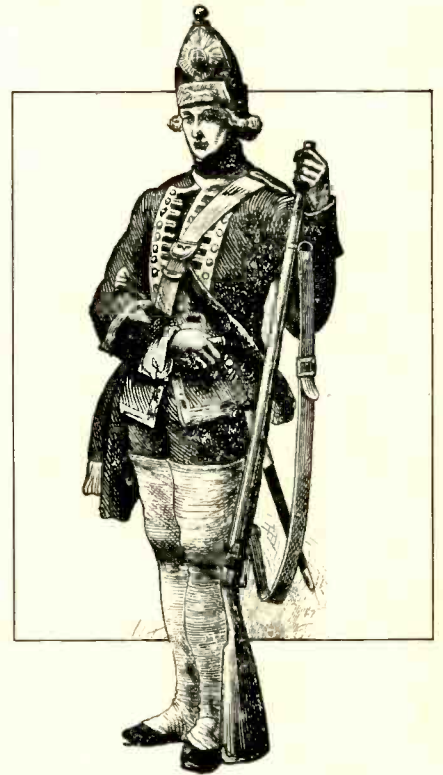
single-motor system, with two ferrite heads (which I personally feel is a mistake, since one of the advantages of the Elcaset system is the ease of monitoring). The EL-7 is said to have a frequency response of 25 Hz to 22 kHz ± 3 dB with the Type Two FeCr tape, a S/N ratio of 62 dB, and a wow and flutter spec of 0.08% (W DIN). Impressive figures, but Sony expects to better them with the Type Three tape, especially formulated for the Elcaset. Superscope invited the press corps to Hugh Hefner's Playboy mansion where a delicious libation of Pol Roger and orange juice helped us wax loquacious, and where I had the pleasure of meeting Mr. Masaru Nagami, General Manager of the Sony Audio Technical Development Laboratory, and Mr. Yoshihiro Wada of the International Division. Both men are deeply involved in the Elcaset project, and we had some interesting discussions on the subject. Best of all, they are rushing Elcaset recorders and Type 1 and 2 tape to me, so I should be able to give you an evaluation fairly soon on this interesting new tape format.

At McCormick Place, it would appear that the top receiver manufacturers are caught up in a horsepower race. Current champion is Technics with its SA-5760 rated at 165 watts, with Pioneer close behind with its 160 watt SX-1250. Note that these are the *watts per channel* figure! Marantz has a 125 watt/channel unit, Kenwood a 120 watt/channel brute, and Sansui a 110 watt/channel receiver. No question about any of these units driving the low efficiency air suspension speaker systems to high SPL levels.

Shades of the Revolution!

The British hi-fi invasion continues, and many people commented on the attractive exhibits of the British group at McCormick Place, which included Alba, Armstrong, Decca, Expotus, Goldring, Jordan-Watts, Keith Monks, Linn Products, Metrosound, Monitor, Mordaunt-Short, and Rola-Celestion (Rocelco). Many of these companies have set up marketing organizations

in this country, so you'll soon be seeing their cartridges, turntables, electronics, and speakers in the audio shops. Good friend Raymond Cooke of KEF had a demonstration suite at the Drake and was showing no fewer than six speakers to be marketed in the U.S., four of which are new, including the KEF 105 reference unit, whose drivers are arranged for minimum time delay distortion. Over at the Bismarck Hotel, that affable Britisher Keith Monks teamed up his new mercury-contact arm with the Linn-Sondek turntables, along with NAIM



pre- and power amps and Keith's own speakers, as well as a Linn speaker.

Speaking of the Bismarck, there was what was termed a "high end" group at the hotel, and it included such audio manufacturers as C/M, Dayton-Wright (ES speakers & pre- and power amp), Armstrong (British pre- and power amps & tuners), Dunlap-Clarke (amplifiers), and Quintessence (pre- and power amps). Hardly the least of

Size isn't everything



Japan. Land of the audio giants. Companies like Pioneer, Sony, Yamaha. Each with 100 times more engineers, production efficiency, research facilities, marketing resources, and sales — than your average good-sized U.S. or U.K. manufacturer.

November 3rd, 1975, Prince Hotel, Tokyo. The scene of a hallmark event — the 5th annual Japan Stereo Components Grand Prix Contest. An occasion which has indeed become the Grand Prix of the Japanese audio scene. Stereo components from Japan, the U.S., the U.K., and Europe — to be judged on the basis of performance and design by eight famous Japanese hi-fi journalists. Among the entrants: a small speaker, the UL6, recently launched by a not-so-big company: Celestion of England.

January 1976 — the results. **AMONG ALL THE ENTRANTS, WORLDWIDE AND JAPANESE — ONLY ONE SPEAKER WINS THE GRAND PRIX: CELESTION'S DIMINUTIVE UL6.**

Surprising? Not really. All the engineers, efficiency, marketing and money in the world are not sufficient to build a great speaker. Intangible resources are needed: experience, intuition, and dedication. Resources which Celestion has more of than any other speaker company in the world.

Since 1924, Celestion engineers have dedicated themselves uniquely to one art — that of building great speakers. And to doing it all by themselves — from scratch.

Starting from the outside, we see that styling is a special feature of the UL6, with beautiful dark walnut finish on all sides — even on the front baffle-board which is normally concealed by the grille. The grille consists of a slim frame carrying two stand-off ribs to give a three-faced appearance when the black, acoustically transparent cloth is stretched over it.

Now for the guts. UL6 deploys the new HD1000 ultra-wide dispersion 1" dome tweeter, a new Celestion mid-bass unit with massive magnet system and specially treated Bextrene diaphragm, and a new ABR (auxiliary bass radiator) which extends bass response, raises sensitivity and reduces distortion to negligible limits. These advanced precision components were totally researched, designed and built by Celestion to optimize overall performance in the UL6. The result is clean, tight, smooth response from 35 Hz-28 kHz. Performance so superlative that we realistically predict that UL6 will become the reference standard for bookshelf-size speakers.

Celestion UL6. Not gigantic. Not made by a giant. Just a giant-killer.

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SHOULD QUAM GO PUBLIC?



The chances are good that you've already invested in Quam loudspeakers, without even knowing it. You'd be surprised how many of the famous manufacturers of hi-fi speaker systems have Quam drivers lurking anonymously behind their fancy grille cloth!

For over forty years we've cherished our anonymity at the consumer level while enhancing our reputation with the audio professionals who buy speakers in quantity. They appreciate the return on investment they derive from our attention to materials, our quality control, and our performance specifications. The experts know that Quam Speakers are the brand to buy when you're buying more than one!!

If Quam speakers can pass the rigorous tests of the prestige speaker system manufacturers for incorporation in their high-priced original equipment, can they pass your listening test for replacement or extension use in your stereo system? Only if we "go public" and tell you about them! Ask your audio distributor about Quam, the not-quite-so anonymous loudspeaker.

Quam: The Sound Decision

QUAM-NICHOLS COMPANY
234 East Marquette Road
Chicago, Illinois 60637
(312) 488-5800

this group was Mark Levinson Audio Systems. Mark was showing his new electronic crossover, which is now in production, and an incredible amplifier which really raised a lot of eyebrows. Imagine a black anodized unit about 2 ft. wide by 3 ft. deep and about 18 in. high, which is absolutely festooned on each side with massive heat sinks. Must weigh over 200 pounds! This is a Class A amplifier with an output of...15 watts! No, I'm not kidding, and evidently neither is Mark. While it can be used as a stereo amplifier to power high efficiency speakers (it will deliver 50 watts into 1 ohm), its real purpose is as a tweeter amplifier in multi-amplified systems, such as Mark's own HQD monitor system, which combines Hartley 24-in. woofers, with Quad electrostatic mid-range (two stacked on each side in a special frame), and Decca ribbon tweeters. Overkill? I guess it depends on your depth of involvement and commitment to audio and the size of your pocketbook. Anticipated price of the ML-1, \$1800-2000.

While on the subject of amplifiers, Yamaha was showing its new B-2 power amplifier, which is a 100 watt/channel unit, using a new type of vertical FET in what they call a cascade bootstrap circuit, said to give very low distortion, i.e. 0.08% THD at rated output, 20 Hz-20 kHz. Price of the B-2 is \$850. A companion pre-amp, the C-2, is a new design, which features a phono S/N ratio of 99 dB below 10 mV (IHF-A, shorted input). You can acquire it for \$650.

Sony Corp. of America, the other purveyor of vertical FET amplifiers, has a new integrated amplifier, the TA-5650, which features true complementary push-pull V-FET output. The unit is rated at 50 watts/channel and will sell for \$500.

Four-Channel

Is quadrasonic sound dead? Perhaps the situation is best described as "difficult." There was little activity at the CES, although behind the scenes (no plug intended) there were several new developments. Peter Scheiber, the matrix pioneer, has joined forces with the Deltec Company, a manufacturer of electronic components such as PC boards, and will produce a super-duper parametric SQ decoder, said to provide 35 dB of separation. In the same vein, the Tate SQ decoder, which was shown in "breadboard" fashion a couple of years ago, will now be available to audio equipment manufacturers in the form of three monolithic integrated circuit chips manu-

factured by National Semiconductor Co. The decoder is said to provide 30 dB separation in all directions with a 70 dB S/N ratio. Perhaps some of this SQ activity has been prompted by the announcements from Columbia Records and EMI in England that henceforth most of their classical recordings and selected pop material will be issued as single inventory items. In other words, no separate stereo and SQ recordings. Significantly, Pioneer introduced a new four-channel receiver at the show, Model QX-949A. This 40 watt/channel unit features an elaborate CD-4 demodulator with phase-locked loop and AGC, a new SQ full-logic decoder, and Regular Matrix decoder. Sansui introduced the QRX 5001, 6001, and 7001 four-channel receivers, all with their Variomatrix circuits for QS, CD-4 demodulators, and with SQ decoding through their phase matrix circuit. The QS-D2 outboard decoder was also shown which uses basically the same circuitry as the receivers.

On the quadrasonic cartridge front, Shure made its long awaited entry into the field with the M24H CD-4 cartridge. I've already sampled one of these units, and it does an excellent job of reproducing CD-4 recordings. Micro-Acoustics has entered the four-channel cartridge market with their QDC lab model which uses dual-electret transducer system coupled to a beryllium stylus assembly. Price, \$150. Lastly, JVC was showing their new CD-4 demodulators utilizing the new noise gating circuitry, which I described in my report on the Los Angeles AES convention. All in all, they haven't put the sod on the quadrasonic grave yet, and with these promising new developments, I don't think it will happen.

AKG introduced six new phono cartridges, their first entry into this field. All of them employ the "transversal suspension" system, described by its inventor, Dr. Fidi, in the March, 1976 issue of *Audio*. The top of the line model, the P8ES, is said to track in top quality tonearms at 0.75 gram. Each P8ES cartridge is furnished with an individual frequency response curve.

Needless to say, there were tape decks, both open reel and cassette, in profusion at the show, far more than I can hope to cover here. One item that caught the eye was the new Teac 860 cassette deck that incorporated dbx noise reduction as well as Dolby B. Nakamichi showed its "recording director" series, slant front cassette unit, with companion "pre-amp," which is

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specifically geared to recording functions including mixing facilities. An unusual item from Nakamichi was a very modern, sleek-looking power amplifier with a 100 watt/channel rating. The Model 620 is a class B design said to eliminate crossover and switching distortions. It is expected to sell for \$600.

In blank tape, Ampex introduced what they call the "Plus Series," a high-end consumer tape, in open reel, cassette, and cartridge. I'm sure

it's a fine tape, but more significantly, Ampex is making available its "Grand Master" professional tape to the consumer market, in 7-in. reels and on 10 1/2-in. NAB reels. Some tape machine manufacturers have been checking Grand Master for use with their high end recorders, and likely will bias and EQ for it.

My Kingdom for a Speaker

New loudspeakers? What flavor would you like? Ye gads, there were


legions of them. The Koss Model One electrostatic speaker has been joined by the Model Two, which however is not full range, using an electromagnetic tweeter. Price is \$675 each. The Acoustat X is a full-range electrostatic speaker, which uses its own built-in direct-drive tube amplifier. It is claimed that the unit cannot be made to arc by overdriving. Cost is \$1895 for a pair. Duntech Labs was showing their DL-15 floor-standing, 3-way speaker, with its novel method of eliminating diffraction distortion. They were also demonstrating a prototype all-FET pre-amp, with built-in head amp for moving-coil cartridges. Infinity Systems was introducing a new high end, large column type speaker, which for mid-range and tweeter used a "sandwich" type of mylar diaphragm with magnetic drive. Infinity's Class D switching amplifier has finally gone into production, and the 250 watt/channel unit should be in the audio stores just about now. Janis Audio Associates was rattling the walls of the Pick-Congress Hotel with their new W-2 sub-woofer, a less expensive relative of the monster unit I reported on about a year ago. They have a new companion electronic crossover network to make interfacing the unit with other speakers a more accurate proposition.

Tube amplifiers still have their adherents, as exemplified by the products of Audio Research. Now the Lux Co. of Japan is producing an advanced tube-type monophonic (!) amplifier, plus a tube pre-amplifier sans tone controls for the super purist. If he wants control, there is a tube-type graphic equalizer available too!

Finally, the Audiopulse Model One digital time delay unit was being demonstrated at the Drake. This garnered a lot of attention, and understandably so. The room in which it was being demonstrated was not too good acoustically, necessitating a little exaggeration of the delay effect. But there was no question that it worked, and worked well, and most people commented favorably on the "concert hall" enhancement afforded ordinary stereo recordings.

That wraps up this years CES. The trade papers said that attendance was down 10-15%, but you would never know it from the crowds. The industry is evidently back in good financial shape, considering the lavish scale of entertainment that was laid on by many companies. As always, apologies to those whose products were not mentioned... just can't cover everything.

24



Soundcraftsmen

THE EQUALIZATION LEADER...

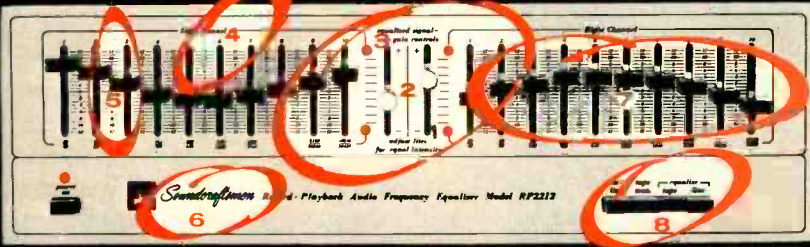
WHY? Because WE CARE about HOW an equalizer does its job BEST!
That's why we provide our customers with our exclusive...
10-POINT "TOTAL-SYSTEM EQUALIZATION"

YOU NEED MORE THAN JUST AN EQUALIZER... FOR OPTIMUM EQUALIZATION BENEFITS, HERE ARE THE TEN ESSENTIAL ELEMENTS YOU NEED:

- 1 YOU NEED VISUAL ZERO-GAIN LEVEL INDICATION:** SOUND-CRAFTSMEN provides combination zero-gain controls with LIGHT EMITTING DIODE indicators to show when exact zero-gain is accomplished. Adjusting the zero-gain controls for equal L.E.D. intensity assures you of input vs. output level matching.
- 2 YOU NEED FULL-SPECTRUM BOOST OR CUT CONTROLLABILITY:** SOUND-CRAFTSMEN'S "zero-gain" circuit provides an additional 18 dB control-range over the full spectrum 20 to 20,480 Hz on each channel for instantaneous input-output zero-distortion signal matching.
- 3 YOU NEED AUTOMATIC/CONTINUOUS OUTPUT-OVERLOAD WARNING SIGNAL:** SOUND-CRAFTSMEN'S 2 top L.E.D.'s glow brightly. (bot-


tom L.E.D.'s off), if output voltage is boosted excessively, thus eliminating the danger of distortion and/or damage to related equipment resulting from the high voltages that can be generated by any line equalizer.

- 4 YOU NEED A POSITIVE METHOD OF READING 1 dB SETTINGS...**
- 5 YOU NEED AT LEAST 24 dB TOTAL CONTROL OF EACH OCTAVE.**
- 6 YOU NEED A UNIT THAT WILL ADD ZERO NOISE AND DISTORTION:** SOUND-CRAFTSMEN'S signal-to-noise and distortion performance figures are far superior to most high fidelity components. SOUND-CRAFTSMEN products are used in professional broadcast and recording systems, assuring you of completely noise-free and distortion-free integration into your system.
- 7 YOU NEED TO BE ABLE TO LOOK AT YOUR ACTUAL "EQ" CURVES.**
- 8 YOU NEED THE ABILITY TO EQUALIZE TAPE RECORDINGS**



9 YOU NEED AN ACCURATE, EASY-TO-USE INSTRUCTIONAL TEST RECORDING FOR ENVIRONMENTAL EQUALIZATION: SOUND-CRAFTSMEN includes Test Record recorded and designed exclusively for SOUND-CRAFTSMEN equalizers. Without any expensive test equipment or technical knowledge, you can quickly tune the acoustics of your room, just by following the announcer's step-by-step directions.


10 YOU NEED A MEMORY SYSTEM FOR "EQ SET-RESET REFERENCING": SOUND-CRAFTSMEN provides you with a quantity of "COMPUTONE CHARTS" for recording the exact setting of each octave control for future reference and resetting. Automatic "Instant-Memory Programming" is readily available by cutting off the "Computone Chart," holding against front panel, and moving up knobs into position.



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GUARANTEED SPECIFICATIONS


FREQUENCY RESPONSE: ±0.5 dB 20-20,480Hz
THD: Less than .1% @ 2 v. Typ: .05% @ 1 v.
S/N RATIO: Better than 106 dB @ full output. Better than 96 dB @ 2 v. RMS. **FILTER TYPE:** Toroidal and Ferrite-core. **INDIVIDUAL OCTAVE-CONTROL RANGE:** Minimum ±12 dB (Typ. ±14 dB), each octave centered at 30, 60, 120, 240, 480, 960, 1920, 3840, 7680, and 15,360Hz.

RP2212 (Includes Cabinet or Rack Mounts) \$369.50
RP2204 (Same as 2212, except no LED's) \$329.50
20-12A (Same as 2212, except no LED's and Tape EQ thru rear panel patching) \$299.50

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an easy to understand explanation of the relationship of acoustics to your environment. This 6 page booklet also contains many unique ideas on "How the Soundcraftsmen Equalizer can measurably enhance your listening pleasures." "How typical room problems are eliminated by Equalization," and a "10-point self-rated Equalization Evaluation Check-List," plus Specs and Reviews.



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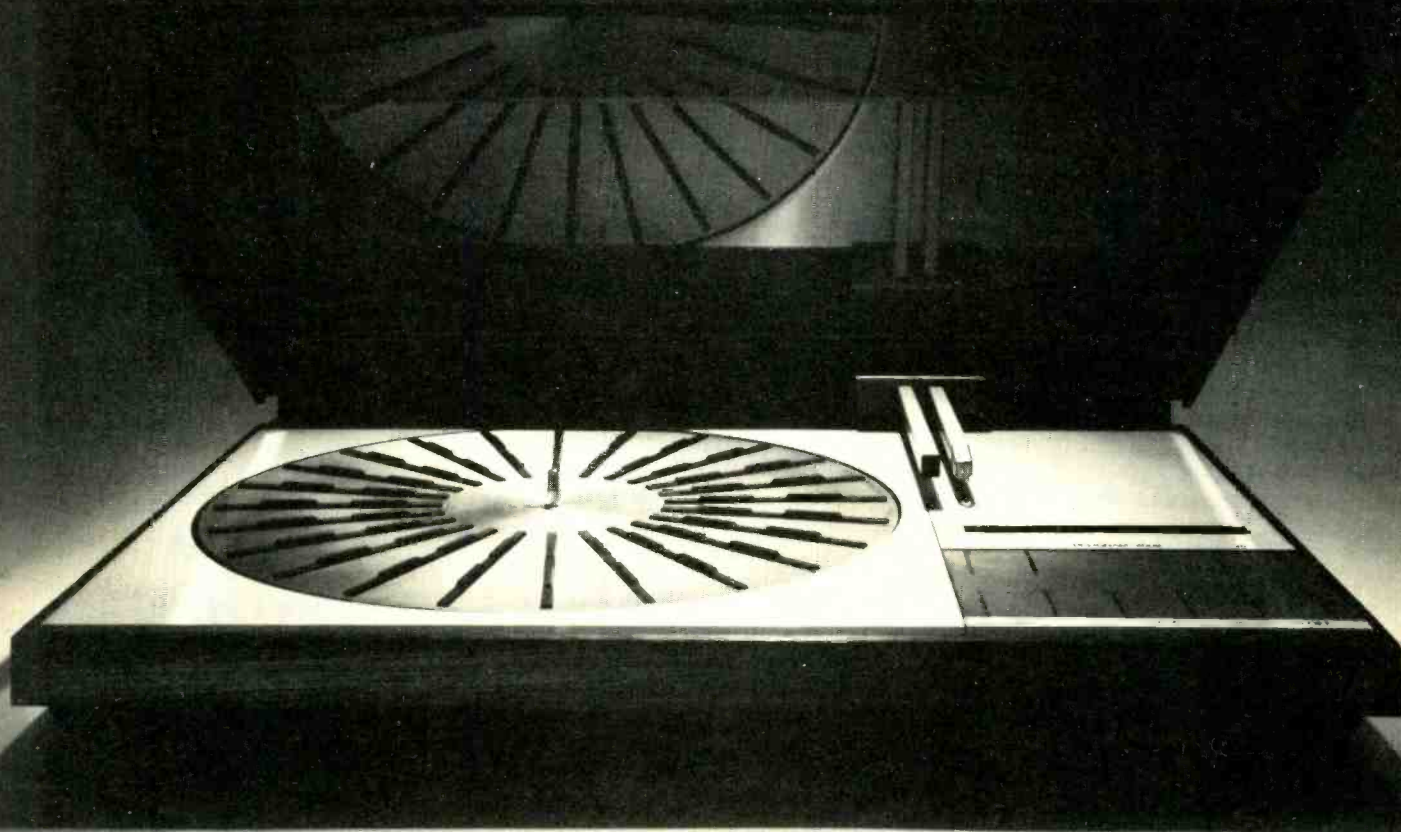
The Beogram[®] 4002. If music in your home is important to you, it should begin here.

The Beogram 4002 is a fully automatic turntable which exhibits a level of creativity and engineering skill unequalled in the field of audio components. Its tangential tracking permits the record to be played back in exactly the same manner that the master disc was cut. Electronic logic circuits, activated by a single light touch on the control panel, automatically select the record size and correct

speed, cue the stylus, and turn off the unit when the selection is finished. Furnished with Bang & Olufsen's finest cartridge, in itself an acknowledged masterpiece of audio engineering.

Request our product brochure and the name of your local Bang & Olufsen dealer. For our detailed, full color catalog, please enclose one dollar to cover postage and handling (available free at your local Bang & Olufsen dealer).

Rarely has technology
served music so well.



Bang & Olufsen

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What's new

DiscProtec

DiscProtec is a dry record preservative, using aerospace technology, and is intended to reduce record wear and stylus skip by placing a micro-thin layer of lubricant on the disc. The maker claims the product does not build up excessively on the disc and is easily buffed to a single layer using a specially designed mitt. Frequency response is said to be unaffected, so that initial disc quality is maintained through repeated playings. Price: \$6.95; 2-oz. refill, \$3.95; 8-oz. refill, \$14.99.

Check 70 on Reader Service Card

Bib Cassette Editor

The Bib Cassette Editor & Tape Winder kit comes with a splicer, cutter, splicing



tape, empty cassette, and winding board, for the editing and splicing, as well as the transferring and adding of tape. Price: \$21.95.

Check 71 on Reader Service Card

Fuji 8-Track

The 8T-45 and 8T-90 are stereo 8-track recording tapes with playing times of 45



and 90 minutes. They are bias and equalization compatible with all 8-track recording/playback decks, with a claimed S/N ratio of 50 dB, and tape sensitivity is uniform within 0.5 dB. Price: 8T-45, \$4.80 and 8T-90, \$6.30.

Check 73 on Reader Service Card

Magnesonics Eraser

The Magnesonics Erasure is designed to erase

Ampex Reel-to-Reel Deck

The ATR-100 employs a closed-loop servo system to maintain constant tape tension at each reel in all operating modes, eliminating the pinch rollers. Both reel motors and single-drive capstan are servo controlled and operate at four record/playback speeds: 3 $\frac{3}{4}$, 7 $\frac{1}{2}$, 15 and 30 ips. The stated signal-to-noise ratio is 80 dB (full track at 30 ips) with a record/reproduce response of $\pm \frac{3}{4}$ dB, 100 Hz to 15 kHz at

15 ips. A matrix-type control panel, which contains all operating buttons, can be installed for either right- or left-handed operation. A separate panel is optional and includes a 25-ft. cable for remote use. Standard items include: pick up recording capability, electronic tape timer, unique editing knob which permits the operator to manually move the tape to a desired edit point, and ferrite heads with a one-year warranty. Prices begin at under \$5,000.00.

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tures include: four mike inputs, dual-scale meters, a test tone selector position for calibration, a stereo headphone jack, and a tape direction indicator. Price: \$1600.00.

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both cassettes and cartridges, saving wear on recording equipment through use of the battery-operated device. The stated noise level is -65 dB from 0. Price: \$19.95.

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Magnesonics Winder

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and helping to control wow and flutter. Price: \$19.95.

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been out of print for many years.

To quote from the Forward: "Six-
teen years after its first appearance,
the reprinting of **From Tinfoil To
Stereo**, with but modest revisions
and additions and by the original pub-
lisher besides, is something of a liter-
ary oddity, especially since, in that in-
terval, the manuscript had been re-
turned to its authors, apparently with
the thought that reprinting would
probably never be warranted. How
differently things turned out! For
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book was entirely unavailable from
the publisher in its original binding
and dust sleeves, while the going
price for used copies steadily esca-
lated, year by year, to \$60 and in one
known case to \$200. Libraries have
found it impossible to keep copies in
good condition because of intensive
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peared!"

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tate of a close associate years ago. Far
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nal ideas that spawned talking motion
pictures, radio, television, and in-
deed, the scientific foundations of the
communications industry as a whole,
back to the time and place where it
was only a gleam in an intuitive inven-
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key to the development of profes-
sional sound. There is detailed histori-
cal treatment of this period: "...The
GE-RCA interest, Rockefeller backed,
founded Radio-Keith-Orpheum,
comprised of RCA, American Pathe,
and the Keith-Albee-Orpheum thea-
ter chain, for the purposes of produc-
ing sound pictures. The Warner
Brothers-E.R.P.I.-Western Electric-
AT&T aggregation was a Morgan fi-
nanced operation. The financial im-
portance of those alignments may be
appreciated by considering that from
a state of virtual insolvency in 1925,
Warner's assets had expanded to
\$16,000,000 by the close of 1928 and
by the end of another year to
\$230,000,000."

The industry went on to become es-
sentially depression proof, especially
for the sound system engineers. West-
ern Electric-E.R.P.I. had income from
theater installations in 1929 of
\$37,000,000. Out of E.R.P.I. came the
Altec and JBL companies.

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the clues to the history of what
amounted to a "space race" of its era,
but between private industries rather
than governments. When the 1920
and 1930 dollars are translated into to-
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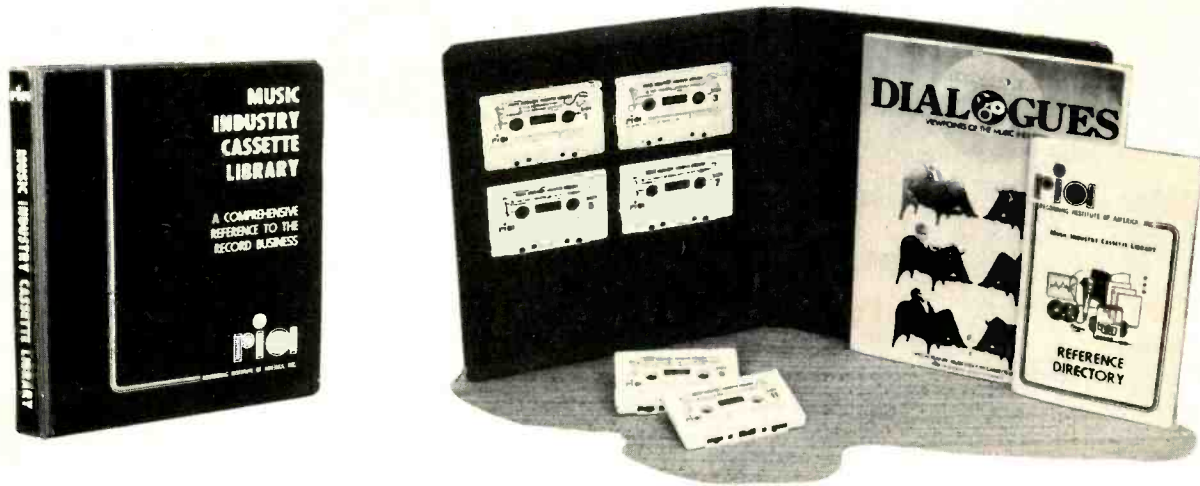
The slaughter of sacred cows looks
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days of the 1870s. How the industry
abandoned the vertical cut for the lat-
eral and how today technology is back
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Signal-to-noise ratios for tape decks tend to be more puzzling than ever due to the multiplicity and variation of factors involved in measuring S/N. The maximum signal which can be put on the tape is defined in various ways. One of these ways is the signal which causes the tape deck's meters to read 0 VU, but such a reading may represent a variety of signal levels. S/N also varies with the type and brand of tape used, and S/N varies, of course, with inclusion of a noise reduction system, such as Dolby.

Because of these and still other factors, the S/N rating for a given model tape deck may vary over a considerable range—possibly 10 dB or even more. The purpose of this article is to explain why S/N ratings for the same deck can vary so much, but first it will be useful to briefly review a bit of history concerning the subject, and to explore the meaning of S/N for tape decks.

A Bit of History

S/N of 55 dB is about the minimum for high fidelity reproduction. Ten years ago, many home tape machines achieved no better than S/N of 45 dB or so. As recently as about two years ago, a home tape deck was considered to be doing excellently if it at-

tained 55 dB S/N. However, improvements in tape electronics, tape heads, and tape, plus the advent of noise-reducing devices such as Dolby, dbx, and JVC's ANRS, have made possible home machines with S/N ratios on the order of 65 dB and even close to 70 dB. Now that really good S/N ratios are within reach at reasonable cost, there is a good deal more candor in the tape industry about the prime importance of a high S/N ratio.

Meaning of S/N for Tape Decks

In a general manner of speaking, S/N refers to the ratio between the *desired* audio signal (program material) and the *undesired* audio signal (noise). This ratio is expressed in decibels (dB), as further discussed in the next paragraph. More specifically, the numerator of the S/N ratio refers to the maximum permissible audio signal which can be put on the tape; and the denominator refers to the noise in the tape system (produced by the record and playback electronics and the tape). Maximum permissible audio signal is generally accepted, at least for home machines, to be that which at 400 Hz results in 3% harmonic distortion on the tape. Therefore, measurement of S/N involves recording a tone of 400 Hz (or similar fre-

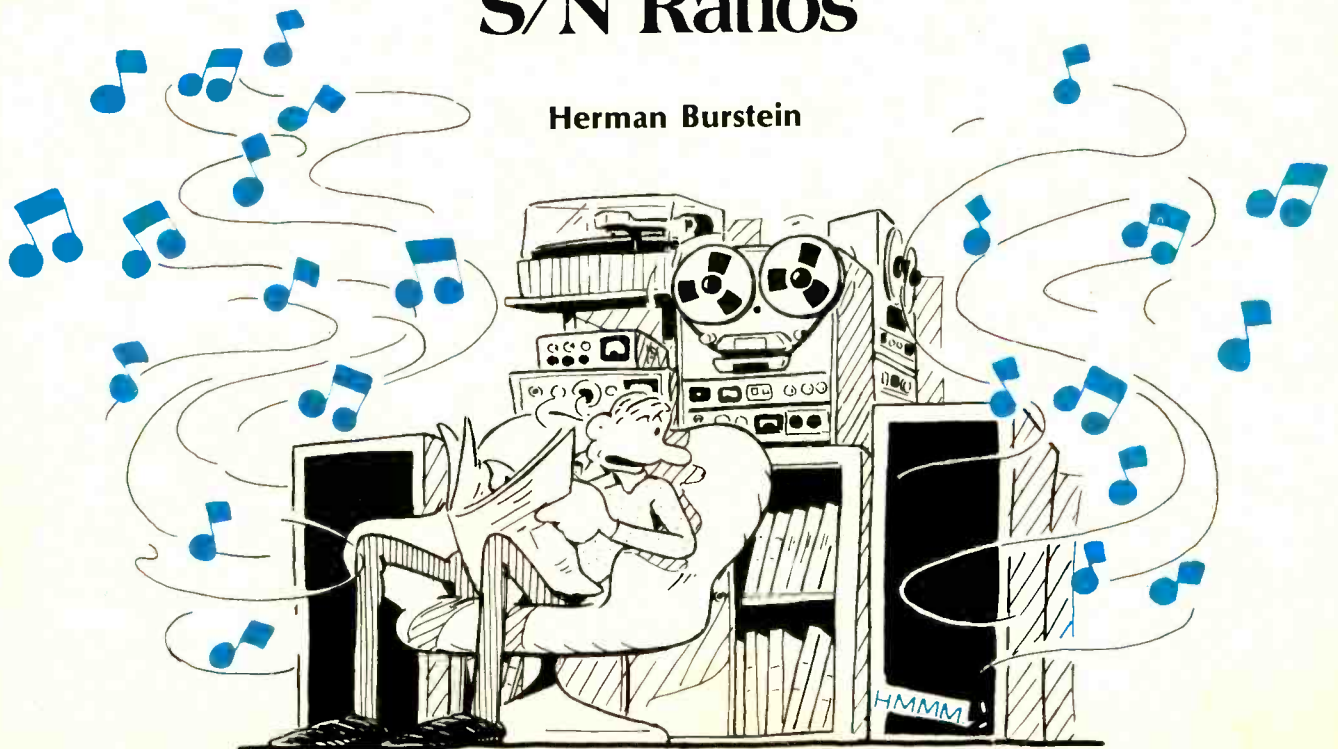
quency) at a level that produces 3% distortion on the tape; measuring the level of this tone in playback; re-winding the tape and again putting it through the recording process but this time *without an input tone of 400 Hz*; measuring the playback output, now consisting entirely of noise; and expressing the ratio between the first and second playback measurements in terms of dB.

S/N of 55 dB signifies a maximum power ratio of 316,000:1. That is, assuming a fairly flat audio system, the loudspeaker delivers about 316,000 times more power for the desired program material than for the undesired noise. A S/N of 60 dB signifies a maximum power ratio of 1,000,000:1; 65 dB, 3,160,000:1; 70 dB, 10,000,000:1.

Note carefully in the preceding paragraph our reference to *maximum* power ratio. Much of the time the audio signal is well below its peak (maximum) level—often 20 dB, 30 dB, or still lower. Then the S/N ratio drops the same number of dB. During a very quiet passage, the audio level of program material may drop as much as 45 dB (perhaps more on a disc or tape with wide dynamic range), so that the S/N ratio drops 45 dB. To illustrate, assume a tape system has a S/N ratio of

Understanding S/N Ratios

Herman Burstein



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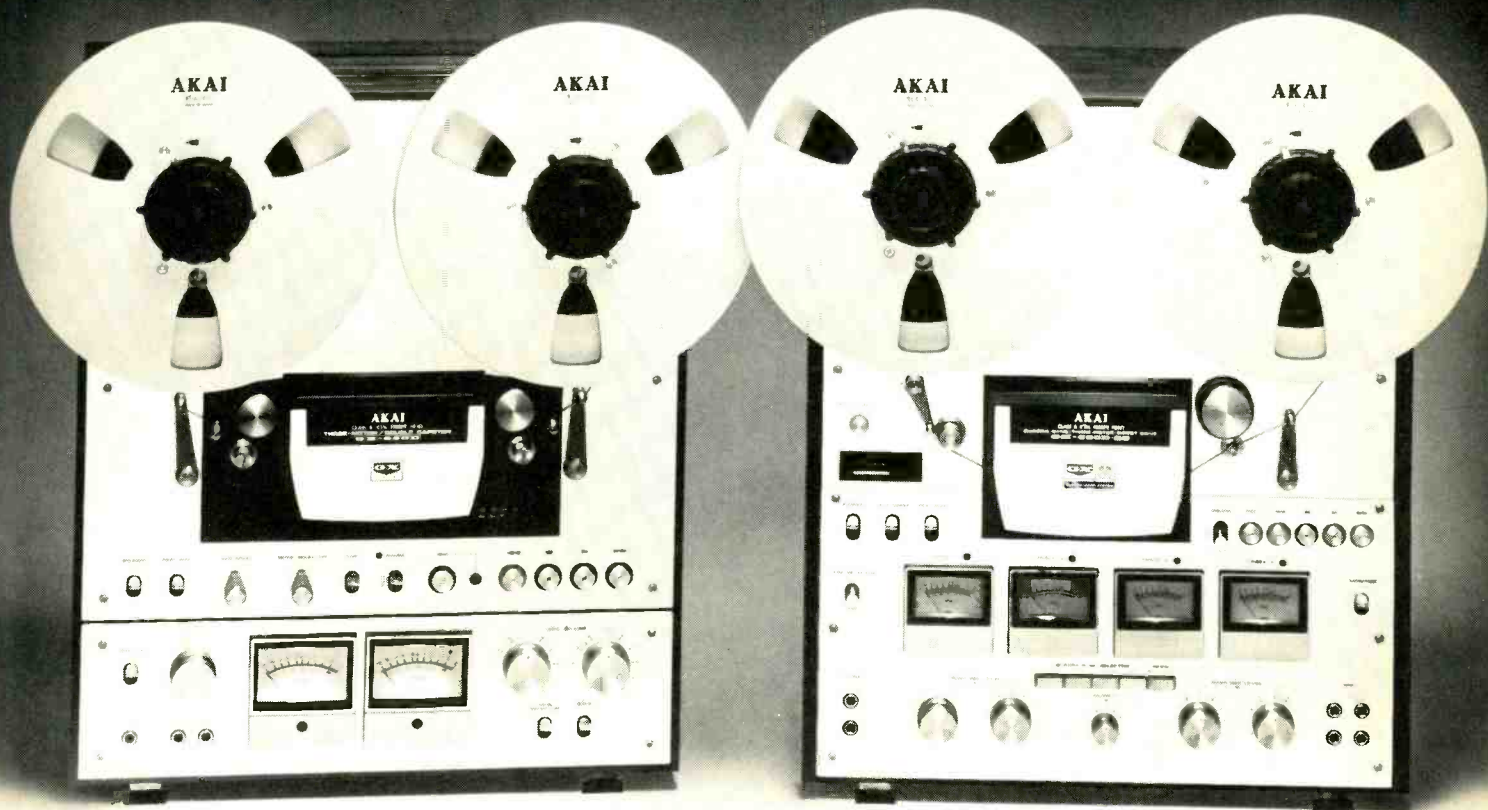
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55 dB based on maximum permissible recording level. But if the audio level drops 45 dB during a quiet passage, the S/N drops 45 dB to only 10 dB; the level of the program material is now only 10 dB above the noise level.

Thus one may realize how desirable it is to attain S/N above 55 dB, particularly when dealing with program material having a wide dynamic range (ratio between the loudest and softest sounds). For example, a tape deck

with 65 dB S/N would assure us that the audio signal is at least 20 dB above the noise, assuming a dynamic range of 45 dB. That is, the S/N ratio would be 20 dB on the quietest passages, more than that on the louder passages, and 65 dB on the loudest passages.

Reasons for Discrepancies

There are at least eight factors that explain why a given model of a given

brand of tape deck can receive different S/N ratings.

1. *Reference Level for Measuring S/N.* As previously stated, S/N for home machines is usually based on a recording level that produces 3% harmonic distortion on the tape. This may be called the 3% reference level. However, two other reference levels—which usually tend to be about the same as each other—are also used. One of these alternative reference levels is that which produces 1% harmonic distortion. The 1% reference level tends to be a recording level about 7 or 8 dB below the 3% reference level. Therefore, when the 1% reference level is employed for measuring S/N (often the case for professional tape decks), the S/N rating drops 7 or 8 dB. For example, a 65 dB S/N rating based on 3% distortion drops to a 57 or 58 dB S/N rating based on 1% distortion.

The second alternative reference level is the recording level which causes the VU meter to read 0 VU. Typically, VU meters in high quality machines are calibrated to read 0 VU when the recording level is that which at 400 Hz produces 1% harmonic distortion on the tape. In such cases, the 0 VU reference level produces the same S/N rating as does the 1% reference level. Sometimes, however, a 0 VU reading will correspond to less than or more than 1% distortion. Correspondingly, the S/N rating goes down or goes up. We should take particular note of tape decks with peak-reading VU meters, which (unlike the standard VU meter) indicate peak level rather than average level of the audio signal. Peak-reading meters tend to be calibrated so that 0 VU corresponds to the 3% reference level. Then the S/N rating based on 0 VU tends to be the same as the S/N rating based on the 3% reference level.

2. *Noise Weighting in Playback.* While the hearing range of humans extends between approximately 20 and 20,000 Hz, we do not hear all frequencies equally well, assuming that all frequencies are presented to our ears with equal acoustic power. Our hearing tends to be less sensitive at low frequencies and at high ones. Therefore noise at low and high frequencies is less audible than noise at middle frequencies. To allow for this phenomenon, the measurement of noise in playback (as described earlier) is sometimes weighted in accord with what is believed to be the typical human change in hearing sensitivity as frequency changes. That is, the noise produced by the tape deck in

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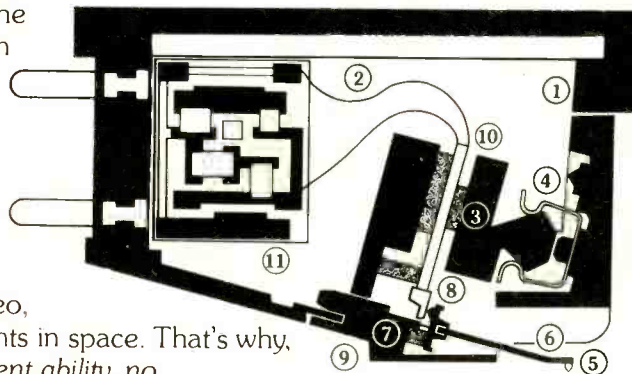
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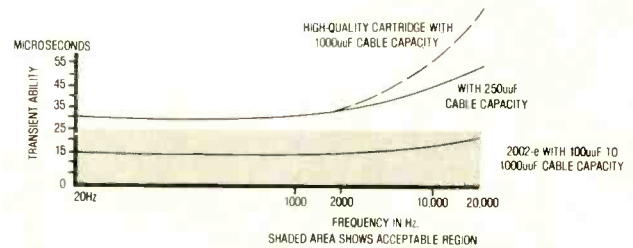
While good tracking ability is vital, it's only an indication of how well the stylus keeps contact with record grooves on louder, harder-to-follow passages, at stylus pressures low enough to minimize wear. *But surprisingly, tracking ability tells almost nothing about how well a cartridge reproduces most musical sounds.*

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Transient ability best defines how accurately a cartridge can reproduce a musical burst at different frequencies. (Note that the 2002-e's results are independent of cable capacity!)

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A9-76

playback is put through an electrical filtering device which gradually reduces the amount of noise energy at low frequencies and at high ones. Then the noise is measured. The result of this process is to reduce the amount of measured noise.

Various "weighting curves" are employed, that is, various amounts of reduction of noise energy at low and high frequencies. An example is the ASA Standard C16.5-1961 weighting

curve, adopted by NAB (National Association of Broadcasters) in its 1965 standards for tape recording. Noise reduction becomes significant (reduced 3 dB or more) below approximately 800 Hz and above approximately 7500 Hz. Noise reduction is greatest for the low frequencies, being about 32 dB at 50 Hz and still more at lower frequencies.

All in all, use of weighting in measurement of S/N results in an increase

in S/N rating. It is difficult to say how much the S/N is increased. The amount of increase depends upon which weighting curve is employed. It also depends upon the particular tape deck being measured. For example, if a deck has particularly strong 60 Hz hum, it can benefit more from a weighted S/N measurement than a deck with very little hum. As a rough guess, weighting can improve the S/N rating by about 6 to 10 dB. (Thus, the NAB standard stipulates S/N ratios 10 dB higher on a weighted basis than on an unweighted basis.) A tape deck with an unimpressive 50 dB S/N rating on an unweighted basis might achieve an impressive 60 dB rating on a weighted basis.

3. *Use of Dolby and Other Noise Reduction Systems.* For a cassette deck to have a real claim to high fidelity, it must include a Dolby or similarly effective noise reduction system (NRS). While open-reel tape decks can achieve S/N of high fidelity caliber without NRS, there is a trend toward inclusion of such systems; earlier discussion has pointed out the advantages of exceeding the minimum high fidelity requirement, namely 55 dB S/N. Dolby and similar NRS can improve S/N by amounts typically varying from 6 dB to 10 dB, particularly at lower speeds (1-7/8 and 3-3/4 ips). The improvement tends to be somewhat less at higher speeds (7 1/2 and 15 ips).

4. *Tape Used.* For a given amount of distortion, say 3%, some types of tape can deliver more audio signal than can others. Thus, high output tape delivers more signal than conventional tape. Further, low noise tape produces less tape noise than do some other kinds of tape, and low noise/high output tape has both advantages. Thus, there may be a few dB difference in S/N ratio depending on which type of tape is used. In addition, for a given type of tape (such as low noise/high output, 1 mil, ferric oxide) there may be a variation of about 1 to 3 dB among various brands of this tape.

5. *Chance.* Random variations in components used (transistors, resistors, capacitors, etc.) and in lead dress (wiring) may result in slight variations in S/N from one unit to another of the same model and brand of tape deck. Such variations might be in the vicinity of 1 or 2 dB.

6. *Manufacturer's Conservatism.* The conscientious manufacturer, wishing to attain and live up to a good reputation, will be conservative in stating specifications for his tape

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deck, including its S/N rating. He will make allowance for chance variation from one deck to another, as just described, for different tapes that may be used with his unit, and possibly for other factors. His may be a "worst condition" specification for S/N. Therefore, the typical purchaser of his tape deck may find that actual S/N performance exceeds rated S/N by several dB.

The reverse can also be true, particularly for tape decks of generally lower price and quality. Rated S/N may be a "best condition" specification; it may assume that a selected tape deck from a given model line is employed, and that it is used with the best of tapes. Thus, the typical purchaser may find actual S/N below specification.

And of course we can have the intermediate situation, where many purchasers find actual S/N above specification, and about an equal number find actual S/N below specification.

7. *Quality Control.* Control over the quality of tape decks reaching the purchaser may range from very rigorous to quite loose. Quality control is one of the unseen things (such as extensive research) that go into a costly machine. In the case of S/N, tight quality control helps insure that there is little variation from one tape deck to another of the same model and that none fall below specification. Loose quality control makes possible fairly extensive variation.

8. *Design Improvements.* During the lifetime of a given model of tape deck, which may be several years, the manufacturer typically makes changes, some of which may result in improved S/N. These changes are based on continued research by the manufacturer, new developments by others (such as the supplier of tape heads), and feedback from dealers, purchasers, equipment reviewers, and others. Therefore, a later version of a given model (higher serial number) may have a few dB better S/N ratio than an earlier version.

Conclusions

While the foregoing discussion hopefully is enlightening, it can hardly be satisfying. It cannot be satisfying to know that S/N ratings for tape decks vary not only because of inherent differences in quality of the decks but also because of differences in methods of measurement and differences in tapes used for measurement. How is the audiophile to compare the S/N of one tape deck with that of another? How is he to know the S/N of a

given tape deck—simply just to know it or to compare it with the S/N of other audio equipment?

It seems this situation can be resolved by the audiophile asking two basic questions and by the industry—manufacturers, dealers, and others concerned—being prepared with the answers for each brand and model of tape deck. The two questions are as follows.

Based on (a) the tape recommended by the manufacturer for his tape deck,¹ (b) the 3% reference level, and (c) measurement on an unweighted basis:

1. What is the S/N ratio *without* use of NRS (noise reduction system, such as Dolby)?

2. If the tape deck includes NRS what is the S/N *with* use of NRS?

We have to be able to compare tape decks' S/N ratios on a common basis. Until the day when all tape decks include built-in NRS, the common basis for measuring S/N is necessarily without use of built-in NRS. Therefore, when a tape deck has built-in NRS, we need the answer to Question 2 as well as the answer to Question 1. (Of course, when a tape deck lacks built-in NRS, we can only raise Question 1.)

NRS are available today either built-in or as an external device made by several companies. Therefore, one may rightfully want to know the S/N of one's tape system including NRS. If NRS is built-in, this information is provided by the answer to Question 2. If not, we can get a reasonable approximation by adding the answer to Question 2 to the S/N improvement claimed by the maker of the external NRS. To illustrate, assume a tape deck without NRS has a rated S/N of 55 dB, based on the 3% reference level and unweighted measurement of noise. And assume that 8 dB S/N improvement is claimed for the NRS device. Then the S/N of the tape system, including the NRS device, amounts to about 63 dB. ▲

¹It is unlikely that the manufacturer would recommend a tape chosen solely because it serves to maximize S/N. Other factors in his choice of tape will include its frequency response, availability, cost, physical characteristics (such as oxide shedding, tendency to cup or curl, accurate dimension, etc.)

Probably a better alternative to (a) would be an industry-accepted standard tape, issued under the auspices of NAB, which all tape deck manufacturers would agree to use for the purpose of specifying S/N. (A manufacturer could still recommend commercially available tape or tapes to be used with his deck.)

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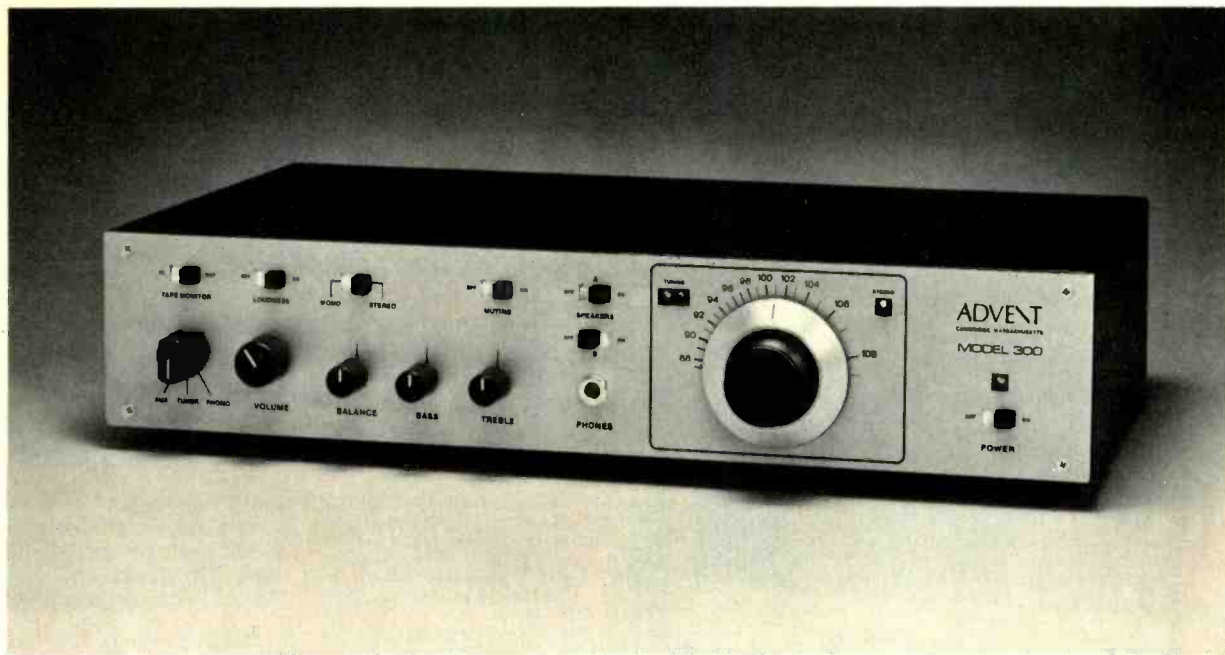
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We found, for instance, that frequency response measurements weren't being made with signals from phono cartridges, but simply with the use of test generators. This meant that important impedance interactions between preamps and various cartridges of different design—causing very audible differences in actual high-frequency performance—weren't

showing up in standard tests. Phono noise measurements also didn't cover the effects of cartridges. And asymmetrical waveforms representative of music weren't being employed to check overall performance under in-use conditions.

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The Tuner.

Like the Model 300's preamp, its FM stereo tuner is designed for optimum performance under real conditions of use.

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Reading VU Meters

C. E. Moule

42

The VU meter was introduced in 1939 as a standard meter to avoid the confusion that existed in the broadcasting industry at that time. Audio level meters up 'til then had a bewildering array of reference levels, various speeds of movement, slow, medium or fast, and some people even chose to ignore the fact that they were dealing with a non-symmetrical wave shape. The meters still do vary on cheap equipment where they were meant to solve these problems. However, they can do very well, on the technical specifications^{1,2}. But now there seems to be more confusion, because of the different ways of reading the meter and also expressing what is read. The problem has recently become more acute, now that the use of the meter is not confined to broadcasting, but has found ready acceptance in sound recording, both for commercial and private uses. Even a novice to the hi-fi market looks for a VU meter on each channel of his new equipment.

But why have a VU meter? Perhaps its need should be justified before detailing the reasons for confused reading. The use of one piece of equipment confined to one person would seem to be the occasion for least use of a level indicator—for the low level passages, listening to a speaker will let you know when the level is getting too low and into noise, and the speaker can still be used to get a rough assessment of "when it's too loud, it dis-

torts." Even so, with the best of equipment, where no compression of volume is required, a starting point for setting the volume control is difficult without the aid of a level meter. Then the meter has a further use, to enable a repeat of the same maximum volume level which has been found to be satisfactory before—the hearing of a speaker won't be accurate enough after only an hour or so. The advantages are more obvious when a change of personnel is involved, or when there is a change of tapes or programs.

A Standard Meter

Not the least of the claims for the use of a VU meter, compared with other level indicators, is that its dynamic characteristics are rigidly specified and controlled, such that the speed of movement happens to correspond very closely with the effect of music and speech on the ear, i.e. the loudness effect. Combined with the background color on the scale, the meter is easy to read and yet easy on the eyes. The same cannot be said for some "peak" reading meters; they need extra equipment to drive them, they look odd with their wild upswing and slow return and still never quite make the peaks.

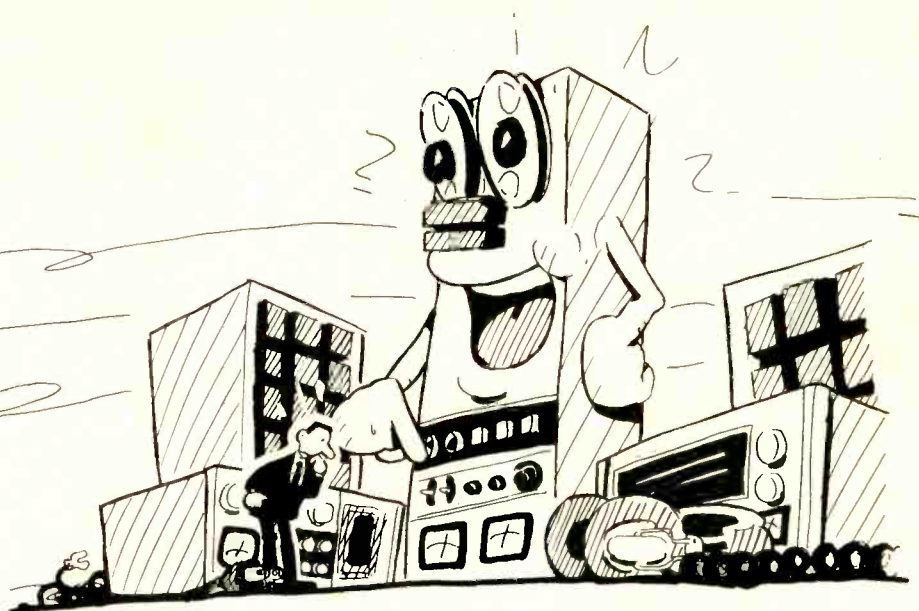
Let's have the "loudness" type meter as long as provision is made for the peaks that are there above the VU reading. Most VU meter users allow 8 or 10 dB above the +4 VU or +8VU, or whatever standard they use, but peaks of 14 dB above the meter reading have been observed on unusual program material. Also it is rare to find an operator that can aim and maintain

the pointer deflection just up to the "0" mark most of the time, without getting, say, 2dB over. If 2dB is allowed for the human error and 10 dB for the peaks, then 12 dB seems to be the appropriate allowance to make for overload and distortion tests, e.g. +20 dBm for a +8 VU circuit. This could be the first of the confused ways of reading a VU meter. How many tape recorders are tested for distortion, with a continuous tone only deflecting the meter to the "0" mark? The VU meter will stand 14 dB above this mark continuously without any ill effect, so should the rest of the equipment. Why not specify and check it at the right level (not 5 dB above,³)?

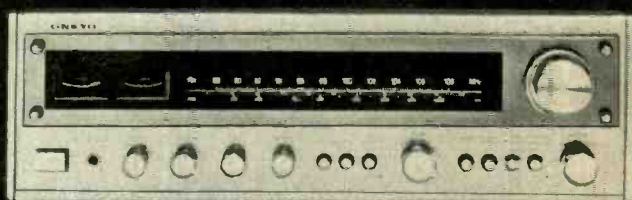
Even if the VU meter had no other advantages, it would still be worth using, just because it is standard, and so valid comparisons can be made between various pieces of equipment and between different locations in a network.

Origin

It was the network folk who probably helped to conceive the idea of a standard meter with rigid specifications⁴, but the advice on how to read was then slanted towards network operators, with observations being made at a transmitter, repeater or a switching center. This was good at the time because each location was staffed and was presumed to have a complete VU meter, i.e. a meter with an attenuator in 2 dB steps, with the recommendation that the attenuator be adjusted until the majority of peaks reached within + or - 1 dB of the "0" mark on



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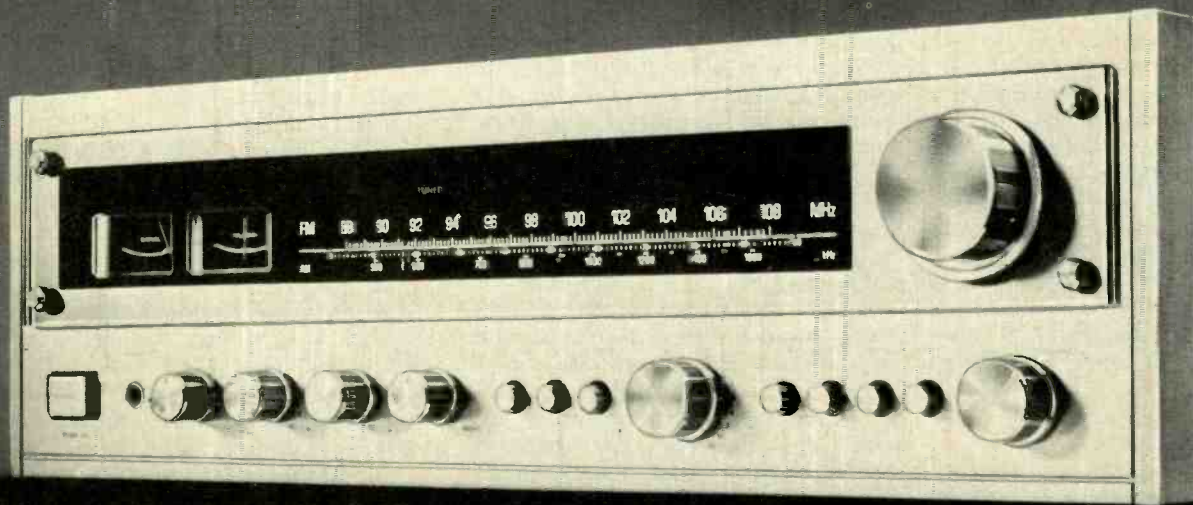
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the meter. Then the measurement was expressed as the sum of the meter reading and the attenuator—easy, if the meter deflects to the “0” mark, just read off the attenuator setting and there it is, so many VU.

But the position has changed, there are fewer transmitter, repeater and switching locations that are staffed, and at the places where programs originate, and certainly on most tape recorders, there is no attenuator visible, and no marks on the meter to say +4, +8, +10, or whatever standard is used. Furthermore, the instructions as to where the needle should deflect are either too brief, such as “up to zero,” or too ponderous, “the reading is determined by the greatest deflections occurring in a period of about a minute for program waves, or a shorter period (e.g. 5 to 10 seconds) for message telephone speech waves, excluding not more than one or two occasional deflections of unusual amplitude.”⁵ There appears to be 4 different interpretations given to these instructions:

1. Keep the needle above the “0” mark, most of the time.
2. Never let the needle get above the “0” mark.
3. Look for some mythical average of the deflections and adjust until this average is at the “0” mark.
4. There must be a correct way. “In average program material (speech and light music), peaks occurring at the rate of 6 per minute are regarded as the most significant, and should deflect to the zero mark, allowing for an occasional overswing; classical music will need to be observed over a longer period.”

Perhaps this last interpretation is more significant when it is seen how some people have twisted it around, and said that you should see a peak every 10 seconds. This is quite wrong, because music and speech are not performed with such regularity; it would be terribly monotonous if it were so. But it does raise the importance of elevating the monitoring speakers or phones to equal status with the VU meter—how can you make a valid observation without ears to tell you what type of program material is present? Even without a knowledge of music, most people can tell from the way the music is being played whether it should be loud or soft.

Using a VU Meter

The instructions should be simplified further and included with each piece of equipment using a VU meter.

The advice to novices, just starting with their first tape or cassette recorder could be: get some prerecorded material, either news type speech or light music with a rhythm, i.e. something with only small variations in volume and, while it is playing, adjust the volume control until it is easily seen that the majority of peak readings come to the same point on the scale, adjust the volume control again until these peaks reach the 100% mark, then you have correct level. A little more time is needed to get correct level on classical music or unusual program material, but what to call it?


There is neither the time or the need to call it anything in some situations⁶. If the concern is only with your own tapes, then it needs only to be called “correct level,” and the figures on the meter are superfluous. The manufacturers of the equipment may tell you in the instruction book that “0” on the meter is +4 VU, +8 VU, or whatever they choose, but they have also allowed a margin of 8 dB to 14 dB above the VU meter reading for peaks. The “medium-fi” market is probably best served by what some of the equipment is now using; i.e. a meter with a black arc up to about 70% of the scale, then the arc continues with red—no figures or letters to confuse the user; just the direction that most of the peaks should come up to the division between black and red.

Something better is needed for the professional and broadcast equipment, but not the present “A” scale with its confusing -20 to +3 VU scale. Certainly this scale has its merit when used in a system that requires line-up tone tests, but for the majority of users, concerned with the origin of a program, and with no meter attenuator in sight, perhaps the best solution would be to have the meter marked +4 or +8 at the present “0” mark. The marking chosen would depend on the reference being used, and then as the meter is only going to be read between the present -1 and +1 VU marks, all that is needed in addition is +3 and +5 markings for +4 VU equipment. Similarly, for +8 VU equipment, the scale would read +7, +8, +9 VU under the arc, and on top, retain the 0 to 100 to emphasize the idea of 100% utilization of the equipment. This could be called a “C” scale to distinguish it from the present “A” and “B” scales. Now the operators and technicians could abandon such phrases as “it’s zero on plus eight,” “it’s zero level” (this was supposed to be

buried long ago) or “it’s peaking at minus five.” This last expression is the most confusing of all: is it -5 VU, -1 VU, +3 VU or -5 on the scale or what? Wouldn’t it be better to be able to say “this program is +4 VU (or whatever the standard is in use)? No more is required, but it would imply three things:

1. An approved VU meter, correctly calibrated, is being used.
2. Program material is being observed, not tone or peaks.
3. The progress has been observed for a long enough time to make a reliable statement.

As starters for a new scale meter, how about only 3 markings for VU and the 0 to 100% in 20% steps on top? For those interested in a composite program of speech and music, the percentage scale is very useful for setting the level for the less important parts of the program, e.g. themes to introduce a speech session or bridging music between two scenes in a play. Most broadcasting organizations look for this refinement in the presentation aspect of operating, and issue instructions worded something like “keep the less important portions of the program down to -5 on the scale, or down 4 dB or down to 60%. The 1/2 mark is easier to see and is another reason for retaining the 0 to 100% markings.

It is worth noting that most motion pictures produced over the last 15 years appear to be using this refinement, combined with the use of VU meters. The effect on the ears is certainly better than what is still evident on older films, where peak type meters were used and the music intervals always sounded 5 to 10 dB louder than the speech. The intelligent use of a VU meter can assist in making a very well presented program. 

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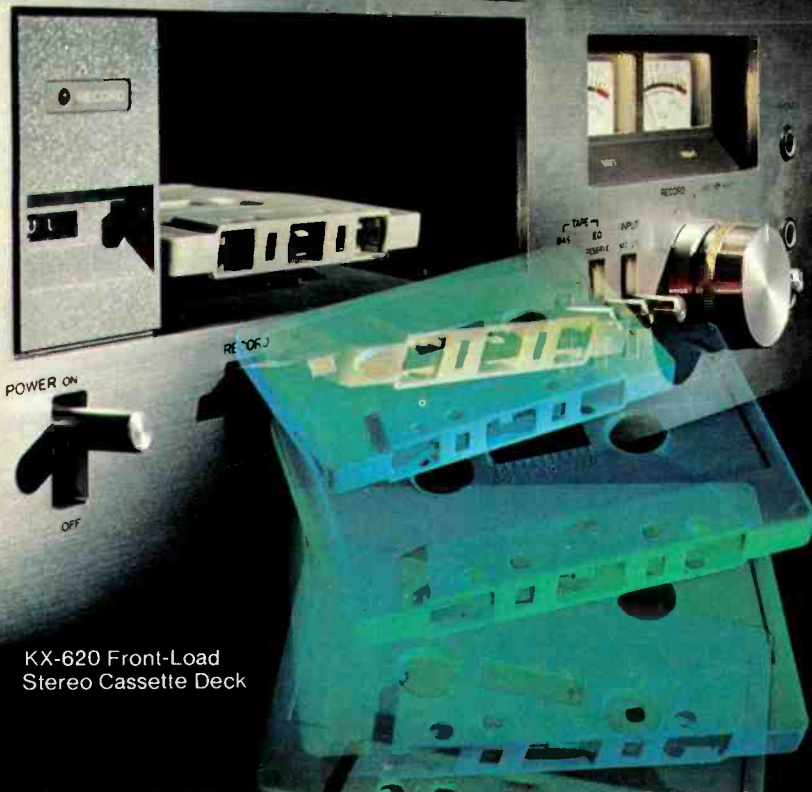
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Equipment profiles

JVC S-300 FM Stereo/AM Receiver MANUFACTURER'S SPECIFICATIONS

FM Tuner Section

IHF Usable Sensitivity: 10.97 dBf (1.9 μ V). **50-dB Quieting Sensitivity:** Mono, 16 dBf (3.5 μ V); stereo, 37.2 dBf (40 μ V). **THD, 1 kHz:** Mono, 0.2%; stereo, 0.4%. **S/N:** Mono, 70 dB; stereo, 60 dB. **Selectivity:** 60 dB. **Capture**

Ratio: 1.2 dB. **Image Rejection:** 70 dB. **AM Suppression:** 50 dB. **Stereo Separation:** 1 kHz, 45 dB; 10 kHz, 30 dB.

AM Tuner Section

Sensitivity: 300 μ V/M, internal antenna; 30 μ V, external antenna. **S/N:** 55 dB. **Selectivity:** 30 dB. **Image Rejection:** 45 dB. **I.F. Rejection:** 50 dB.

Amplifier Section

Power Output: 50 watts/channel continuous, 8 ohm loads, 20 Hz to 20 kHz,

at no more than 0.3% THD. **IM Distortion:** 0.3% at rated output. **Damping Factor:** 50 at 8 ohms. **Input Sensitivity:** Phono, 2.5 mV; high level, 180 mV. **S/N, "A" Weighted:** Phono, 70 dB; AUX and Tape, 95 dB. **Phono Overload:** 200 mV. **Frequency Response, Phono:** RIAA \pm 0.5 dB. **S.E.A. (Graphic Equalizer) Center Frequencies:** 40 Hz, 250 Hz, 1 kHz, 5 kHz, 15 kHz. **Range of Equalizer Controls:** \pm 12 dB.

General Specifications

Dimensions: 19-11/16 in. (50 cm) W by 6-5/16 in. (16 cm) H by 13-3/16 in. (33.5 cm) D. **Weight:** 22.9 lbs. (10.39 kg). **Suggested Retail Price:** \$400.00.



For several years now, Japan Victor Company has been concentrating its advertising efforts on the promotion of the CD-4 four-channel disc concept. This emphasis has, perhaps, distracted the public's attention from that company as a producer of excellently performing component equipment. Now, with the "big splash" promotion of quadraphonic equipment on the wane, the company has introduced a completely new line of integrated receivers which, outwardly at least, are as different from the conventional looking receiver as a quadradisc is from an old 78-rpm record.

The front panel of the S-300 (a mid-priced unit of five similarly styled receivers) has no rotary knobs, with the exception of a single edge-mounted tuning control somewhat reminiscent of the thumb-wheel tuning knob used by Marantz on its tuners and receivers. This tuning control, positioned on a light colored section of the panel, divides the two main areas of the receiver's front. AM and FM frequency dials and pointer are sloped backwards to make them highly visible from above, and FM calibration points are linear and spaced at every half MHz. In addition to the

usual tuning and signal-strength meters (at the left), another pair of meters (to the right) which are accurately calibrated to read power output delivered to 8-ohm loads. These meters, most often found on very expensive separate power amplifiers, can be used to monitor output power levels so that speaker power ratings are not exceeded or to balance stereo channel outputs.

Program source and all other functions are selected by means of 11 rectangular push buttons arranged in a neat single row below the dial area. Functions of these buttons, in addition to program source selection, include speaker selection, tape monitor and dubbing selection (there are two tape monitor circuits), FM muting/mono selection, power on/off, and loudness circuit selection. A stereo indicator light is located between the two pairs of meters, while a headphone jack is located along the lower edge of the panel. Instead of the usual bass and treble controls, the S-300 receiver is equipped with a five-control graphic equalizer, which JVC calls S.E.A. (for Sound Effects Amplifier). Five slide controls divide the audio spectrum into five segments, and each control varies the output at a specified center fre-

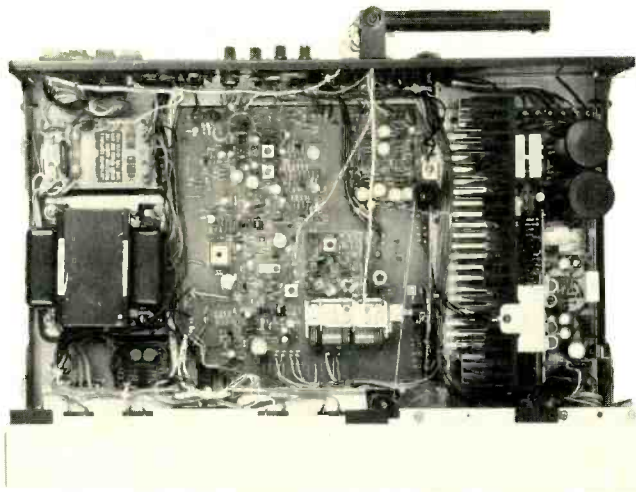
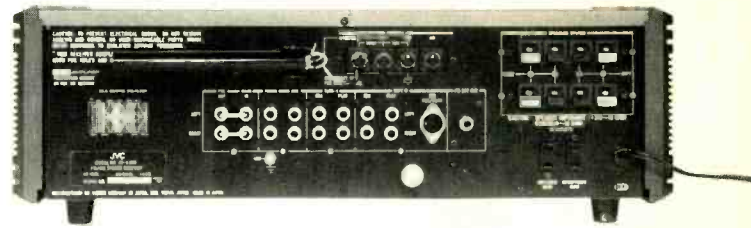


Fig. 1—Interior view, JVC S-300.

Fig. 2—Back panel view.



quency (listed in the manufacturer's specifications, above) by ± 12 dB. To the best of our knowledge, JVC is the first company to incorporate a full graphic equalizer circuit into an all-in-one receiver, providing a much greater degree of tonal equalization than is possible with even the most elaborate bass and treble control arrangements. Each of the five S.E.A. levers moves in discrete click-stop or detented increments, permitting easy duplication of favorite settings. Above these five controls are two horizontally moving slide controls which take care of master volume and balance adjustments.

The rear panel of the JVC S-300, pictured in Fig. 1, features spring-loaded speaker terminals for two sets of speakers. The usual input and tape output jacks are provided, as is a multiple DIN socket for the *Tape 2* connections. Preamp out/main amp in jumpers can be removed for separate access to the preamp and main amplifier sections of the receiver, and an FM detector jack is also available for possible use with an FM four-channel adaptor in the future. The 75-ohm and 300-ohm antenna connections are in the form of screw terminals, one of which comes connected to a so-called "indoor antenna wire" which must be removed before a normal antenna is connected. Switched and unswitched convenience a.c. outlets and the usual pivotable ferrite AM bar antenna complete the rear panel layout.

Circuitry and Internal Construction

While no schematic diagram is supplied with the owner's manual of the S-300, an examination of the internal construction of the receiver (See Fig. 2) and perusal of the company's descriptive literature yielded the following data. A single-unit four-resonator ceramic filter is used in the i.f. section together with a quadrature FM detector and a phase-lock-loop stereo decoder. AM circuitry is contained in a single multi-purpose IC. The FM front-end uses a three-section tuning capacitor and a dual gate MOS-FET r.f. amplifier stage. The phono preamp section includes a two-stage direct coupled PNP-NPN pair powered by a dual polarity supply. The amplifier section uses a differential input stage followed by a Class-A driver circuit. Output stages consist of a Darlington-connected, parallel push-pull, full complementary circuit. Several forms of protection circuitry are provided, including a speaker circuit relay, a d.c. voltage detector, and a speaker safety circuit which, according to the

company, is covered by two granted U.S. patents. Dual-polarity output-stage voltage supplies are filtered by a pair of 10,000 μ F filter capacitors.

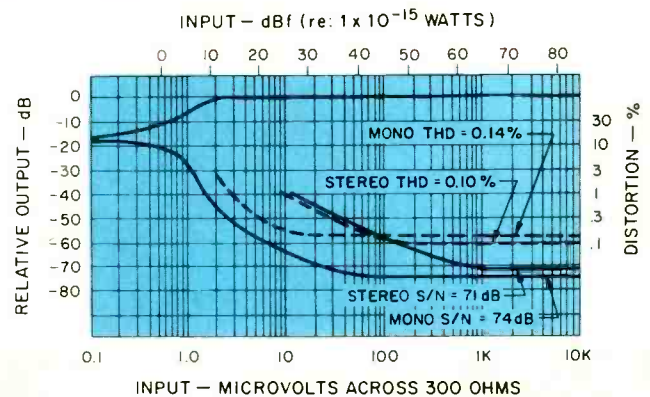
FM Performance Measurements

IHF usable sensitivity of the S-300 measured 11.6 dBf (2.1 μ V), while 50-dB quieting in mono was an exceptionally good 13.2 dBf (2.5 μ V). Stereo sensitivity was limited by the switchover threshold to 25.2 dBf (10 μ V), and 50 dB of quieting in stereo was obtained with a signal input of 37.2 dBf (40 μ V), exactly as claimed.

In the area of S/N and THD the JVC S-300 did *much* better than claimed, with S/N readings in mono and stereo of 74 and 71 dB respectively and THD readings (at 1 kHz) of 0.14% in mono and, surprisingly, 0.1% in stereo. These results are shown graphically in Fig. 3. Selectivity (alternate channel) measured 63 dB, while image rejection was exactly 70 dB as claimed. Capture ratio at 45 dBf measured 1.3 dB. Spurious responses were down some 85 dB, and AM suppression measured 54 dB, again exceeding published claims.

Stereo separation and distortion versus audio frequencies are plotted in Fig. 4, and while separation at mid-frequencies fell short of the 45 dB claimed (it measured 42 dB, still a good figure), some 30 dB of separation was maintained

Fig. 3—FM quieting and distortion characteristics.



10 sound reasons to buy our new receiver.

Plus its sound.



Sony's new, more powerful STR-6800SD receiver should get a warm reception. Because it not only looks different from other receivers, it *is* different.

It has some features found in more expensive separate components—and other features found nowhere else at all.

1. The most-used controls all in one place.

Electronically, it would have been convenient for us to scatter the level control, tuning knob and input and tape selectors all over our receiver. Instead we grouped them in the upper right-hand corner—so they're convenient for you.

2. A dial pointer that doubles in length when it's close to a station. Together with the signal strength meter and the center channel meter, this Sony innovation constitutes a system that helps you tune faster and more accurately.

3. A muting switch—great if the phone rings.

Flick it down and volume drops. Flick it back up and volume goes back up to where it was. And this muting switch is right where it should be—right next to the level control.

4. A stepped level control to keep both channels equal.

It guarantees unprecedented accuracy—to within 1/2 db instead of 1 db. And it guarantees it over the whole volume range instead of just in mid-volume.

5. MCS FET front end electronics unitized tuning.

The 4-gang tuning section and all its associated electronic parts are mounted on one sub-assembly. So

temperature differences don't affect these circuits—the receiver tunes the same whether it's cold or warmed up. And, with MOS FET, the receiver has a very wide dynamic range.

6. Dolby noise reduction system.

As more and more stations broadcast in Dolby, you can really use a Dolby system. And ours has a definite advantage: Instead of being an optional extra, it's built in—operated from the front panel.

7. Phase locked loop. It gives you greater stereo separation and less distortion.



8. LEC (low emitter concentration) transistor. This piece of advanced design in the preamp phono stage assures you tight RIAA equalization plus low noise, low distortion and a wide dynamic range. It's a Sony exclusive.

9. An acoustic compensator for easy control of highs, lows and middles. A conventional loudness control only lets you boost bass. Our acoustic compensator has three positions: For true

loudness compensation, for bass boost and for mid-range presence.

10. Sony's most powerful receiver. It delivers 80 watts minimum RMS continuous power per channel at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.15% total harmonic distortion. It has a direct-coupled power amplifier with true complementary symmetry output stages.

And more. To these specifications (remember, we state them conservatively), add Sony's proven reliability. And you get a receiver that produces a sound that'll make you understand why you have ears.

That's the STR-6800SD at \$600. Or, for less power and a few less features — but no loss of fidelity — the STR-5800SD at \$500 and the STR-4800SD at \$400 (all suggested retail prices).
A sound investment.



SONY

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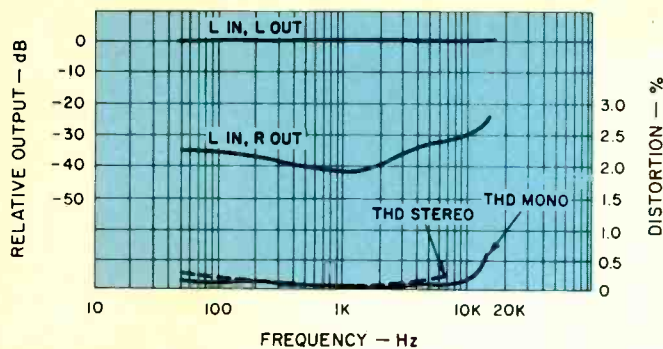


Fig. 4—Separation and distortion versus frequency.

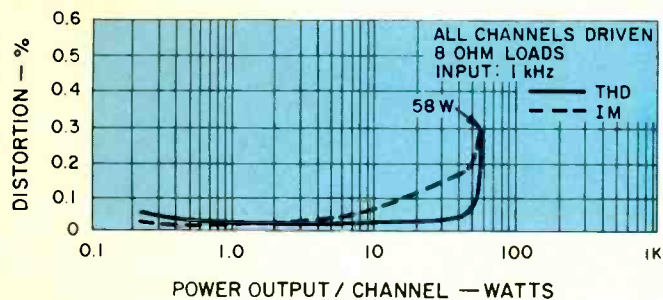


Fig. 5—Total harmonic and IM distortion characteristics.

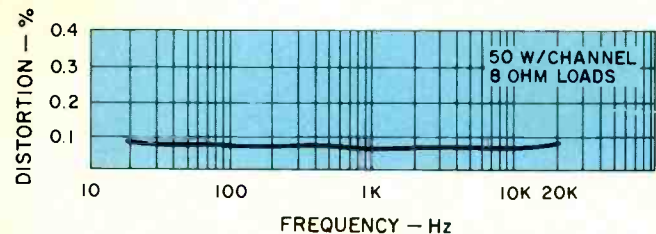


Fig. 6—THD versus frequency.

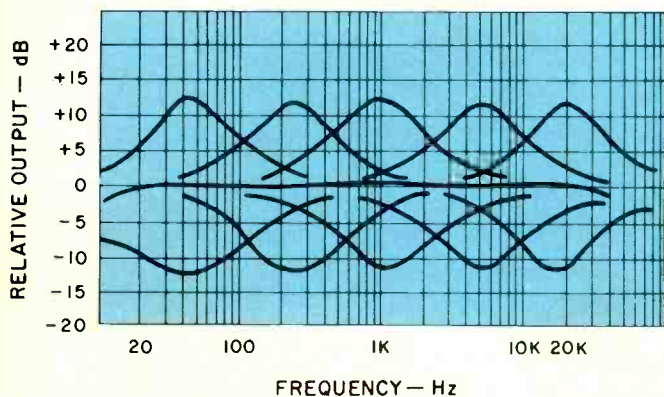
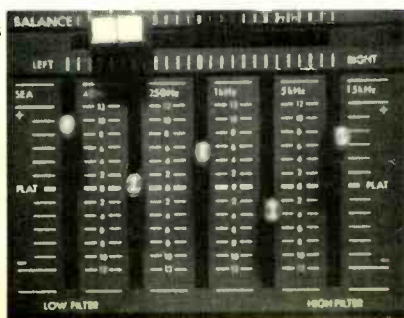


Fig. 7—Boost and cut ranges of the five S.E.A. graphic equalizer controls.

Fig. 8—These settings of the S.E.A. controls resulted in the response shown in Fig. 9.



all the way out to 10 kHz. There was little evidence of "beats" in the high frequency stereo THD measurements, and at 6 kHz in stereo THD was still a low 0.2%.

AM Tuner Section Measurements

External AM antenna sensitivity measured 27 μ V, while signal-to-noise ratio in AM reached levels of 55 dB as claimed. I.f. and image rejection both measured 49 dB, and THD at 30% modulation was just under 1.0%, typical of AM circuit designs found in mid-priced integrated receivers.

Amplifier and Preamp Section Measurements

The amplifier section of the JVC S-300 is conservatively rated in that we were able to obtain 54 watts per channel at rated THD (0.3%) even at the frequency extremes of 10 kHz and 20 Hz. At mid-band frequencies, the amplifier section delivered 58 watts of continuous power per channel for its rated THD of 0.3%. At rated output (50 watts per channel), THD was only 0.065% while IM measured 0.18%, still well below the 0.3% rating. There was no evidence of notch or crossover distortion at lower output levels down to 0.25 watts (see Fig. 5), and any lower level readings were obscured by residual noise levels, as might be expected. Distortion versus frequency for the rated 50 watt per channel output level is plotted in Fig. 6.

Phono input sensitivity measured close to the 2.5 mV stated and overload capability of this section was 220 millivolts, a bit better than the 200 mV claimed. S/N ratio in phono was measured both weighted and unweighted and were impressive with readings of 71 dB unweighted, 78 dB for the "A" weighted measurement. For the high level inputs, weighted S/N was 97 dB, while residual noise (with volume control fully counterclockwise) was 102 dB below rated output. All of these numbers would be considered excellent for a receiver at any price but are particularly outstanding in a medium-priced receiver such as the S-300.

S.E.A. Graphic Equalizer Range

Figure 7 is a graphic representation of successive sweeps on our spectrum analyzer in which each of the five frequency slide controls was moved to its boost and cut extreme positions. Action is precise and center frequency points are exactly where stated. The true flexibility of this five-control system can best be appreciated only when using the instrument in a music listening situation, but to indicate the flexibility of this graphic equalizer, we set the controls at arbitrary but reasonable settings, as shown in the close up photo of Fig. 8. The resulting response curve obtained with these settings is shown in the frequency response plot of Fig. 9.

Although JVC suggests that the end controls of the graphic equalizer may be used as high- and low-cut filters, a re-examination of Fig. 7 shows that this is stretching their usefulness a bit, since the 40-Hz and 15-kHz cut action is such that response at those frequencies reaches a minimum (when controls are in their downward position) but rises again above and below those center frequencies. However, given the choice between a graphic equalizer such as this and conventional tone controls we would opt for the five-control S.E.A. system every time. Obviously, it (like any graphic equalizer) can be over-used to upset response beyond belief, but if used for the purpose intended, the S.E.A. system on JVC's new receivers is by far the best tonal response altering system we have encountered on an integrated receiver.

Listening and Use Tests

Functionally, the "knobless" receiver takes a few moments of familiarization but the switching arrangement and

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It all started in 1883 in St. Croix, Switzerland where Herman Thorens began production of what was to become the world's renowned Thorens Music Boxes.

For almost a century Thorens has pioneered in many phases of sound reproduction. Thorens introduced a number of industry firsts, a direct drive turntable in 1929, and turntable standards, such as the famed Thorens TD 124 Model.

Over its long history Thorens has learned that an exceptional turntable requires a blend of precision, refined strength, and sensitivity. Such qualities are abundantly present in all five Thorens Transcription Turntables. Speaking of quality, with Thorens it's the last thing you have to think about. At Thorens it's always been *their first* consideration. So if owning the ultimate in a manual turntable is important to you, then owning a Thorens, is inevitable.

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TD-165C

Why the only easy way to
keep your new records
new -



is to use the Decca Record Brush

Most record cleaning devices consist of a fibrous pad or brushlike material which, in conjunction with water or a chemical compound, do a reasonably good job of keeping records clean. All of these devices, however, suffer from two critical drawbacks which prevent them from keeping your new records new.

First, they do nothing about the static problem. As you remove a new record from its jacket, it becomes charged with static which attracts tiny dust particles in the air like a magnet. While the record plays, a static charge builds up between the diamond stylus and the vinyl record surface. Sufficient static buildup causes discharge to occur. This rapid charge/discharge process produces frequent enough discharges to create a continuous series of tiny pops while the record is playing. The result is a high enough level of background noise to make the low noise qualities of expensive turntables and amplifiers wasted on your records.

Second, fibre/liquid devices do not remove dust but convert it to tiny grit deposits which form in the record grooves. When liquid is applied to dust, the resulting mixture is grit. This grit formation in the record grooves erodes the stylus and causes distortion. Chemical cleaners go one step further. They gradually eat away at the vinyl mouldings of which record grooves are made, changing the original shape of the grooves and causing your record to suffer from permanent audible distortion.

The Decca Record Brush is conceptually very simple. It consists of one million tiny bristles. Bristles so fine that 1000 of them enter each record groove to completely remove dust and dirt — without any liquid of any kind. Each bristle is electrically conductive. Before playing a record, a few seconds with the Decca Record Brush ensures removal of all static charges which have built up between the stylus and record or record and record jacket. Thus, no discharges and a significantly lower level of background noise-and no risk of stylus or record deterioration which liquid cleaners present.

Physically and audibly, you want your new records to stay new. Decca Record Brush is the only easy way to keep them that way. Decca Record Brush - from the people who know more than anyone else in the world about record production, reproduction and care.

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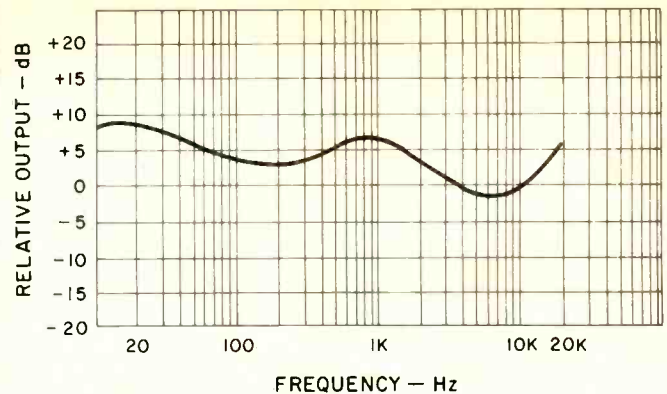


Fig. 9—Response curve obtained with S.E.A. control settings shown in Fig. 8.

slide controls give a professional feel to the set that is easy to appreciate and even prefer. Under strong signal conditions, both stereo and mono reception were excellent, and we detected none of that edginess or raspiness associated with less-than-perfect stereo multiplex circuits. JVC's engineers seem to have been able to extract a maximum amount of performance out of what is really quite an economical FM tuner circuit in the S-300 and their production departments have seen to it that alignment is well nigh perfect and calibration is right on target all across the dial.

We have to argue with the design philosophy that led JVC to couple the mono/stereo FM switch with muting on/off, because, when listening to stereo, it is impossible to defeat muting. Since the muting threshold on our sample was preset at about 24.5 dBf (9 μ V), the result is that weak-signal stereo signals will simply not come through unless that double-duty button is depressed, at which time the signals will be heard monophonically. Stereo switching occurs at 10 μ V (25.4 dBf) so that at least there is fairly close compatibility between the two thresholds, but both of them might have been lowered a bit, in our opinion, especially since when stereo switching does occur, S/N is already better than 40 dB and THD is below 1.0% in the stereo mode.

The rugged amplifier section and preamp control portion of the receiver cannot be faulted in any respect. The nominal 50-watt rating seemed every bit as conservative during listening tests as it did during our bench measurements, in that the receiver was able to drive low-efficiency acoustic suspension speaker systems to louder-than-life levels with a variety of record and tape program material which we use in our listening evaluations. The tape monitoring and dubbing facilities are sufficiently flexible to meet the need of serious recording buffs and record-out levels seemed fine in relationship to the line input requirements of our open-reel and cassette decks in the lab. JVC might want to consider providing equalized record output points as well as those which come ahead of the graphic equalizer in future designs, for it seems a pity to confine the use of that excellent S.E.A. graphic equalizer to playback only, but this is quite a small point.

In our opinion, JVC has managed to cram a great many circuit features and innovations into a medium-priced, good-looking receiver which offers exceptionally good value in its price range. Many of the features (plus some additional ones) are incorporated in the two higher-priced JVC receivers of this family (S-400 and S-600) and if you think you need more than 50 watts per channel and like the new JVC approach, these upper models might be worth looking at too.

Leonard Feldman

Check No. 90 on Reader Service Card

The new Dual CS721 is the ultimate expression of the principles that determine the performance of tonearms and drive systems. Its straight-line, tubular tonearm pivots horizontally and vertically within a true, four-point gimbal, thus maintaining dynamic balance in all planes.

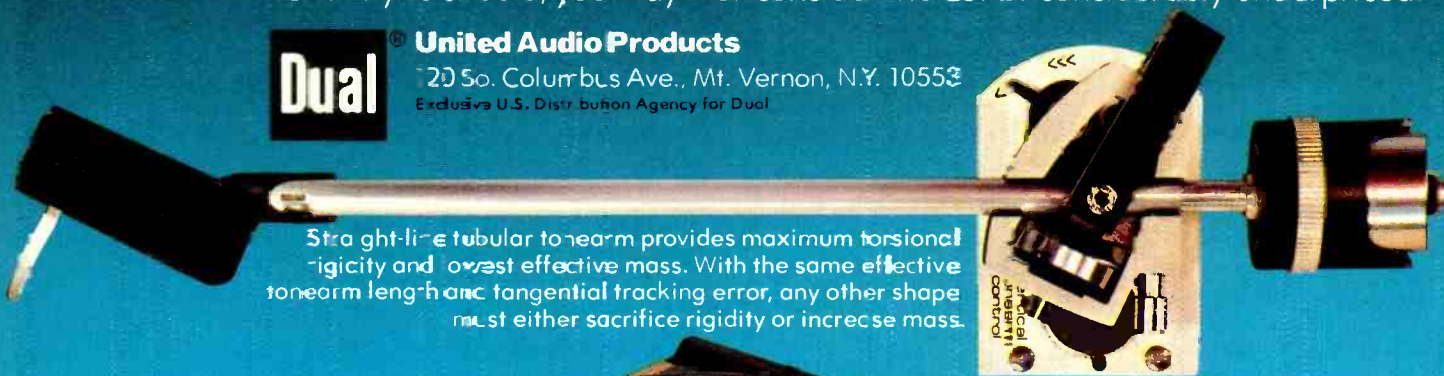
Another Dual innovation—Vertical Tonearm Control—contributes in yet another way to fine tracking performance. A vernier height-adjustment over an 8mm range parcels the tonearm to the record with any cartridge. This eliminates the added mass of cartridge spacers otherwise needed to achieve precise vertical tracking angle. In all, there are seven tonearm settings and arc adjustments — from stylus overhang to cueing height and descent speed — all serving to optimize tracking performance with any cartridge.

The new Dual CS721 represents everything Dual has learned about turntables.

The direct-drive system of the CS721 is of comparable precision. The electronically-controlled, DC, brushless motor is the smoothest and quietest ever made. A major contribution to this end result is an exclusive Dual feature: two stacked coil layers, each consisting of eight coreless bifilar-wound coils, that overlap to achieve a gapless rotating magnetic field. This eliminates the successive magnetic pulses typical of all other motor designs.

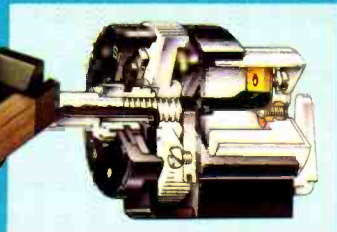
Although the CS721 is Dual's most expensive model, it is hardly the most expensive turntable available today. When you make comparisons, as we believe you should, you may well consider the CS721 considerably underpriced.

Dual [®] **United Audio Products**
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Straight-line tubular tonearm provides maximum torsional rigidity and lowest effective mass. With the same effective tonearm length and tangential tracking error, any other shape must either sacrifice rigidity or increase mass.

The Dual CS721. Single-play direct-drive turntable with fully automatic start and stop, plus continuous repeat. Features include: 10% electronic pitch control, illuminated strobe, dynamically-balanced 12" platter, anti-skating separately calibrated for conical, elliptical and "long-contact" styli. Less than \$400, including base and cover.
Dual CS704. Similar, except semi-automatic. Mechanical sensor locates lead-in groove of 12" and 7" records; tonearm lifts and motor shuts off at end of play. Less than \$310, including base and cover.



Counterbalance contains two mechanical filters, tuned to absorb energy in resonance-frequency ranges of tonearm/cartridge system and chassis to avoid feedback.

Other Dual turntables: Fully automatic, single-play/multi-play: 1215, less than \$140; 1226, less than \$170; 1228, less than \$200; 1249, less than \$260. Semi-automatic, single-play Duals: 502, less than \$160; 510, less than \$200.

Check No. 8 on Reader Service Card

Phase Linear Model 2000 Preamplifier

MANUFACTURER'S SPECIFICATIONS:

Rated Output: 2.0 Volts; maximum 10 Volts into 5 kOhm load.

Frequency Response: Phono, RIAA ± 0.5 dB.

Input Impedance: Phono, 47 kOhm, 290 pF; High Level, 40 kOhm.

Input Sensitivity: Phono, 3.2 mV; high level, 350 mV.

Phono Overload: 80 mV.

Gain: Phono, 56 dB at 1 kHz, input to output; high level, 15 dB.

Hum and Noise: Phono, 74 dB below 10 mV input; high level, 88 dB below 2 V output.

Bass Control Range: 50 Hz turnover, ± 11 dB at 20 kHz; 2 kHz turnover, ± 14 dB at 20 kHz.

Dimensions: 19 in. (48.3 cm) W x 5 1/2 in. (14 cm) H x 6 in. (15.2 cm) D.



Weight: 9 lbs. (4.1 kg), less optional wood cabinet.
Suggested Retail Price: \$299.00.

56

Despite what appears to be a great number of controls and buttons on the face of Phase Linear's Model 2000 preamplifier, it is really quite a "basic" control center with few frills. Aesthetically, the result is a pleasing, symmetrically laid out panel. Controls include a selector switch at the upper left (only one phono position is provided), master volume control at the upper right, balance and "ambience level" controls in the lower corners, smaller centrally located individual bass and treble controls (for each channel), and a tiny power on indicator light just below the model number designation at center-panel. Push button switches along the bottom of the panel take care of the two tape monitor circuits, stereo/mono switching, low frequency EQ (which adds a fixed amount of bass boost below 50 Hz that is independent of any tone or volume control settings), a pair of tone control turnover selector switches, and a tone defeat switch which bypasses tone control circuitry entirely when depressed.

Figure 1 pictures the rear panel layout, which is as comfortably expanded as the front panel arrangement. All outputs are clustered at one end of the panel and include main and "rear" outputs plus the two sets of tape out jacks. Five sets of input jacks include: the two tape-in circuits, tuner, AUX and phono. A chassis ground terminal is provided as are a switched and unswitched a.c. receptacle for auxiliary equipment and a line fuseholder.

Internal Construction and Circuitry

Internal layout of the chassis is shown in Fig. 2. Total solid-state complement of the Model 2000 consists of three ICs, one bi-polar transistor, one bridge rectifier, a Zener regulating diode, and an LED indicator. A single IC is used for the preamp-equalizer circuitry, while a pair of type 4136 ICs are

used for tone control and voltage amplification, with a type 4739 IC in conjunction with a bi-polar transistor taking care of the mixing circuitry and phase inversion required for the so-called "ambience" or "rear" outputs which Phase Linear has chosen to incorporate in this preamp. As is evident from the block diagram of Fig. 3, the "ambience" amplifier is simply fed with left and right inputs in such a way as the combine "difference" information with primary left or right channel information. The control labeled "ambience" therefore supplies "rear output" signals which contain variable amounts of R-L or L-R signals. Such signals, fed to a secondary stereo amplifier (only a basic power amp would be required) and an extra pair of loudspeakers, have been used to create a sense of "hall ambience" in home listening rooms. The effectiveness of the "ambience" system depends in great part upon the types of stereo recordings with which it is used. In our own experience, using recordings that were made "live" (instead of from multi-track studio mix-downs), the random out-of-phase signals fed to the back channel speakers can be quite pleasant if you care for that sort of thing. The additional circuitry required to pull this off probably represents only a small portion of the cost of the Model 2000 and so we cannot fault Phase Linear for departing from the "purist" approach to preamplifier control design.

Laboratory Performance Measurements

At nominal rated output (2.0 volts), THD of the Model 2000 was an almost unmeasurable 0.009% for 1 kHz, 0.02% at 5 volts out and 0.022% at the maximum 10 volt output. Waveform clipping occurred at an output level of 11.0 volts. At 20 Hz and 10 kHz respectively, THD for rated output (2.0 volts) measured 0.04% and 0.027%. IM distortion was only

Fig. 1—Rear Panel of the Phase Linear 2000.

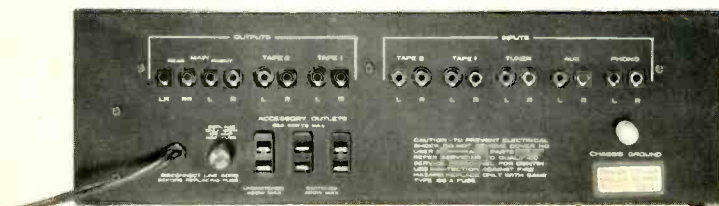
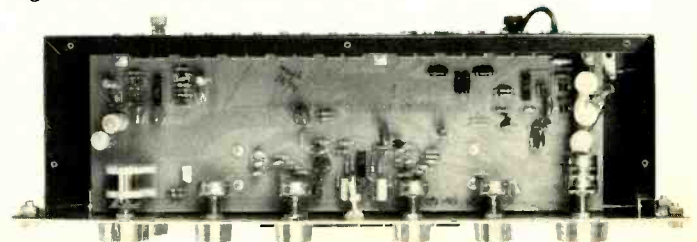
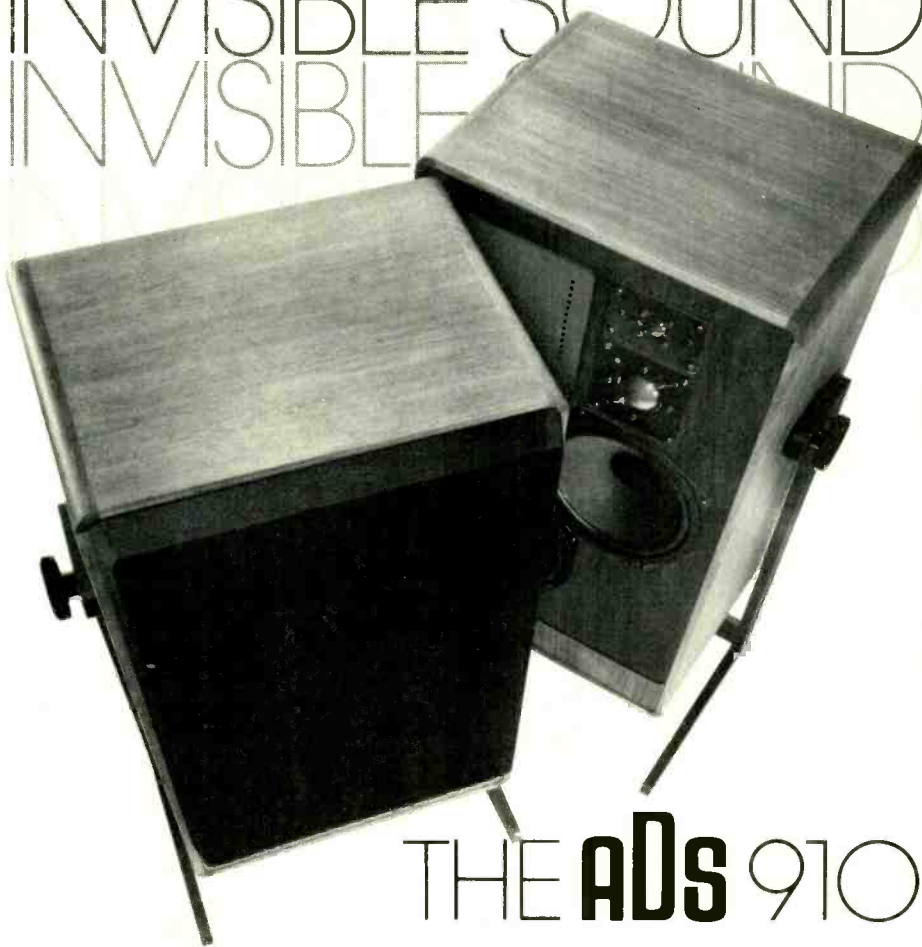


Fig. 2—Internal view of the chassis.



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THE ADS 910

**The ADS 910 Reference System -
 A benchmark in loudspeaker performance.**

For the first time, awesome dynamic capacity, widest bandwidth, high efficiency, and substantial power handling have successfully been combined - in the ADS 910.

Equally important, it is a transducer of unprecedented musical merit: incredible realism (regardless of playing level), stunning clarity and openness, pinpoint definition and stable imaging, identify this new standard of sound reproduction.

State-of-the-art materials technology and brilliant audio engineering allow the speaker to fulfill the demands of both active performers and recording engineers: their demands for "true to life" musical presentation.

Tasteful, functional design, expressed through choice woods and a meticulous furniture finish, elevates the ADS 910 to a showpiece in the well-appointed home of the discerning music lover. The speaker system's integrity and built-in flexibility appeal to the dedicated audiophile.

A new cost/performance ratio has been established by which all future studio speakers will have to be measured.

Coast to Coast, the skilled and carefully selected team of ADS dealers will proudly demonstrate our new 910, as well as any of our other eight, smaller precision speakers. Listen to the ADS 910 reference system; listen to music - the way it was recorded: Live, authentic, real!



ADS 910's shown in the recording studio of Deutsche Grammophon Gesellschaft at Symphony Hall, Boston. ADS speakers range in price from \$100 to \$600. ADS 910 Dimensions: 33 1/2" (H) x 19" (W) x 15 1/2" (D) 910C - 76PG

ADS, Analog & Digital Systems
 64 Industrial Way, Wilmington, MA 01887

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The Micro Seiki DDX-1000.

The Problem.

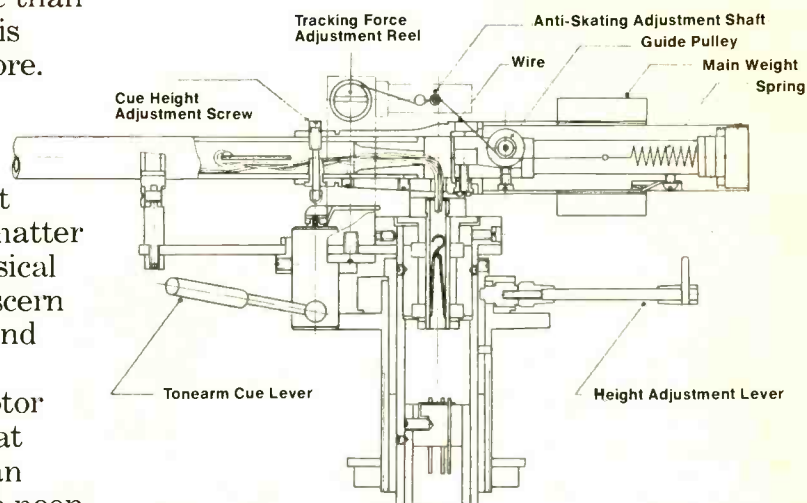
Any cartridge is subject ultimately to your personal taste. That's why so many serious audiophiles own and regularly use more than one cartridge. But changing cartridges is really a major undertaking. Not any more.

The Solution.

The Micro Seiki DDX-1000. It will accept up to three high quality tonearms. No matter how cultivated and diversified your musical tastes are, the DDX-1000 will let you discern the subtlety of interplay between disc and cartridge, cartridge and tonearm.

A direct drive DC servo controlled motor drives the large, balance-tested platter at near perfect speed. Wow and flutter is an unprecedented 0.025%. Additionally, the neon strobe lamp is driven by an independent built-in 45Hz oscillator with a frequency fluctuation of less than 0.03%.

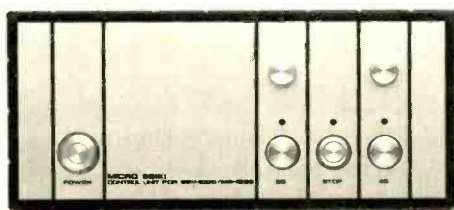
A unique 3-point aluminum alloy supporting frame and special shock mounting provide optimum stability. The two-layer absorber system (consisting of cushion rubber and insulator balls with built-in springs) eliminates any possibility of acoustic feedback. The completely isolated power supply/control unit eliminates hum and electrical noise. And micro-switches provide fast, exact operational control. The signal-to-noise ratio is greater than 63 dB.



The MA-505.

Pictured is the Micro Seiki MA-505*, the first audiophile quality dynamic balance tonearm. Since it does not depend on gravity to maintain the proper tracking force, it will compensate better for surface and groove irregularities present in many mass produced discs. In addition, the stylus pressure may be adjusted while the disc is playing to assure the best possible reproduction.

*Not included with DDX-1000. Supplied without cartridge.



**The DDX-1000 and MA-505. Creative design.
Superior execution. The complete turntable system
for the most critically demanding audiophile.**

MICRO SEIKI

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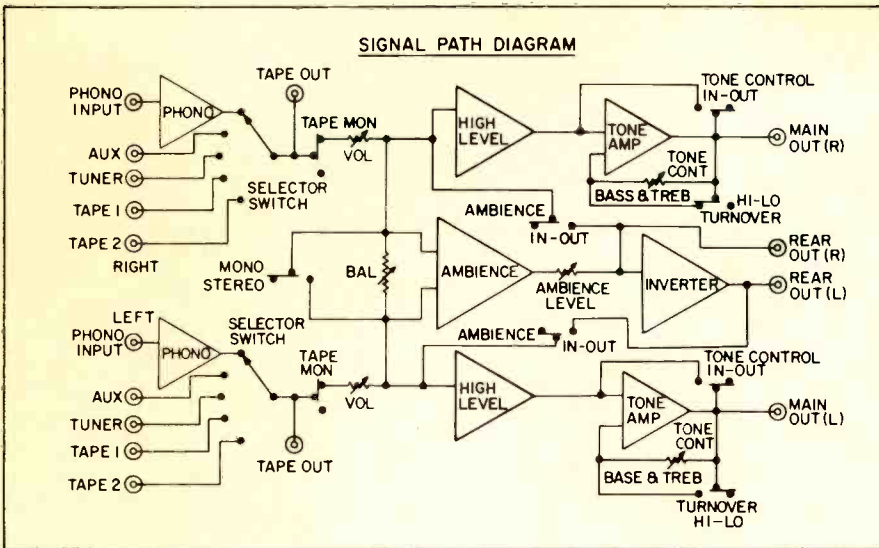


Fig. 3—Block Diagram.

0.01% at 5.0 volts output, increasing to 0.08% at maximum 10 volts out. Phono overload occurred with an input signal of 95 mV, better than the 80 mV claimed, but, in our opinion, a bit on the low side compared with the overload capability of other separate preamps (and even some integrated amps and receivers) currently being produced. Hum and noise in phono was an incredibly good 76 dB below 2.0 volts output with volume adjusted for greatest sensitivity (3.0 mV). Translated to a 10 mV phono input, the hum and noise figure becomes 86.5 dB, about the best we have ever measured for a phono preamp circuit. In the high level switch position, hum and noise measured 88 dB below 2.0 volts output, as claimed. RIAA equalization was accurate to within 0.4 dB from 30 Hz to 15,000 Hz, and overall frequency response, with tone controls defeated, was flat within 1 dB from 12 Hz to 28,500 Hz.

Figure 4 shows the range of tone control action of bass and treble controls with the turnover points set to 50 Hz and 5 kHz, while in Fig. 5 tone control range for the more conventional turnover points (150 Hz and 2 kHz) is plotted on our 'scope photo. Using the more extreme turnover points (50 Hz and 5 kHz), as represented in Fig. 4, we see the advantage gained by this kind of tone control action in that it becomes possible to compensate for tonal deficiencies at the frequency extremes without altering the essentially flat response of the mid-frequency region.

The two traces in Fig. 6 show the action of the low-frequency EQ circuit, whose boost characteristics is not unlike that obtainable by means of the bass control set to its 50 Hz turnover point.

Use and Listening Tests

The Phase Linear 2000 is easy to install, and the separate controls are a welcome (if mildly extravagant) feature after one is used to dealing with multi-function, dual-concentric, clutch-activated knobs for all these years. Sonically, the 2000 contributes no coloration that we could detect and handles transients and complex musical waveforms with the best of them. The high output levels attainable (with minimal distortion) make it a suitable mate for some of those high-powered amps that lack gain and therefore require inputs well in excess of the 1 volt level (there seem to be more of these around now than ever before). There are preamp/control units on the market which are even more basic (offering even fewer controls) than this one and, conversely, there are some preamps designed for the inveterate knob twirler which have more input and switching facilities than the 2000. Whether or not it has too few or too many inputs, switches, and controls is something you (and I) must judge on the basis of our own needs and taste.

Leonard Feldman

Check No. 91 on Reader Service Card

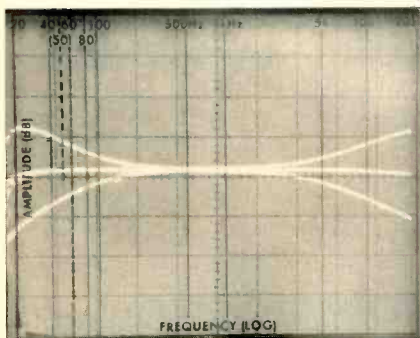


Fig. 4—Range of bass and treble controls when the 50 Hz and 5 kHz turnovers are used.

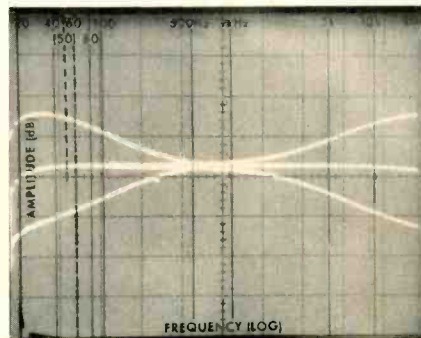


Fig. 5—Range of bass and treble controls when the 150 Hz and 2 kHz turnovers are used.

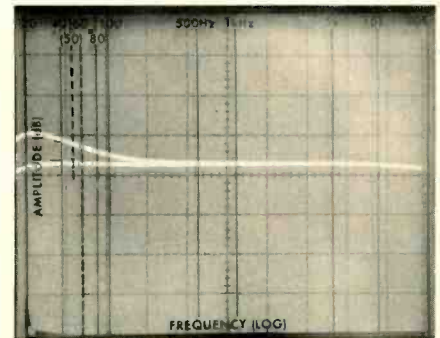


Fig. 6—Response of the Phase Linear with the tone controls set for flat (lower trace) and with the low frequency EQ button depressed (upper trace).

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★ **WIDE RANGE PICKUP RESPONSE TEST RECORD STR 120** Makes possible the measurement of pickup response at frequencies far beyond the audible range, where elusive distortion elements can cause audible distortion. The low-frequency range includes glide-tones at twice normal level for the detection and elimination of arm resonance, loudspeaker cone and cabinet rattles. Other tests include: silent grooves for measuring rumble and surface noise characteristics; and standard level bands at 0 dB for overall system S/N measurements. This record is suitable for use with a graphic level recorder to provide permanent, visible records for precise evaluation.

★ **BROADCAST TEST RECORD STR 151** Developed especially to meet the needs of broadcast engineers, audiophiles, and other professionals seeking a convenient signal source for the testing and adjustment of all audio equipment. Tests include: phonograph pickup response and separation, speed accuracy at 33 1/3 and 45 rpm, wow and flutter, rumble and hum detection, ballistic test of V.U. meters and many others."

★ **QUADRAPHONIC TEST RECORD SQT 1100** Designed for calibration, verification, and adjustment of SQ™ decoding equipment. The record provides test bands for pickup measurements, for adjustment of decoder electronics and for channel identification and balance. Each band is described in terms of recorded characteristics and its intended use.

★ **RIAA FREQUENCY RESPONSE TEST RECORD STR 130** Provides RIAA frequency characteristics for the calibration of professional recording equipment and for testing the response of professional and consumer record reproduction equipment. This record is suitable for use with a graphic level recorder to provide permanent, visible records for precise evaluation. Spot frequency bands for use without automatic equipment are included.

★ **RIAA PINK NOISE ACOUSTICAL TEST RECORD STR 140** Designed for acoustical testing of systems and loudspeakers and for psychoacoustic tests on reproduction equipment. With the STR 140 it becomes possible to test loudspeakers in the room in which they will be used. Spot frequency tones with voice announcements facilitate the testing procedure. Continuous glide-tones in 1/3-octave bands cover the frequency range from 30 to 15,000 Hz and are synchronized with a graphic level recorder.

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AG9-76

Audioanalyst Model A-100X Loudspeaker System

Manufacturer's Specifications

Type of System:

Acoustic suspension.

Speakers:

One 10-in. woofer, one 2-in. midrange and one 1½-in. tweeter.

Nominal Impedance:

8 ohms.

Power Needed:

10 to 60 watts per channel.

Size:

24¾ in. H x 13¾ in.

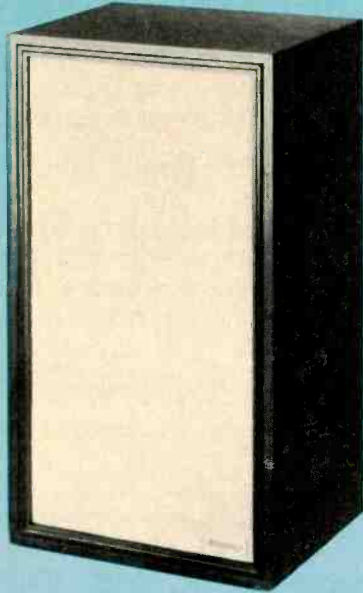
W x 12 in. D (62x35x

30.5 cm.)

Weight:

35 lbs. (15.9 kg.)

Price: \$159.00.



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The Audioanalyst Model A-100X is a three-way speaker system using a 254-mm (10-in.), high-compliance woofer, a 51-mm (2-in.) midrange driver, and a 38-mm (1½-in.) wide-dispersion tweeter. The major structure is designed as a sealed enclosure to provide the proper woofer loading for good low frequency response in a moderate sized box.

The external finish on the sides and top of the system is walnut, with an optically opaque, but acoustically transparent, cloth grille covering the front. Measuring 619 mm (24¾ in) high, by 349 mm (13¾ in) wide, and 305 mm (12

in) deep, the A-100X is designed as a bookshelf unit that can be mounted either vertically or horizontally. However, even though of modest weight, 16 kg (35 lbs.), the smooth sides of this unit cause me to recommend that rubber bumpers, or similar safety stops, be provided on any shelf containing this speaker to prevent the unit from accidentally sliding off, as with any smooth-sided speaker.

Connection is made to well-marked terminals on the rear of the enclosure, and two toggle switches provide simple adjustment of midrange and tweeter acoustic balance if that is desired in a particular listening situation.

A simple, but adequate, instruction sheet comes with the speaker, which even a novice can use with comprehension in hooking up a system for the first time. A welcome addition in the instructions is the inclusion of a cautionary note on the hazards that long term exposure to high sound pressure level poses to hearing. The long term risk to hearing is a very real hazard if common sense is not used, and I applaud Audioanalyst for their concern.

Technical Measurements

The magnitude of speaker impedance as a function of frequency is shown in Fig. 1. While the rated nominal impedance is 8 ohms, the lowest value of about six ohms is reached at around 120 Hz. There is some change in load impedance with position of the rear-mounted level switches, and the two extremes of this variation are shown in this plot. From the standpoint of amplifier load, a slightly lower impedance is presented at high frequencies when the rear-mounted switches are both set to the upward or *HI* position. The bass resonance for this speaker occurs at 54 Hz.

The polar impedance counterpart of Fig. 1 is shown in Fig. 2 for the same range of frequencies and for the condition when both rear-mounted switches are in the *HI* position. Bass resonance is quite well behaved, and the 450 Hz shelf in impedance in Fig. 1 is revealed as a possible diffraction effect. At the higher frequencies, the maximum capacitive

Fig. 1—Impedance versus frequency for extreme positions of equalizer switches.

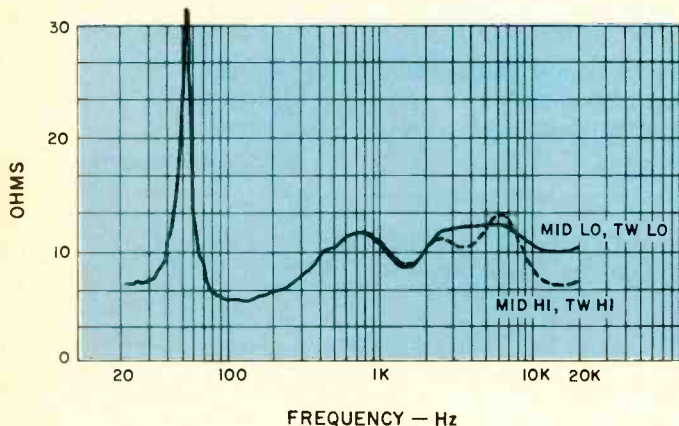
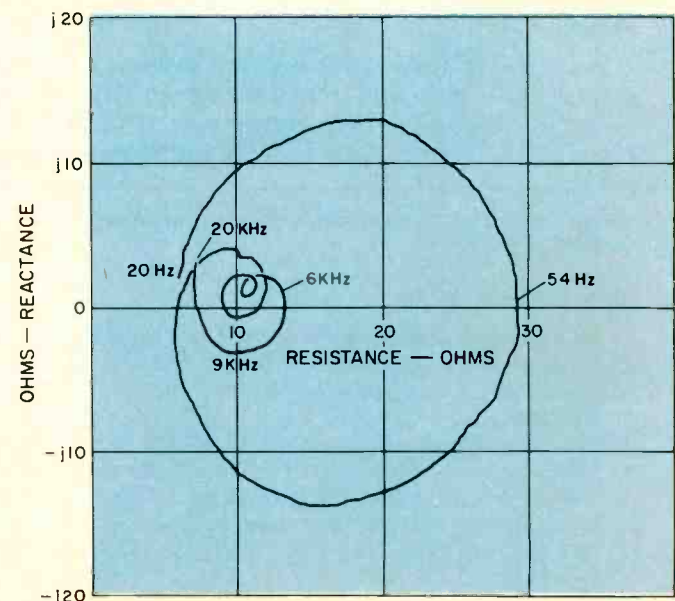


Fig. 2—Complex impedance for *Mid Hi* & *Tw Hi* equalizer switch positions.



phase angle is seen to occur at around 9 kHz, with a transition toward inductive reactance at 20 kHz. Since the magnitude of this impedance at 9 kHz is around 10 ohms, with only about 3 ohms capacitive reactance, most amplifiers should have no difficulty driving the A-100X near clipping level on high frequency transients.

Figure 3 shows the one-meter axial anechoic frequency response for one-watt average drive. This is the plot of the sound pressure amplitude and is made for the two extreme positions of the equalizer switch position. There is the slightest tendency for a low end peak at around 63 Hz before the response falls uniformly below that frequency. From 200 Hz and continuing upward there is a very gradual increase of level with frequency, even for the LO equalizer positions. This indicates that the direct sound will have a mildly bright characteristic with a tendency toward a bit too much top end. Output for this one-watt drive level averages approximately 87 dB above about 50 Hz, showing the A-100X to be moderately efficient for a closed-box system.

From the anechoic standpoint, the tweeter is about a dB and a half hotter than the midrange woofer, and you may want to drop its level by that amount for a better spectral balance. The tweeter keeps right on going at 20 kHz, which is quite good performance. There are enough variations in both midrange and tweeter response to indicate the existence of diffraction effects.

The anechoic phase response is shown in Fig. 4. There are two plots here. One plot is corrected for the path delay of the tweeter, while the other is corrected for the path delay of woofer unit. The tweeter is acoustically the first driver heard, followed by the midrange unit, then followed by the higher frequency components of the woofer. The tweeter is actually 0.28 milliseconds in front of the top end of the woofer and 0.07 milliseconds in front of the midrange.

The actual acoustic crossover between woofer and midrange occurs at slightly above 2 kHz, while the 7.5-kHz crossover for the tweeter is just what Audioanalyst specifies it to be. There is, however, a 180-degree phase reversal between tweeter and woofer, so that care should be used when matching this system with ones of other manufacturer for use in quadraphonic systems.

The time scatter of arrival for the three drivers gives a non-minimum phase response around the crossover regions. Small details in response due to each driver considered separately, however, are of minimum phase.

The spectral dominance of the tweeter, coupled with the fact that the tweeter and midrange sound arrived ahead of the components below 2 kHz, implies a bright sound.

The three-meter room response for on-axis and 30-degree left-channel stereo position are shown in Fig. 5. For this test the A-100X was placed against a wall, and the height adjusted so that the tweeter was one meter above the floor with the enclosure long axis vertical. The plots are displaced 10 dB for clarity of presentation.

The better of the two responses is obtained directly in front of the enclosure, in an on-axis position. Severe diffraction dips take their toll off-axis. This measure strongly suggests that the A-100X should be angled toward the listening area for more accurate sound.

The equalizer positions chosen for this test were both midrange and tweeter in their LO position, which was the condition experimentally chosen during the earlier listening test and the position the maker recommends in their literature. The drop in response in the octave of middle C shown in this plot for both speaker positions may account for the feeling of thinness which I had earlier when listening to or-

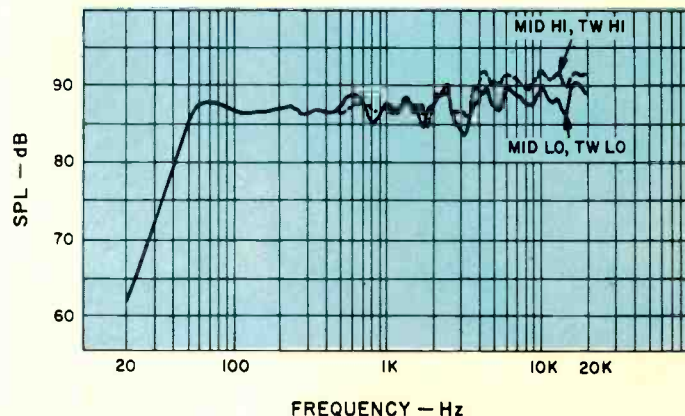


Fig. 3—One-meter anechoic sound pressure level for one-watt drive.

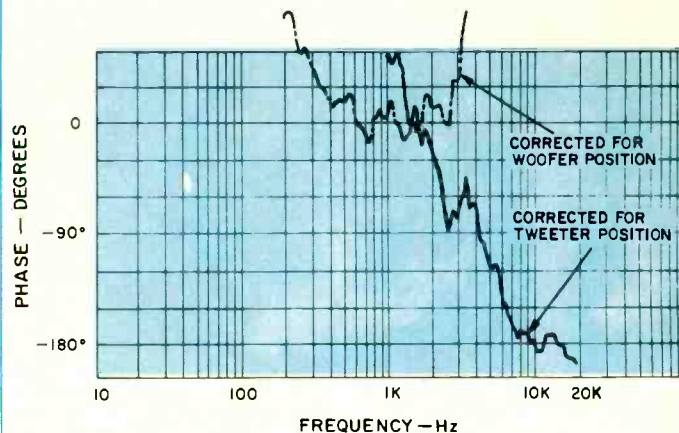


Fig. 4—One-meter anechoic phase response.

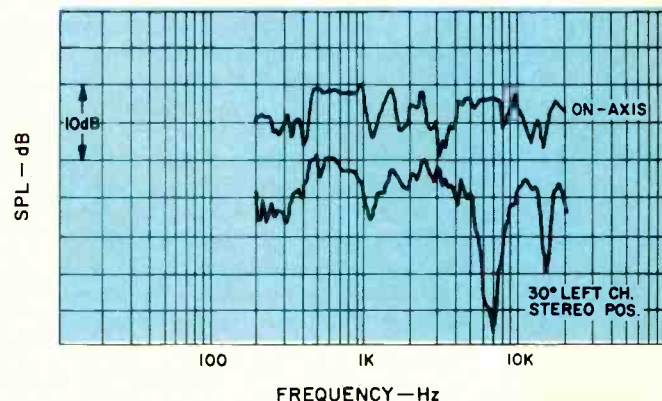


Fig. 5—Three-meter room response.

Fig. 7—Vertical polar energy.

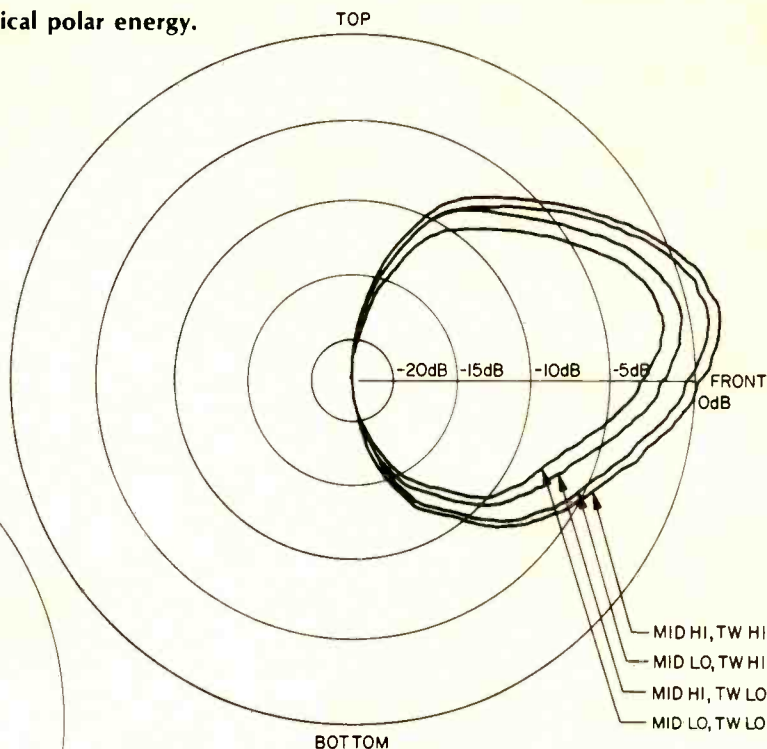
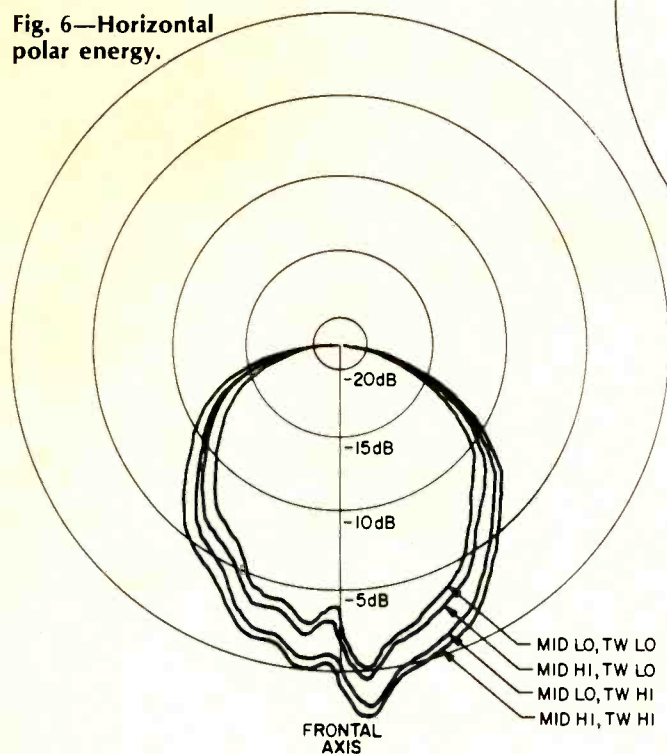


Fig. 6—Horizontal polar energy.



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chestral and piano music. As in the anechoic response, the top end goes right up to 20 kHz with no strain.

The polar-energy response plots are shown in Fig. 6 for azimuth and in Fig. 7 for elevation. For these measurements, the long axis of the enclosure was vertical, with the tweeter above the woofer, as it was placed for the three-meter room test. The four possible combinations of switch equalizer position are shown in these plots. On average, the midrange control gives about a 1 dB variation, while the tweeter control gives about 2 dB variation for the total energy in the 20 Hz to 20 kHz frequency range. It is apparent that there is a definite left-right dissymmetry. These plots indicate that if the A-100X is placed in a conventional manner, with the enclosures pointing directly out from a wall, the left channel will be slightly stronger than the right channel for higher frequency stereo sound. Some care should therefore be taken in the choice of mounting configuration for these speakers, as there is an azimuth beaming problem within 15 degrees or so of a position directly in front of the enclosure. If the spacing between speakers is wide enough to give a physical angle between them and the listening area of 60 degrees or greater, then the speakers should definitely be rotated toward the listening area for balance. But don't angle them directly toward the listening area or the beaming will be noticeable in terms of a diffuse stereo image.

The good vertical dispersion above the median plane in Fig. 7 shows that the A-100X should be placed reasonably close to a floor for the best timbre. But do not mount the units above ear level or directly under protruding reflecting surfaces.

Harmonic distortion for the musical tones of E1 or 41 Hz, A2 or 110 Hz, and A4 or 440 Hz is shown in Fig. 8. With the exception of the second harmonic of E1, the distortion remains quite acceptable throughout the dynamic range of most material. Even though the numerical value of such distortion is higher than that found in most power amplifiers, the uniform characteristic of this distortion and its continual reduction to very low values at low drive level will lead to an acceptably good listening characteristic for the A-100X from the standpoint of harmonic distortion.

Intermodulation distortion is shown in Fig. 9. This is the amount of distortion produced on a pure tone of 440 Hz when 41 Hz is simultaneously reproduced at equal drive level. The low frequency produces a rather large effect which infers that low frequency tones can produce distinct muddiness on higher frequencies when sound is played at high levels. At low power levels the intermodulation is almost pure amplitude modulation of 440 Hz by 41 Hz. As the level increases the characteristic of this distortion changes. At ten watts average, there is 6 per cent peak-to-peak amplitude modulation and 5 degrees peak-to-peak phase modulation of 440 Hz, larger than I would prefer to see in a loudspeaker of this quality.

Crescendo handling capability for random sounds, such as hand claps and cymbal crashes, is quite good and the full power capability of the A-100X can be used on wide range material without difficulty. For the musical tones of middle C (262 Hz) and low G (98 Hz), the Audioanalyst A-100X was able to handle signal levels of random noise up to 105 volts peak to peak, corresponding to about 150 watts average, without masking inner musical voices.

The conclusion I would draw from these three measurements, harmonic, intermodulation, and crescendo handling, is that the Audioanalyst A-100A should give a brisk,

reasonably clean level for most material, but will tend to go muddy if pushed too heavily with frequencies below 100 Hz, such as strong and deep organ pedal notes.

The energy-time response, which is the measure of energy spread in the reproduction of a perfect impulse, is shown in Fig. 10. The first peak in arrival, for the microphone placed exactly one-meter in front of the enclosure, comes from the tweeter at 3.02 milliseconds. The midrange drive contribution arrives at 3.1 milliseconds and is sufficiently close to the tweeter response to give a single peak in energy. The woofer contribution occurs at 3.3 milliseconds, with some longer term "grumbling" extending to 4 milliseconds, where the sound level is sufficiently low that diffractive scatter from enclosure boundaries are all that remain.

The impulse response is quite good, with some mild oscillatory ringing in the drivers, and the midrange and woofer energy scatter in the 3.5 to 4.25 millisecond time range would indicate that physical structure on the front of the enclosure is causing a small degradation of percussive response properties.

Listening Test

In order to audition the A-100X, the speakers were placed near a wall and the height adjusted so the position of the tweeter was about one-meter above the floor level. This places the speaker at ear level for normal listening. The included angle between the speakers and the listening location was set to about 60 degrees for stereo.

The first impression I had was that the sound was bright, with a distinct upper register dominance. The rear-mounted switches were then set to *LO* for tweeter and *LO* for the midrange for most of the audition material, which are the maker's recommended positions.

My impression then was that the sound was clean but thin, as though the woofers were being driven out of phase. A momentary phase reversal test performed on one of the speakers convinced me that the drivers were properly phased. Serious listening to wide range material assured me that the bass was there, but was simply down in level for such a speaker placement. Moving the speaker down to the floor, to pick up an extra boundary, might help, as would placing the A-100X's in the corner of the room. But in my opinion this would not be as acoustically proper for this particular speaker as would simply lifting the bottom end with pre-amplifier equalization.

Piano music has good articulation, but tends toward a thin sound, with the octaves below middle C definitely requiring augmentation in the preamplifier to achieve balance. On orchestral music I found that I preferred to lift the midrange switch to *HI* position, keep the tweeter in its *LO* position, and pull the top end down slightly to avoid the bright sound on strings which some persons like, but which I find unnatural. When I did this the stereo image was quite good, and in fact had a good sense of depth which is so often lacking on speakers in this price range.

The Audioanalyst A-100X can handle peaks on rock music at lease-breaking levels, but I could never quite get proper spectral balance. Choral music and single vocals were quite another thing and the A-100X did an excellent job of reproducing both.

This is a darn good machine for general listening, considering the low cost of the loudspeaker. Most listeners should appreciate the sound reproduction of the system, particularly with vocal selections, though there are obvious exceptions such as rock enthusiasts who will prefer a stylized sound for their specialized listening needs.

Richard C. Heyser

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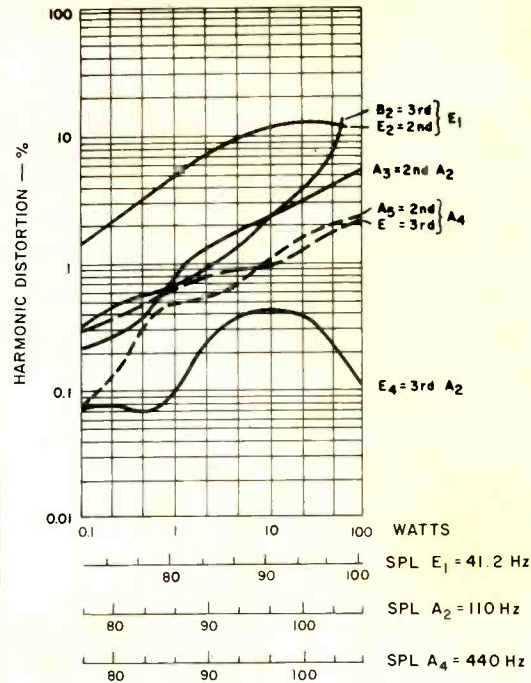


Fig. 8—Harmonic distortion for the tones E1 or 41 Hz, A2 or 110 Hz, and A4 or 440 Hz.

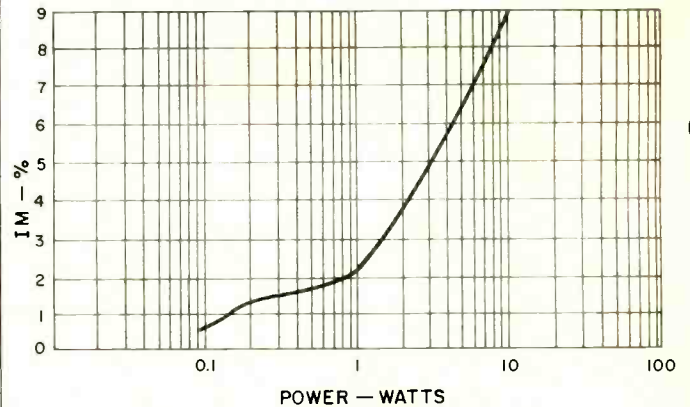


Fig. 9—Intermodulation of A4 or 440 Hz by E1 or 41 Hz mixed one-to-one.

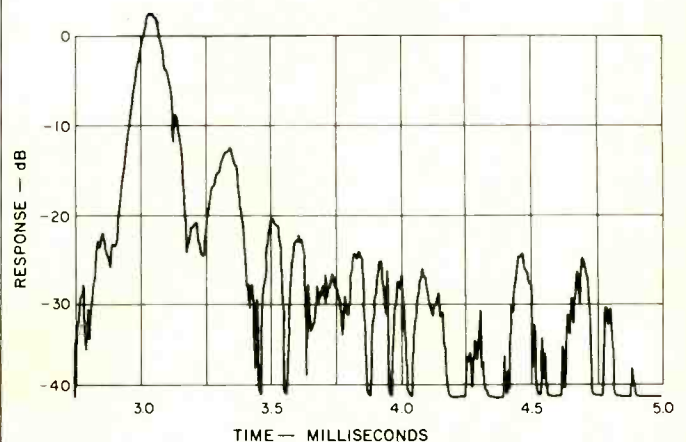


Fig. 10—Energy-time response for axial one-meter microphone position.

Nakamichi Model 600 Stereo Cassette Console

MANUFACTURER'S SPECIFICATIONS

Frequency Response: 40 Hz to 18 kHz.
Harmonic Distortion: Less than 1.5% for 400 Hz at 0 VU; less than 0.5% with IM Suppressor in. **Signal/Noise Ratio:** 60 dB with SX tape and Dolby at 0 VU, 68 dB at 3% THD with IM Suppressor.
Separation: 35 dB. **Crosstalk:** 60 dB.
Erasure: 60 dB. **Input Sensitivity:** 60 mV at 50K ohms. **Output Level:** 580 mV. **Wow and Flutter:** 0.12% WTD peak. **Speed Deviation:** $\pm 1\%$. **Dimensions:** 15-3/4 in. (40 cm) W by 6-7/8 in. (17.5 cm) H by 9-3/8 in. (23.8 cm) D.
Weight: 14.3 lbs. (6.5 kg). **Suggested Retail Price:** \$500.00.



The 600 Cassette Console is one of a group of special new Nakamichi components, the Recording Director Series. The front panel is solid aluminum, over 1/8-in. thick, inclined back about 30 degrees. This position is excellent for on-table control and monitoring. The cassette well is on the left side, with the counter and memory above, and the tape motion controls below. The cassette tray has a partial cover, but the majority of it is open which aids in checking tape motion. Access to the heads is ample for all cleaning and demagnetization needs, a welcome design feature. Tape motion controls are interlocked so that it is necessary to go through *Stop* before changing modes. After *Stop*, this lever must be released and then pressed again to eject the cassette. When the cassette is placed on the tray, a light push causes it to drop into play position.

At the top of the right side of the panel are the peak-reading level meters, with a wide range from -40 to $+7$ VU. The range around 0 VU is expanded with red markings above zero, the scales are very legible, even at a distance, and the meters are well illuminated; all help to make an excellent display. Below the meters is a row of button switches: EX or SX tape types, 70 or 120 microseconds equalization, 400-Hz tone on-off, multiplex filter in-out, Dolby in-out, IM suppressor in-out, and power on-off. The 70-microsecond equalization is used with the newly introduced SX tape which offers a number of advantages over CrO₂ tape, which would use the same equalization. Below the button switches

are adjustments for both EX and SX tapes for *Bias*, *Level* and *IM Suppression*. There are pots for each channel with removable caps covering the access holes. Adjustments of *Level* are made in conjunction with the 400-Hz tone to ensure having the proper Dolby record level. There are individual record level controls for each channel in addition to the very handy master pot. A single control governs the outputs from the two channels. Handles at each end of the panel facilitate moving the unit, which can be easily installed in a cut-out.

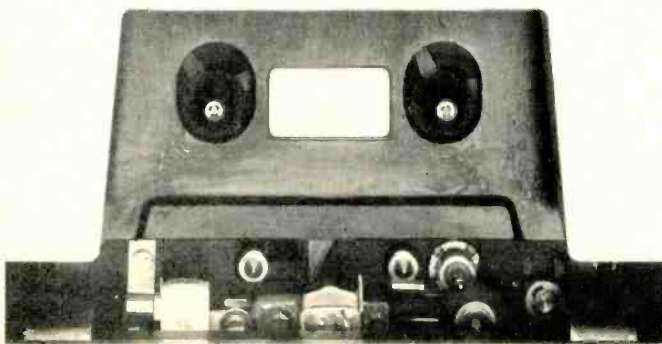
On the back are the line-level input and output connections through phono jacks or a DIN socket. Above the jacks is a block schematic of some detail showing the recorder circuitry. In line with its intended use with other equipment, there are no mike level inputs and no headphone jack. The bottom, sides, and back consist of a one-piece molded plastic enclosure held in place with five screws. One PCB contains the majority of the circuitry, with five smaller PCBs for such functions as power supply and motor governor. Soldering on the circuits cards was excellent, and the card-to-card wiring was neat and tied. The recorder can be turned on in *Play* or *Record* mode with an external timer.

Circuit Description

Of particular interest in the Nakamichi 600 collection of good design features is the unique Intermodulation Suppressor. In other designs, limiters and predistorters have been used to limit distortion generated in the recording process. The Nakamichi circuit is immediately different and fascinating because it operates on the playback signal, taking out the distortion that was previously recorded, even on another recorder, but the other recorder must have linear phase characteristics. The approach is based upon some of the characteristics of the magnetic recording process. In most cases, the predominant harmonic distortion component is the third at all frequencies and all levels. Also, the level of the third harmonic changes at a constant rate relative to changes in the record level. Finally, major components of intermodulation distortion change at this same rate with level changes. With careful design, then, a linearizer, or distortion suppressor, could be made to operate on the playback signal, making it more linear and reducing the distortion.

The IM suppressor is part of the sophisticated playback circuitry. EQ₁ provides the initial high frequency time constant of 70 microseconds and a low-frequency time constant

Fig. 1—Close-up view of cassette well.



of 120 milliseconds for proper integration of the lowest frequencies. EQ₁ is an LCR network designed to compensate for head gap and spacing losses. EQ₂ has a 22-microsecond time constant which brings the saturation points at the different frequencies to approximately the same level. Typically, there are considerable phase shifts in the playback, with harmonics losing their time relationships to the fundamentals. Without the correction of these shifts, the suppressor could possibly introduce more distortion than it would remove. The phase shifter, therefore, is an essential element in the overall design. Performance tests showed the effectiveness of the suppressor of benefit over a wide range of levels and frequencies. Following the suppressor itself is EQ_T which provides switching to 120 microseconds as needed. EQ₃ undoes the 22 microsecond TC of EQ₂, and EQ₄ provides the standard 3180 microsecond low-frequency TC.

Performance

The Nakamichi 600 provides an outstanding level of performance in a number of areas. The manufacturer states that the focused-field crystal permalloy head is the major reason for the wide frequency response and great dynamic range. The playback response was flat over most of the range for both equalizations with a gently rising response at the highest frequencies. The unit surpassed the specified 40 Hz to 18 kHz record/playback response at -20 VU quite handily. With SX tape without Dolby, there was a little droop at 2 kHz and some rise at 8 kHz, but the low-frequency end-point remained the same, and the high end changed *slightly* to 20.0 kHz. Superior headroom properties at 0 VU record level were shown with the 3-dB down point at 12.0 kHz, 11.0 kHz with Dolby. The results with EXII tape were similarly excellent: from 21 Hz to 20.5 kHz at -20 VU, and 21 Hz to 20.3 kHz with Dolby. At 0 VU the -3 dB point was at 12.0 kHz, 11.8 kHz with Dolby. There was no measureable effect on any of these responses with the suppressor switched in. The record/playback responses discussed here were notable in other respects. The two channels were very well matched, within a *fraction* of a dB, over the entire frequency range both normal and with Dolby. Accurate Dolby tracking and channel matching are essential to realize the full potential of this noise reduction system. In this regard, the Nakamichi 600 is without doubt the best cassette recorder this reviewer has evaluated. An additional benefit from such performance is that stereo imaging has more solidity and does not shift with level changes.

Measurements were made of the relative levels of the 3rd harmonic of a 1-kHz tone recorded at levels from -10 to +10 VU. A spectrum analyzer was essential in getting reliable data at the lower levels and also permitted observation of other harmonics. This was particularly important in

assessing the performance of the IM suppressor. The results for one channel were substantially identical to the other. With SX tape, the distortion was just 0.56 per cent at 0 VU, 0.40 per cent with the suppressor. At +7 VU, the distortion was 4.5 per cent, 2.5 per cent with the suppressor. The benefits of this circuit were in evidence even at -10 VU where it reduced the third harmonic from 0.06 to 0.05 percent. Other harmonics than third appeared at the highest levels, but they were acceptably low even at +10 VU. With Dolby, all distortion figures were about 20 per cent lower.

With EXII tape, there was little effect from the suppressor at lower levels, but distortion was a most respectable 0.45 per cent at 0 VU, 0.36 with Dolby. At +7 VU, the suppressor reduced the distortion from 3.2 to 1.8 per cent, and from 2.8 to 1.4 per cent with Dolby. Few harmonics other than third were observed even at +7 to +10 VU. Tests of IM distortion with various combinations of tones revealed that the suppressor obtained reductions of 50 per cent at higher record levels. The device also restored the output as a linear function of the input up to +7 VU within a fraction of a dB. Tests were made of the harmonic distortion from 30 Hz to 10 kHz, both at 0 VU and at -20 VU. There is little significance to 3rd harmonic distortion figures for 10 kHz. The distortion values were low across the band for SX tape, with reductions obtained with the suppressor. EXII tape generally had lower distortion at 0 VU than SX tape, but showed little benefit from the suppressor at this level. Distortion figures for -20 VU for both tapes were usually below the limits of the test equipment. Distortion figures for the two channels were substantially identical over the entire band. Suppressor action was primarily on 3rd harmonic at each test frequency up to the highest without adding other harmonics, indicative of excellent phase compensation. In summary, the suppressor was consistently effective in reducing IM and 3rd harmonic distortion without negative side effects.

The signal-to-noise ratio was 61 dBA (A weighting) with SX tape and Dolby, 69 dBA with the suppressor. The ratio for EXII tape was 57.8 dBA with Dolby, 66 dBA with suppressor added. All of these figures are referenced to the 3-per cent harmonic distortion level. Separation from one track to the other was a good 46 dB at 1 kHz and 0 VU. Crosstalk to the adjacent track of opposite play direction and erasure were both excellent, over 80 dB down. Line input sensitivity was 66 mV, slightly greater than the specified 60 mV. All pots were smooth in action with very close tracking of the sections of the dual pots. The output level for 0 VU record was 580 mV, exactly as specified. With the multiplex filter in the response was down 3 dB at 16.2 kHz and 32 dB at 19 kHz. The meters are stated to be peak-level type and respond to within 3 dB with a 33 millisecond burst of 1 kHz at reference level. Response was to the same level with single-cycle bursts

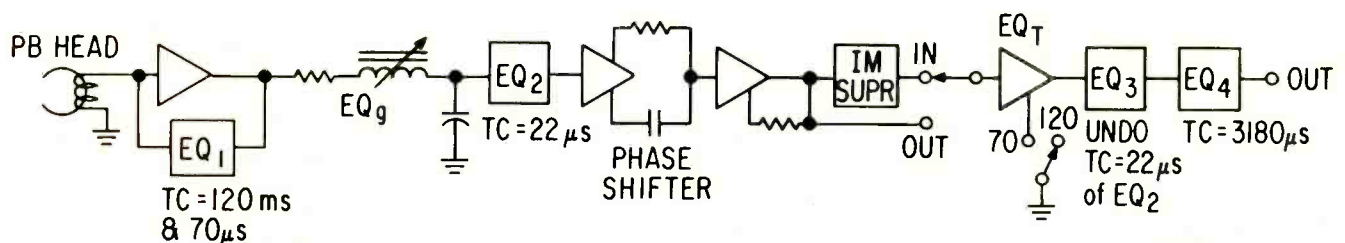


Fig. 2—Block diagram of playback circuit.

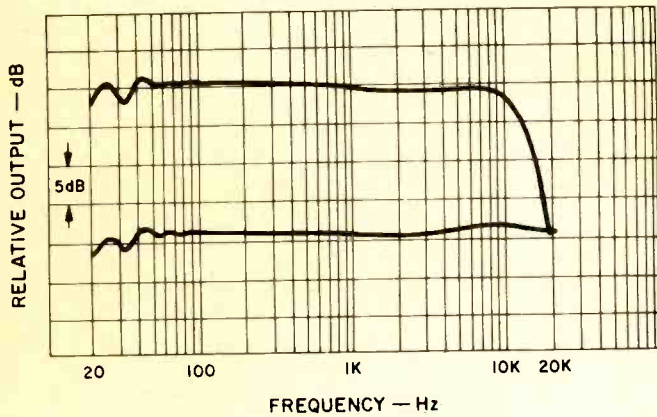


Fig. 3—Record-replay response of Nakamichi 600 using the firm's SX tape without Dolby. Response with Dolby was virtually identical.

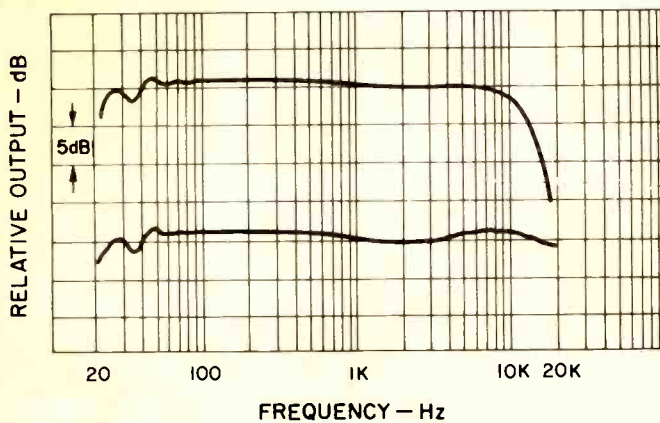


Fig. 4—Record-replay response using Nakamichi EX II tape with Dolby. Response without Dolby was virtually identical.

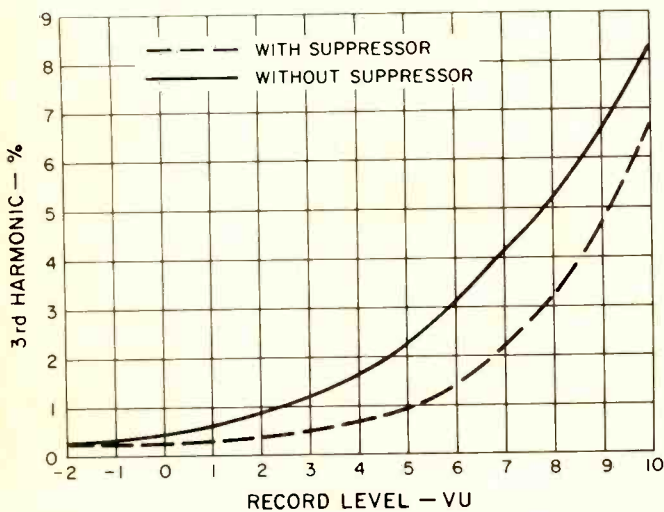


Fig. 5—Percentage of third harmonic versus record level, showing action of suppressor, using SX tape.

every 35 milliseconds. The meters, therefore, do provide peak-level indications with typical speech and music inputs, although they do not respond fully to short, isolated bursts. The slower decay rate facilitated reading and setting levels. Scale markings were found to be quite accurate, and tracking between meters was excellent.

The lowest measured flutter was 0.04% DIN weighted peak, with an average of 0.08%. The tape play speed was 0.9% fast at the standard test 120 V a.c., with very little change from 110 to 130 volts. Rewind time was about 110 seconds, rather slow, but of minor significance. It is quite possible that Nakamichi chose a slower wind to minimize any possible damage to the tape which could affect contact to the heads. The recorder had shown superior amplitude smoothness in the swept-frequency responses, an indicator of good tape/head contact.

In-Use Tests

When the opportunity was presented to record the SUNYA (State Univ. of New York at Albany) Woodwind Quintet, the 600 was quickly conveyed to the performance hall, complete with mike and a Shure mixer. As judged earlier, the angle of the front panel made all level control and monitoring most natural. The line outputs were used to feed a small headphone amplifier. For a critical test of the unit's capabilities, the performance was recorded at a high level, with many peaks to +5 VU. Even with this approach, the wide range of the meters to -40 VU was of value. A different tape formulation was used for each composition, with a check and adjustment of Dolby record level with the 400-Hz tone. The calibration was already exactly correct for the SX and EXII tapes; the Maxell UD (EX settings) and the TDK SA (SX settings) required some adjustment.

A piece by Milhaud was performed first by the SUNYA quintet and provided challenges for the musicians. The listening experience was a joy, however, with an unstrained openness reserved for some original recordings. Some brittleness in high-level oboe tones was judged to be the result of slight overblowing, but switching on the distortion suppressor provided instant sweetening. *Kvintet* by Nielsen demonstrated the subtle impact of the suppressor. Although there was no obvious change, the playback seemed "more musical" with it in. The beneficial action of the suppressor was more apparent on peaks over +7 VU during an encore piece by Ibert.

Insertion and removal of cassettes was easy and fast, yet gentle at the same time. Cleaning and demagnetization was the easiest of any cassette machine checked to date. The instruction book is succinct and clear with helpful route maps drawn over front-panel layouts showing the order of switching or adjustment for various tasks. Nakamichi provides a limited list of recommended tapes including their own SX, EX, and EXII, a necessary step to ensure that all of unit's performance capabilities will be obtained by the user. The directions given on making the adjustments include worthwhile cautions to prevent uninformed fiddling. No detailed schematic is provided, but with the adjustments made available, there would be little need for it by most users. The external-timer control function demonstrated good design technique, having a few seconds delay after power turn-on, thus allowing recording to start after transients had died away. A dust cover is supplied which fits neatly over the front panel. All in all, the Nakamichi 600 should be judged a medium- to high-priced recorder with outstanding performance coupled with important and useful features. Δ

Howard A. Roberson

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ISLAND RECORDS has had a powerful reputation as a particularly artist-oriented organization. This has led the company to try out some not so obviously commercially potent alleys in the pursuit of excellence. Island's newest venture is a subsidiary label called Antilles, with a \$4.98 list price, strictly devoted to exotica in the music world. The label debuted in late 1975 with 8 records ranging from a disc of **Tibetan Bells** (AN-7006) an electronic environment album by Brian Eno and Robert Fripp called **No Pussyfooting** (AN-7001) to a Jimmy Reed blues set **Cold Chills** (AN-7007), a superb history of traditional British dance music in **The Complete Dancing Master** (AN-7003) and 2 superlative jazz-rock fusion



70

The feast is yours

Michael Tearson



AUDIO • SEPTEMBER, 1976

albums, **Aiyeketa** (AN-7005) featuring Steve Winwood and 2 Africans, and **Mainstream** (AN-7008) by Quiet Sun, the reunion of Phil Manzanera's pre-Roxy Music outfit. John Surman's avant jazz **Morning Glory** (AN-7004) and a live album by the Portsmouth Symphonia (AN-7002) which is an orchestra entirely comprised of musically untrained amateurs with unsettlingly hilarious results to complete the label's appetizer course.

Expanded Parameters

March of '76 saw a big follow-up, 14-album release that greatly expands Antilles' parameters. The feast begins with two solo piano albums, each a tribute to an American composer in the vein of Joshua Rifkin's historic Nonesuch Scott Joplin discs. For **Other Sides of Sousa** (AN-7015), Czech expatriot Antonin Kubalek uncovers a healthy portion of the March King's lesser-known dance music and idyls, plus 2 obscure marches, one of them, *Mother Hubbard*, based on nursery rhymes. Hugh Delain's, **Harry Warren's Piano Favorites** (AN-7009) is a series of vignettes Warren composed long after his glory days as a top Hollywood songwriter in the musical era. The vignettes are delightfully inventive and complex in a way that *Jeebers Creepers*, *Chattanooga Choo Choo* or *That's Amore* never allowed him to be.

Tim Hardin 9 (AN-7023) is the singer-songwriter's most recent effort, recorded in 1973 and never issued in America before. It is Tim's best in years; featuring a pair of tunes from **Tim Hardin 1**, which is nearly a decade old, *Never Too Far* and *While You're On Your Way*. *Shiloh Town* is a fine new song. That and the Oscar Brown, Jr. song *Rags and Old Iron*, which sports some classy Peter Frampton lead guitar highlights, are a find of an album. Nick Drake, too, is a find. Unknown Stateside when he died in late '74, his songs are wispy mood pieces enhanced by Drake's hazy voice with gentle yet full settings. **Five Leaves Left** (AN-7010) was his first album, issued in England in 1969 and undiminished by time. Nick Drake has always deserved attention. With luck Antilles may yet issue his master work **Bryter Layter**.

Two new blues Antilles feature Willie Mabon (AN-7013) and the late Mississippi Fred McDowell. Mahon's set is a good Chicago blues offering neatly complemented by McDowell's

country blues. Incidentally, the McDowell release was out previously on Just Sunshine as **1904-1972**, and three tracks have been added for the reissue. The tracks all date from the same sessions that yielded Fred's Grammy winning classic **I Do Not Play No Rock And Roll**.

Country Gazette Live (AN-7014) is a top-notch show by one of the very best modern bluegrass bands, featuring award-winning fiddler Byron Berline. The Gazette run through a 14 song set including bluegrass standards and some more recent tunes. This is one of the most elegant additions to bluegrass in a while.

Traditional English Ballads

Three albums of traditional English folk music spice this hefty release. The Waterasons, long regarded as about the best unaccompanied group of singers on the island, present **For Pence and Spicy Ale** (AN-7020) on which Martin Carthy, himself a folk legend, joins Mike, Lal and Norma Waterson. The singing, all acapella, covers a broad emotional spectrum, from drinking and vocational songs to some seasonal pieces. **For Pence** is a mighty record. So is Frankie Armstrong's **Songs and Ballads** (AN-7021). Frankie, another of Britain's great traditionalists and possessed with a strong feminist conscience, visited the States last summer for the folk festival circuit and was most impressive. Her record features sparse and stark accompaniment to Frankie's voice. The songs she chooses are often about hardship and bad times such as *The Collier Lass*, *The Whore's Lament* and the modern *Jack the Lad* about a drug overdose. Whimsy also appears in *The Female Drummer* and *Three Drunken Maidens*.

Shirley Collins is another towering figure in the English folk world. On **No Roses** (AN-7017) she has gathered a stellar crew from the rock, jazz and folk communities for a sterling album of electric folk music of the Fairport-Steeleye school. The album is a glorious result. The track by track musical line-up varies wildly, using traditional and modern instruments in as many combinations as there are songs on the disc. Quite simply, **No Roses** is a landmark electric folk album.

Osamu Kitajawa's **Benzaiten** (AN-7016) is another kind of fusion album. Kitajawa takes the traditional instruments of Japan and adds modern electrical instruments for a sound ab-

solutely unique. That Island even discovered Kitajawa is unlikely enough, but **Benzaiten** is a major part of the Antilles release and it begs to be heard. Kitajawa is an original and this is only the first of him for American consumption. He will be heard from again.

Electronic Albums


A pair of electronic albums fill out this heady smorgasbord. The White Noise album **An Electric Storm** was a previous Island release that has found its home on Antilles. The two lengthy pieces on side 2, *The Visitation* and *Black Mass: Electric Storm in Hell* are as truly scary as *My Game of Loving* with its simulated copulation scene is witty.

Evening Star (AN-7018) is the second Fripp & Eno collaboration. Packaged in the ECM graphics style, it consists of provocative electronics as titles like *Wind on Wind*, *Wind on Water* and *An Index of Metals* might suggest. As on **No Pussyfooting** the pieces evolve environmentally.

Recorded Potpourri

The final Antilles delicacy for now is **Rockin' Duck** by Grimms (AN-7012) which really relates to nothing else on the label. Grimms began as a poetry & music & comedy revue barnstorming England somewhat in the Monty Python style with an extra touch of the cerebral, and finally grew into this album of choice cuts and odd slices of life. The troupe includes one-time Bonzo Dog Neil Innes plus Mike McGear, Roger McGough and John Gorman—collectively previously known as Scaffold—and Brian Patten and Adrien Henri of the Liverpool Poets. Suffice to say **Rockin' Duck** alternately brings laughter and tears occasionally intermingled, and I don't want to give away the punchlines.

Well, that's the scope of the feast, at least what is on the table already. I've not yet mentioned that most of these records have the benefit of superior, truly illuminating, liner notes that for once aid in fully appreciating the music. Island Records have congratulations due them for the bold move in forming Antilles. Presenting esoterica like this may not make them rich, but it enhances the total musical scene no end. And it may well cure those embarrassing boredom spots on the ears.

I just wanted you to know about it. Now the feast is yours. 

The column



Cardiff Rose: Roger McGuinn
Columbia PC 34154, stereo, \$6.98.

Roger McGuinn's last couple solo outings have been hard to like. I even wrote a review on **McGuinn & Band**, their last one, that in retrospect is almost embarrassingly generous. Since then the tight little band of that album quit as the disc bombed.

And then came a "saving grace" in the form of Dylan's Rolling Thunder tour on which Roger was a very prominent participant. **Cardiff Rose** is obviously the result. The enthusiasm that tour generated is this album's propulsion. The band includes Thunderers Rob Stoner and Howie Wyeth, who appeared on Dylan's **Desire**, plus David Mansfield and the unlikeliest Thunderer of all, Mick Ronson, who now has gone from David Bowie's Spiders from Mars to Roger McGuinn's producer, not an obvious transition.

On record, the band sounds great. And best of all McGuinn sounds enthusiastic, like he's having more fun than he's had in years. Maybe that tour saved his soul. The opening song, *Take Me Away*, is all about the tour and its unique spirit—"You should have been there/I was told I had a smile on my face."

That song, *Jolly Roger*, *Partners in Crime*, and *Round Table* are the album's McGuinn-Jacques Levy collaborations. A strong storytelling thread unites them. Each has a strong plot and researched detail. I figure that this kind of "song staging" is Levy's

peculiar contribution, the difference he makes on the **Desire** album as well. *Jolly Roger* relates the bloody tale of the pirate ship **Cardiff Rose** while *Round Table* tackles the King Arthur legend while comparing the deadly truth of the Crusades with the current Middle East conflict.

Partners in Crime brilliantly asks whatever happened to the Chicago 8 from the bloody Chicago police riots of '68. The song takes the form of a letter addressed, with delicious ambiguity, to *Dear Abbie* (Hoffman). The opening verse slips into a mock doo-wop bridge that brings the other seven up to date. After a pause that perfectly provokes the song's nervous irony, it continues:

"Dear Abbie, I wish they would let
you
Come back to us again.
And truly I hope they don't get you
And slam you in the pen."

It's always bitter for the fallguy.

Cardiff Rose also contains a terrific previously unheard Dylan song from the **Blood on the Tracks** period, *Up to Me*, and a new Joni Mitchell song *Dreamland* which at first sounds a trifle confused, but still grabs with an infectious hook that doesn't quit.

After a spell in the hospital **Cardiff Rose** felt like a clean, fresh breeze. The band cuts the hell out of its **Desire** performance as Mick Ronson's production ear held it all together. It doesn't sound like the Byrds, but it is

unmistakably McGuinn and his best in years.

Cardiff Rose is the album **Desire** would have been with proper production and clean sound. It is the flip side to Dylan's standard "one take or forget it" formula. M.T.

Sound: A

Performance: A

Resolution: Andy Pratt

Nemperor NE 438, stereo, \$6.98.

Andy Pratt is one of the most peculiar recording artists you could ever imagine—a little background is essential to totally comprehend this artist. This is Andy's third album (after one on Polydor which was very strange and one on Columbia which was extraordinary but not quite commercial enough to make any impact), and in the words of a friend of his, "the first Andy Pratt album which isn't totally suicidal." Andy is one of those individuals who doesn't have any financial pressures to speak of—the Pratt is as in Pratt & Whitney Aircraft, and he used to own his own studio—and perhaps that is the reason that it's taken so long for him to make a record that could conceivably sell lots of copies. Or maybe he hasn't made it because of his lack of stage presence, but anyway he probably will break through with **Resolution**. After just one listen I was convinced that if he wanted to be a solo artist with a stature along the lines of Elton or Joni he could do it; after several more, I'm certain that he's far more talented than either of them.

There's his voice, which is somewhere along the lines of "the power of Robert Plant and the frailty of Gram Parsons," and there's his songs which have nothing to be compared to. *Can't Stop My Love* and *Constant Heat* are my favorites at present, but they weren't when I first listened to the record. His appeal hits in different ways, because on one hand you've got bizarro love-oriented lyrics, commercial production (nice one, Arif) and beautiful melodies, but on the other you've got these really innovative chord structures and rhythms.

He's got them all arranged beautifully (lots of lush tones) and the sidemen are exceptionally tasty (there's no other word to use), particularly drummer Andy Newmark and guitarist Mark Doyle. It's extremely hard for me to find a flaw in the record—how it can sound so spacious yet so full, is a small achievement unto itself. At last, an Andy Pratt album that you can get behind one hundred per cent.

All in all, Andy Pratt could well be the most important solo artist to make his mark in 1976 if his record company is able to break him on both the AM and the FM stations. What's more, regardless of whether he makes it or not, **Resolution** should set an example for songwriter/singers all over as to what an album can sound like. Pratt proves that you can be sensitive without simping out, and you can be a powerful singer/songwriter without relying upon old cliches for dynamics. *J.T.*

Performance: A
Sound: A (State of the Art)

Rastaman Vibration: Bob Marley & the Wailers
Island ILPS 9383, stereo, \$6.98.

Now I don't believe that the Golden Age of Reggae is upon us, nor that reggae music will dominate the scene anymore than I think that the Bay City Rollers are the sound of tomorrow. But at the time of writing this review it looks like a sure bet that **Rastaman Vibration** will break into the top ten of the album charts, a major accomplishment for a reggae record. In the past, the reggae audience has been a growing cult who knew all about reggae and who all the Jamaican hitmakers were; chances are that half of the people who buy this album have little idea who U-Roy, The Mighty Diamonds, or Big Youth are. But they bought **Rastaman Vibration**—not exactly a pleasing album to reggae purists but a slightly rocked-out reggae effort nonetheless—and some people would have you believe that getting the people who bought Eric Clapton's *I Shot the Sheriff* to buy this album is as monumental an event as it was when those who followed Bill Haley started to pick up on Little Richard and Chuck Berry.

I'd be inclined to agree if I didn't know that Toots & the Maytals got booted off the stage on almost every date on the Who tour. Most of the younger audiences are primarily enthused with rock and couldn't give a
(Continued on page 79)

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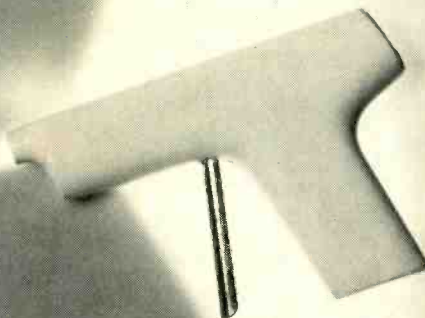
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hoot about reggae, at least so far. And they're still buying records by Queen, Be-Bop Deluxe and Thin Lizzy, while the reggae records are being eaten up by mostly post-rock audiences who are tired of most rock, turned off by disco, and looking for a new music that doesn't smack of Frank Sinatra, John Cage, or Tchaikovsky. Reggae music is simple but not as stupid as say Kiss, it's political but more authentic sounding than Bob Dylan, and it's new. Reggae music is also based in the Rastafarian Culture and is highly appealing to intellectuals.

So Reggae Music has caught on to the extent that Bob Marley is on the verge of Superstardom in the United States. It's far more surprising that this didn't happen before, as there were hits by Desmond Dekker, Led Zeppelin, and The Beatles which had a reggae flavor to them during the early Seventies.

Errr... what about the record itself? This is the first Wailers' album released in the United States that features the fully modernized Marley sound, which is closer to the guitar sound of Jimi Hendrix than Joe Higgs. Marley has gotten his rocks out on the table, and I'm not complaining a bit.



His music improves by the slight compromise, and he's still one of the best singers around. So if you haven't heard the Wailers, chances are you're not hip to reggae, and it would be a good move to pick up on **Rastaman Vibration** to clue yourself in. And if you've already gotten into Marley, it's about time you discovered Toots, Peter Tosh, Mighty Diamonds, or Big Youth. *J.T.*

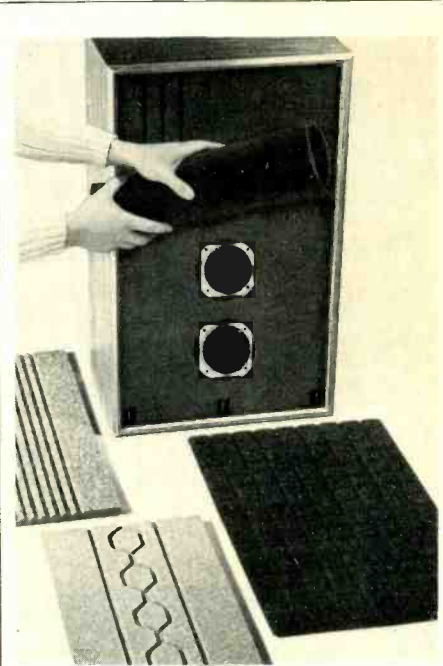
Sound: A Performance: A-

Bill Cosby Is Not Himself These Days, Rat Own, Rat Own, Rat Own: Bill Cosby

Capitol ST-11530, stereo, \$6.98.

In general, I tend to hate disco music, especially Barry White's. So along

comes Bill Cosby who has done one or two albums himself singing songs and being funny at once, a hard trick to be sure, but Bill has generally not done well on his attempts at novelty records. But **Bill Cosby is Not Himself**... is an absolute knockout. The send-up of Big Barry's Yes, Yes, Yes is a full-fledged hit and justly so. Like the silent waiter in Alka Seltzer's "I Can't Believe I Ate the Whole Thing" commercial you don't notice how funny Cos' lyrics are until about the third or



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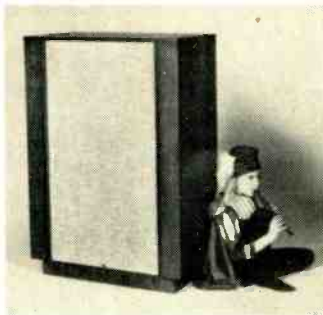
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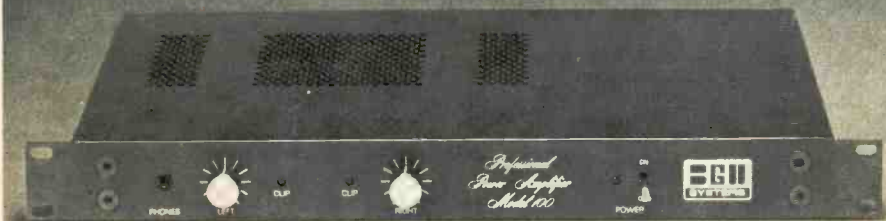
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fifth time through. The follow-up could just as well be his Pointer Sisters parody *Girl on the Side* or the one that fights hard to out-Brown James himself.

When he's on, Bill Cosby is one of the funniest men on the planet. **Not Himself** is mostly on. It stays funny way past the third time, and it is guaranteed a winner for parties.

The only disco album I need. M.T.

Sound: B+

Performance: A

Steal Your Face: Grateful Dead
Grateful Dead GD-LA620, stereo,
\$6.98.

This two-disc set is a live album/movie soundtrack of the Dead's last stand at Winterland in San Francisco, and it is standard Dead live fare. The program features the Marty Robbins classic *El Paso*, Johnny Cash's *Big River*, Chuck Berry's *The Promised Land*, and *Around and Around*, as well as their own *Sugaree*, *It Must Have Been the Roses*, *Black Throated Wind*, and others. *Cold Rain and Snow*, and *Beat it on Down the Line* are particularly nostalgic since both appeared on the first Grateful Dead album nearly a decade ago.

The performance is standard Dead as well. What it lacks is quality recorded sound. The problem is most notable when the record appears on the radio and sounds weaker than any record it's played next to. The sound is thin, utterly lacking closeness to the listener. When the performances are good, the poor recording undermines it. *Black Throated Wind* is stirring except for the tin can sound of Bob Weir's voice.

An extra peculiarity for live records, though not for the Grateful Dead, is the absolute non-effort to recreate a concert feel to the album. The tracks are completely separated and banded. Some songs faded out before the end has a disconcerting effect on a live album. Still the Dead Heads seem to love it regardless. M.T.

Sound: D-

Performance: D

Words We Can Dance To: Steve Goodman
Asylum 7E-1061, stereo, \$6.98.

You can do no better than Steve Goodman live. He is absolutely the best solo folkie-type working with an uncanny ability to draw some of the damndest pickers literally out of the woodwork. **Words We Can Dance To**,

Goodman's fourth album, largely follows the comfortable pattern set by the previous two, **Somebody Else's Troubles** and **Jessie's Jig & Other Favorites**.

Words features a wide variety of song styles from a solo on *The Glory of Love*, with some dazzling acoustic guitar, and the rock and roll oldie *Tossin' and Turnin'* to an original Bob Wills style western swing number *Between the Lines*, and the bluegrass *Death of a Salesman*, as well as the Tin Pan Alley schmaltz of the appropriately named *Old Fashioned*. Goodman's songcrafting chops are in top form, especially on the ironic and topical *Unemployed* and *Banana Republic*.

Each of Steve's last two albums have featured wonderful song stories by Mike Smith, and in that tradition **Words** opens with Smith's *Roving Cowboy (Ballad of Dan Moody)*, a profound story of robbery, Jesus, betrayal, and murder.

The cast of pickers on **Words** is mighty formidable. To just salute a couple let me mention co-producer Steve Burgh's imaginative guitar work, the great Jethro Burns' presence on mandolin, Saul Broudy's plaintive harp, Winnie Winston on pedal steel and banjo, and Jim Rothermel's various woodwinds on loan from Jesse Colin Young's band.

Words We Can Dance To is no piece of fluff. It is an album of rare intelligence and taste. *Michael Tearson*

Sound: B+ Performance: B+

Time Is On My Side: Tracy Nelson
MCA 2203, stereo, \$6.98.

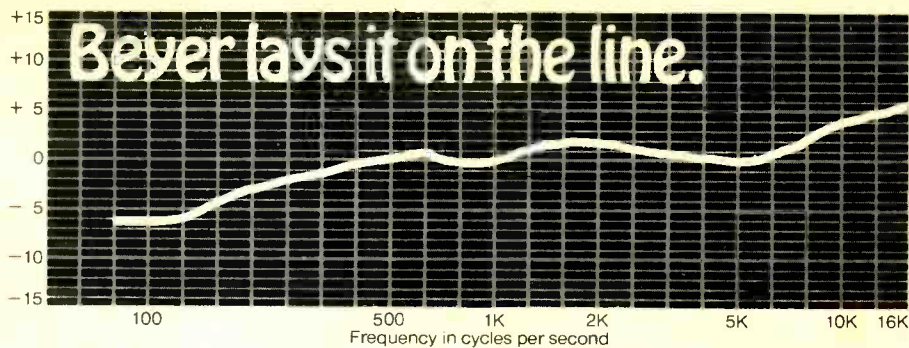
From the unimaginative cover design on, this is a dispirited effort. Tracy Nelson has always had a terrific voice. What she has lacked in her last several efforts is any sign of warmth or conviction.

Time is on my Side was produced in Los Angeles, instead of Tracy's customary Nashville. Whatever prompted the move didn't work out right. Producer Jimmy Bowen lined up good session cats and went in and just did the album. The arrangements are cluttered, particularly the backing vocals. Not surprisingly the cluttered arranging is compounded with muddy sound that diffuses attention. It sounds like just another job from LA.

Tracy Nelson has wasted herself too damn long. I wish she'd sing as if something depended on it. *M.T.*

Sound: D Performance: F

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The Outlaws: various artists
RCA APL1-1321, stereo, \$6.98.

The Sound Of Your Mind: Willie Nelson

Columbia KC 34092, stereo, \$5.98.

It's been a long time coming, as the song goes, but Texas-bred music by the likes of Waylon Jennings and Willie Nelson has expanded the horizons of country music and, with **The Outlaws** collection stampeding the charts, has arrived. **The Outlaws** features Waylon and Willie separately and together plus Waylon's wife Jessi Colter and the under-rated Tompall Glaser.

As a primer to the music, **Cowboys** is invaluable. The two Waylon solos *My Heroes Have Always Been Cowboys* and *Honky Tonk Heroes* very much define the form. The two Colter songs are nice Heartbreak Derby entries but her duet with Waylon on the standard *Suspicious Minds* is a stunning emotional piece.

Willie Nelson is represented by two of his biggest RCA hits, *Me and Paul* and *Yesterday's Wine*, but his special moment here is on *Good Hearted Woman*, a song sung and co-authored with Waylon Jennings and recorded live, the two of them trading off lines with an electric crowd. Closing the disc, Tompall Glaser nods toward traditional country with Jimmie Rodgers' *T for Texas*, balancing it with a contemporary song by ever-witty Shel Silverstein.

The meat after the hors d'oeuvre is Willie Nelson's own **The Sound in Your Mind**, follow-up to last year's wildly successful **Red Headed Stranger**. **Sound** should be just as successful. It is less Western movie music than **Stranger**, with no storyline unifying it. **Sound** is fun, in part, a collection of personal favorites—*That Lucky Old Sun*, *If You've Got the Money, I've Got the Time*, a particularly heart-felt *Amazing Grace*—with a 9 1/2 minute medley of Willie Nelson classics, from *Funny How Time Slips Away* through *Crazy* into *Night Life* for a show-stopper of a number.

The title track, *Penny for your Thoughts*, and *The Healing Hands of Time* make up the album's three new Nelson songs, and they make the disc. Much of Willie Nelson's best recent work feels like he has carried it a long time while refining it, and it's only now really ready for people. A strong effort.

A friend once described Willie Nelson's voice as outstandingly moral. Didn't exactly know why, but it somehow fits as an adjective, moral, authoritative, whatever. Willie Nelson is

a certified country master, and so is Waylon Jennings for that matter. **The Sound in Your Mind** ranks with Willie's best. But watch out for a killer from Waylon on his next solo out. He's way overdue. *Michael Tearson*

Outlaws

Sound: C+ Performance: A-

Nelson

Sound: B Performance: A-

I Don't Want To Go Home: Southside Johnny & The Asbury Jukes
Epic PE 34180, stereo, \$6.98.



CBS is no stupid organization. With the first-string band from Asbury Park, NJ, a certified hit, the kid himself turns them on to the second team. Figuring that since they made waves with the kid, better to ride with it themselves than to let someone else do it, so they sign Southside Johnny. Springsteen wrote atmospheric liner notes and his guitarist Miami Steve Van Zandt produced the album, contributing three songs. Furthermore, they engaged Jimmy Iovine who engineered the **Born to Run** album to do Johnny's.

What came out is pretty much what I expected, pure Jersey shore bar-band sound, recorded adequately if not with the electric spark of an original. Miami Steve's songs include two of the disc's highlights, the cooking title song for one, and *How Come You Treat Me so Bad* with special guest Lee Dorsey who gets to repeat a line from *Working in a Coal Mine* in the fade—"How long can this go on?" Ronnie Spector similarly cameos on an old, previously unrecorded

AUDIO • SEPTEMBER, 1976

Springsteen number *You Mean So Much to Me*. The radio legend *The Fever* which Springsteen wants never to release on his own, also appears in a powerful rendition.

From Southside's standards rack come goodies like *Fannie Mae*, *It Ain't the Meat* (which far outfunks Maria Muldaur's version) and Solomon Burke's *Got to Get You Off My Mind*.

While the show is a good one, it won't thrill you. Johnny is a typical Jersey shore bar character. But at least the "hype" doesn't mislead you, you know what you're getting. No one ever called Southside Johnny an original, even Bruce the Boss and Miami Steve. M.T.

Sound: C+ Performance B-

Jailbreak, Thin Lizzy

Mercury SRM-1-1081, stereo, \$6.98.

It's hard to talk about a hot new group that's put out half a dozen albums, but the fact is that the promotional thrust for Thin Lizzy only began with their last album, and until very recently, most people were unfamiliar with the brilliance of Phil Lynott. Phil is the songwriter, singer, and bass player with Thin Lizzy; he's also black and from Ireland, and comes across with what some might term an "intelligent street sense." You know from his lyrics and the tone of his voice that he's mean/bad and one smart cookie to boot. He knows that the way he looks and the way he sings puts him next in line for the position that Jimi Hendrix once occupied—the black man who can talk/sing to a white audience. I don't know whether he's ready for fame and fortune, but this writer suspects that'll hit soon and hard... **Jailbreak** is one of the best hard rock albums since the first Bad Company disc, and I already have been informed that the FM radio play for the record far exceeds that for previous albums and makes it a sure chart item.

The song *The Boys Are Back In Town* is a great rock 'n' roll song, and if it doesn't become a hit single, it surely will be a progressive radio classic for a long time, sounding like *The Ultimate Thin Lizzy Track*. Most of the album comes right close to this excellence, the songs are all of a very high caliber, the guitar playing (particularly the twin leads) is effective, the drums sound full and menacing, and the singing of Phil Lynott is stylized, distinctive, and guaranteed to turn a whole lot of people onto Thin

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Lizzy. If the production sound on the next album could be a touch more interesting, I'd say that Thin Lizzy's future would be sewn up, but as is they're pretty near unstoppable. I can't wait to see how it comes across live (I've heard that they really shine onstage), and I don't go to a whole lot of concerts but I know I'd make it out for Thin Lizzy.

Jon Tiven

Sound: B+ Performance: A

Together: Johnny & Edgar Winter
Blue Sky PZ 34033, stereo, \$6.98.

I just know how good the idea sounded. Both brothers' careers were in a skid, record sales way down, so why not put 'em together like old times in Texas for a few shows, then go in and record some live shows for a good hot album?

Unfortunately, this set shows you can't go home again. Both the selection and performance are strictly old bar-band standards, with the kind of feel that makes you kind of wish you were listening to the good old original version.

The pure sound is standard live rock and roll sound, a straightforward thing it's awfully hard to snafu.

The joyless album cover photos should have tipped me off in advance.

M.T.

Sound: B Performance: B

Sweet Harmony: Maria Muldaur
Reprise MS 2235, stereo, \$6.98.

By now Maria Muldaur's singing and stance are a known quantity. With **Sweet Harmony**, she has only followed her formula and taken no chances.

Jon the Generator is a dandy John Herald song which with *Lying Song* (by another old friend Kate McGarrigle) are the most exciting moments on the record. *Back by Fall* and *Wild Bird* are two new ones from Wendy Waldman, a regular contributor to Maria's records. Nice but without the spark of *Mad, Mad Me* or *Gringo en Mexico* from the previous albums. *Sad Eyes* from the Sedaka/Cody catalog has some good J. J. Cale slide guitar but too much arrangement in general.

Maria Muldaur needs to be pushed to really work. When that happens, **Sweet Harmony** makes it. Too often it doesn't.

Michael Tearson

Sound: C+ Performance: C+

AUDIO • SEPTEMBER, 1976

Canby's capsules

Edward Tatnall Canby

Bizet: Roma Symphony; Symphony in C. City of Birmingham Symph. Orch., Fremaux. **Klavier KS 546**, stereo, \$6.98.

Interesting contrast. The youthful Symphony in C everybody now knows—charming and fresh, if immature. "Roma" was Bizet's big later attempt at pure orchestra (he was a stage man); it kept fizzling, and still does, after many rewritings. Outwardly very Romantic, it is full of platitudes and not at all up to the B. best. An EMI (non-SQ) license.

Beethoven: Bagatelles, Opp. 33, 119, 126. Stephen Bishop, piano. **Philips 6500 930**, stereo, \$7.98.

These highly personal, often eccentric tiny piano pieces are sometimes just finger fluff but often they have in them the germs of the most profound Beethoven, especially the late ones, Op. 119 and Op. 126. Bishop does them neatly but, I'd say, not with the full implications of those later small miracles. They can take slower tempi, greater weight.

Shubert: Fantasy Op. 119; Sonata (Duo) Op. 162; Rondo Brilliant Op. 70. Gerald Tarack, vl., David Hancock, pf. **Monitor MCS 2146**, stereo, \$6.98.

Look closely on this disc and you'll see the DBH initials of a well known New York audio engineer—who is also the pianist in this splendid recording. (He probably rushed straight from the Ampex button to the piano.) Congrats! DBH has found his musical milieu par excellence. His Schubert (always difficult to hear, even for great pianists, with its weirdly quick changes of key) is absolutely at the top, as knowing as any I've heard, and the teamwork with equally knowing N.Y. fiddler Tarack is impeccable, making for some very rare Schubert indeed. The music, too, is top Schubert. And very well recorded. Go buy quick.

Hummel: Clarinet Quartet. Crusell: Clarinet Quartet. (On original instrs.) The Music Party. **L'Oiseau-Lyre Florilegium DSLO 501**, stereo, \$6.98.

Here's England's answer to the German revival of authentic older instruments and it is good—two Beethoven-period quartets with old-type clarinet—and some clarinet! Alan Hacker is an awesome master, playing an astonishingly raw, expressive sound (like a jazz clarinet!) with tremendous intensity. This is how it *must* have been, and clarinetists have something new to learn. Hummel, a top notable, was shadowed by the more flamboyant Beethoven; he is excellent, if a bit conservative—so what. Crusell was a clarinet virtuoso, wrote lesser but still very listenable music. A superb disc.

Arne: Eight Overtures. The Academy of Ancient Music, Hogwood. **L'Oiseau-Lyre Florilegium DSLO 503**, stereo, \$6.98.

Eight little semi-suites by the good Dr. Arne (all composers were "Doctor" in mid-18th c. England), perky post-Handelian, like Handel but already more elegant and frittery, not unlike the long-familiar little Symphonies by Arne's exact contemporary, William Boyce. These English-based operators were not big composers but could turn out a stylish and very listenable product, nicely played here on old-type instruments—all except the horns, which are absurdly flummoxed by Arne's demands—no valves. The Germans have *that* down much better! They play in tune.

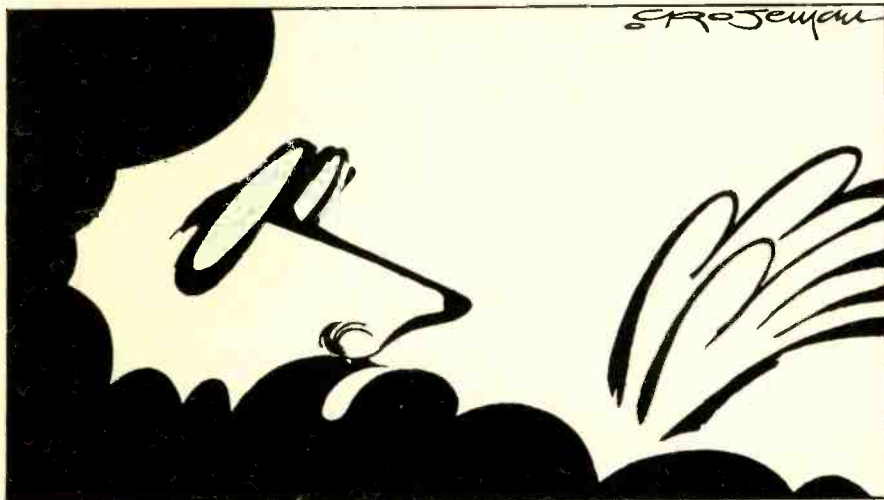
Couperin: Pièces de Clavecin. Huguette Dreyfus, harpsichord. **Telefunken Das alte Werk 6.35276 EK**, 4 discs, stereo, \$27.92.

Phew—8 sides of this delicate and profound French master of the tiny musical cameo, nine of the "ordres" or loose suites in which his music was published; even so, there are plenty left out of the 27. Dreyfus plays with much rubato (hesitations, uneven beat), a somewhat old-fashioned approach but far better than machine-like precision! A fine introduction to this special and memorable musical mini-world, and it won a Grand Prix du Disc.

Marsche (Prussian and Austrian Military Marches). Berlin Philh., von Karajan. **Deutsche Grammophon 2721 077** 2 discs, stereo, \$15.96.

Four sides of German and Austrian military might, projected by the great Von K. himself, and it's a fascinating collection, from Beethoven's "Yorck" march (dull) to a batch of superb pre-Sousa pieces, later 19th c., challenging our famous John Philip as he is seldom challenged. Gorgeous color booklet. But I bet this doesn't sell in France; the atmosphere is definitely Deutschland (Ostereich) uber alles.

Jazz & blues



Since We Met: Bill Evans

Musicians: Bill Evans, piano; Eddie Gomez; bass; Marty Morrell, drums.

Songs: *Since We Met*, *Midnight Mood*, *See-Saw*, *Sareen Jurer*, *Time Remembered*, *Turn Out The Stars*, *But Beautiful*.

Fantasy F-9501, stereo, \$6.98.

Since We Met proves to be Bill Evans most inspirational trio effort since **The Bill Evans Album** (Columbia C 30855) circa 1972. The superb quality of this live recording, made at the Village Vanguard in early 1974, enhances the already obvious effectiveness of the trio. Although the **Tokyo Concert** (Fantasy 9457) was also a live date, the acoustic intimacy of the Vanguard and the physical proximity of the audience to the performer, as opposed to the bouncy acoustics and distance of the concert hall, are perceived well through this record. The Vanguard is, of course, a special club. Its atmosphere buoys the lingering souls and memories of jazz' greatest performances by its most legendary exponents from Miles to Trane—and so adds a touch of gold to subsequent performances.

Although two years separate **The Bill Evans Album** from **Since We Met**, the music feels like a logical continuation from the same date. The same forces of nature at work on the former LP appear to manifest themselves in the same creative manner.

Since We Met is quickly spotted as an Evans composition as the compos-

er takes a poignant opening cadenza. As Evans and Morrell enter, Evans continues to paint colorful landscapes (or **Handscapes**, as is the name of the Jazz Piano choir's first release on Strata East) as the impressionistic, improvisational virtuoso of the keyboard. *See-Saw* also opens with Evans out front, this time in a block chord oriented excursion, but quickly changes gears—enter trio—and swells into a bright tempo perfect for Evans' more linear statements.

Evans playing is a probing musical maze of harmonic intricacies and subtleties. Listening to him affords one the opportunity to open up one's mind to its maximum aperture and allow it to wander the myriad directions one is taken by Evans' flowing contrapuntal approach. Certainly, Evans and trio are the reflection of the tune Evans so often plays, *Alice in Wonderland*—you know, revolving bookcases that lead from one mood to the next, two way mirrors with different rhythms on either side, trap doors that take the music from one harmonic place to another, and secret passageways that flow harmonically above, in between, or below!

Gomez is an incredible bassist whose reputation probably doesn't extend as far as it should or will. He is a speedster, with magnificently phrased lines, and a big and projecting sound. Morrell, who is no longer with the trio, served as a fine rhythmic counterpart to the Evans and Gomez

harmonic weavings. He added drive and a certain restrained intensity while perfectly interpreting and anticipating Evans' every move.

The Bill Evans Album, my most worn release of his, is now rivaled by **Since We Met**. Much listening pleasure is to be derived from these releases.

Eric Henry

Sound: B+

Performance: A

Tears For Dolphy: Ted Curson

Musicians: Curson, trumpet, piccolo trumpet; Bill Barron, tenor sax, clarinet; Herb Bushler, bass; Dick Berk, drums.

Songs: *Kassim*, *East Sixth Street*, *7/4 Funny Time*, *Tears For Dolphy*, *Quick-sand*, *Reava's Waltz*.

Arista AL-1021, stereo, \$6.98.

Tears For Dolphy could have become one of the more essential jazz releases during the 1960s, had it been released when it was recorded in 1964. However, the delay of 12 years hasn't diminished its musical value, the quartet's music is merely absorbed with added perspective. The music is not derivative, neither too outside, nor too inside, and certainly not boring. Refreshing!

Curson's group with Bill Barron's saxophone functions in a way the JJ Johnson and Kai Winding groups did. The two horns serve as improvisational, contrapuntal devices to one another. While one solos, the other plays a spontaneous (sometimes prearranged) counterline of long tones, pedal points, fills, and even two-part harmonies, implying broader harmonies with the bass. The Curson group plays without piano and much freer than the J-Kai collaborations.

Curson's performance on **Tears For Dolphy** places him far beyond the majority of trumpet soloists. Most people are not aware of Curson, due to his stay in Europe since this recording. Critics hailed him as a significant new stylist on trumpet, as early as 1961 in *Downbeat* and elsewhere. He upholds this claim.

Curson is a multi-dimensional soloist. He cooks, steams, and smokes

as he solos through his composition Reava's Waltz. He describes his playing on the 'latin-oriental' *Kassim* as "snakes running up and down modal scales." He also demonstrates poignant lyricism on the melancholy *Tears For Dolphy*. Dolphy was the brilliant reedman with whom Curson grew musically, especially during his stint with the Charles Mingus workshop.

Curson's group concept is most suited to a drummer like Elvin Jones, who was with Coltrane at the time of this recording. Dick Berk was used, although he is more in the context of a drummer who plays beats.

Bushler on bass does not come through as clearly as he would have, had this been recorded now, but his playing is discernible, nevertheless. He plays the bass with more of a straight-time concept than, say, Jimmy Garrison, who played against and through Coltrane. Bushler is a superb player whose current recordings with Gil Evans and Joe Farrell show his movement in these and other directions.

Tears For Dolphy does not project that slick, bass-heavy quality of today's recordings. Each instrument comes through with more than acceptable clarity. The separation, although adequate for the jazz recordings of 1964, is less than par for today. This, again, is a function of the recording processes and mixings of 1964. If this were recorded today, Berk's drums would project fewer highs and sound much drier. The balance would have gone decidedly in the direction of the horns and particularly Bushler's acoustic bass.

The recording is listenable and the music indispensable. **Tears For Dolphy** was 12 years in arriving. Don't wait a moment longer. *Eric Henry*

Sound: B — Performance: A

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rich vein of invention; he's aided by a superb rhythm section which includes pianist Oscar Peterson, guitarist Joe Pass, and drummer Grady Tate. Every track on **Zoot Sims and the Gershwin Brothers** has the compelling sound of one of the great contemporary horn players, who would be outstanding in any era of jazz. *I've Got Rhythm* is an intensely jumping track with Sims' graceful, steaming lines complemented by tremendous comping by pianist Peterson and guitarist Pass; a driving, lilting *Lady Be Good* is beautifully knit, with the Pass and Peterson solos seeming to flow out of Zoot's choruses, all of the playing threaded to the fabric of the brilliantly constructed Gershwin music.

Sims, the tough, vigorous cool-jazz prodigy of the 50s and step child of the Swing Era, is a master of the jazz ballad. He sings a lovely song on his horn and *How Long Has This Been Going On*, *I've Got a Crush on You*, *Isn't It a Pity* and *Someone to Watch Over Me* have silken, melodic embellishments that the Gershwins would surely have liked. *John Lissner*

Sound: A Performance: A+

Beyond Mobius: Cedar Walton

Musicians: Walton, keyboards, synthesizers; Eddie Harris, sax solos; Blue Mitchell, trumpet and flugelhorn solos; Eric Gale, solo and rhythm guitar; Cornell Dupree, rhythm guitar; Gordon Edwards, bass; Jimmie Young, drums; Charles Collins, drums; Angel Allende, percussion; Mike Lipskin, Arp.

Songs: *Bad Luck*, *Low Rider*, *Beyond Mobius*, *Jive Talkin*, *Canadian Sunset*, *The Girl With The Discotheque Eyes*, *Lonely Cathedral*.

RCA APLI-1435, stereo, \$6.98.

Little did August Ferdinand Mobius (1790-1868) know that he would receive recognition in 1976 on the covers of two record albums. Who was Mobius? A mathematician and astronomer whose work led to projective geometry. Big Deal? Not if you needed a Mobius band (a three-dimensional, two-sided, one-edged surface that is made by connecting the ends of a strip of paper after one twist) for the cover of your next album! (*Editor's Note:* This is the first time we've ever had a combination record review and geometry lesson.)

If you visit your local record store, examine (do not buy) Cedar Walton's **Mobius** and **Beyond Mobius**, and you will see such bands on the covers. Inside the cover (should you mistakenly

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purchase either lp), you will find a Walton Band. This is on a two-sided vinyl surface of discified hits and flip-sides made, upon the urging of record companies and producers, with various recording equipment and the assistance of a large number of musicians whose livelihood has made them victims of this commercial twist.

It's not all that bad. Walton's arrangements are professionally done, and the performance is a musical one, but the tunes are forgettable, barely more interesting than Muzak. *Bad Luck*, a big hit last year by a sound of Philadelphia group, appears as the first tune on the first side, for record buyers impressed with headlines and surface features; also for DJs who drop the stylus at the first opportunity. *Canadian Sunset* is just one more tune, fallen victim to the "hit syndrome" mixture of electronics and a heavy disco beat, though Walton gets off a nice piano solo.

The recording, technically speaking, is of such listenable quality, it's a shame it was wasted on this music. Walton comes through clearly on all keyboards. Bass is, of course, most prominent, while the drums are too thuddy for me. The guitars, as usual, wind up being little more than guitar noise—lots of chords and solos in there somewhere.

Walton is an important enough keyboard artist that I felt it imperative to alert everyone to avoid this pot-pourri of money music. I suggest you save your money for Walton's regular trio (Sam Jones & Billy Higgins) on the Danish Steeplechase label or pick up one of his earlier Muse or Prestige releases.

Eric Henry

Sound: B+ Performance: D-

Beware Of The Dog: Hound Dog Taylor and the House Rockers

Musicians: Hound Dog Taylor, lead guitar, vocals; Brewer Phillips, second guitar; Ted Harvey, drums.

Songs: *Give Me Back My Wig; The Sun Is Shining; Kitchen Sink Boogie; Dust My Broom; Comin' Around the Mountain; Let's Get Funky; Rock Me; It's Allright; Freddie's Blues.*

Alligator AL 4707, stereo, \$6.98.

It's a long established tradition among musical observers to consider blues a sad music, an anguished cry born of frustration, depression, and pain. All blues songs are supposed to be down, and virtually all music has been referred to at one time or another as blues. If ever there was a refutation of the equation of blues, the

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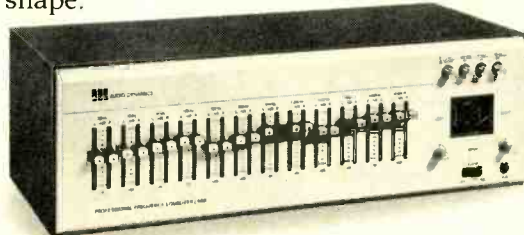
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musical form, with blues, the state of mind, it was the music of Hound Dog Taylor.

Hound Dog played "blues" (music that kicked "the blues" (state of mind) in the butt—frantically rockin', loud, rowdy, overpowering, fiercely distorted electric blues, filled with savagely swooping slide guitar riffs that often eschewed subtlety in favor of total, irresistible excitement. To be sure, his was still an anguished cry, born of frustration, depression, and pain. But rather than mope and moan about how "times is hard" (although

his repertoire *did* include this sort of sad blues, they were of lesser importance than his rockers, providing "breaks in the action" you might say), Hound Dog's mission was to, at least temporarily, drive away those hard times and mental torment more swiftly and effectively than any new-fangled psychological therapy. In other words, Hound Dog Taylor was blues' answer to the primal scream.

This posthumous live album presents Hound Dog in his natural element, sharing his catharsis with an appreciative, youthful audience. You



can almost picture the crowds boogiein' in the aisles, as Taylor romps his way through a couple of his standards *Give Me Back My Wig* and *It's All-Right*, a solid contemporary-blues-rocker called *Let's Get Funky*; a highly unorthodox adaptation of *She'll Be Comin' Around The Mountain*, and the most harrowing *Dust My Broom* on records. "Let's have some fun" was Hound Dog's motto (more a kindly suggestion than the sort of defiant threat that "Everybody boogie" has become at rock concerts); except for *The Sun Is Shining* and *Freddie's Blues*, the two "down blues" of the album, **Beware Of The Dog** is just that, hard-stompin', partyin' fun, no questions asked and no explanations needed. Only *Rock Me* disappoints, with little melodic variation to its repetitious riff.

To anyone familiar with Taylor's two earlier Alligator albums, the music here will be more of the same (not that I'm complaining, mind you!). Hound Dog was versatile—combining elements from Elmore James, John Lee Hooker, and Jimmy Reed, along with his own Mississippi roots into one distinctive style—but hardly musically innovative. However, the sheer power of his fuzz-crazed amplifier took urban electric blues to a new *technological* extreme, particularly when combined with the deft, eerie manipulation of his metal slide.

Tom Bingham

Sound: B+ Performance: B+

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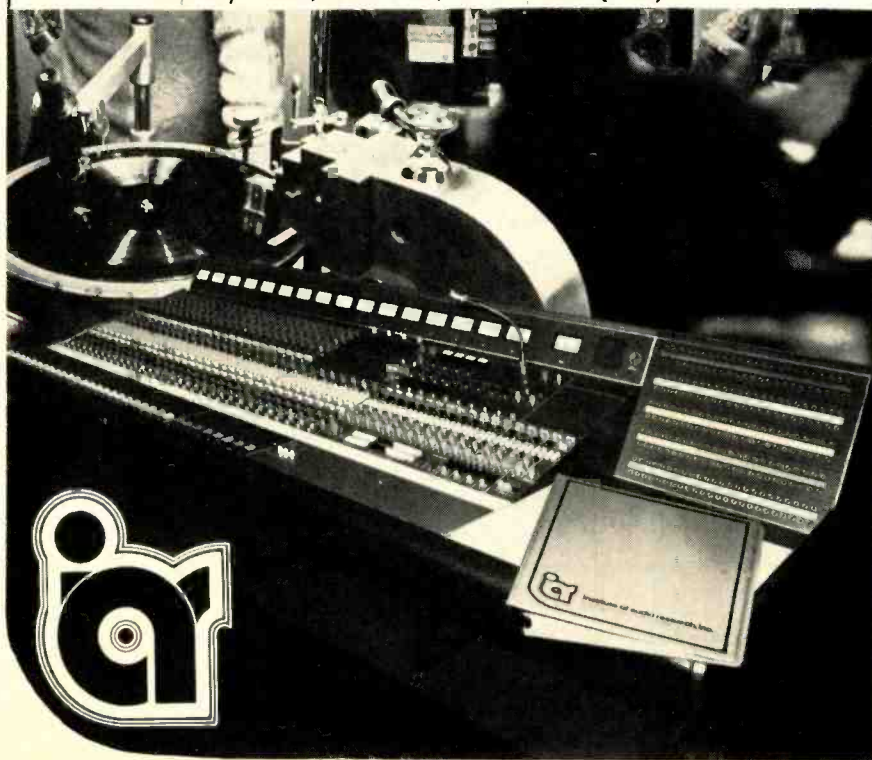
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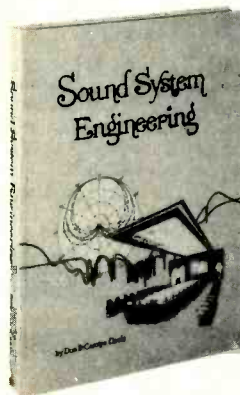
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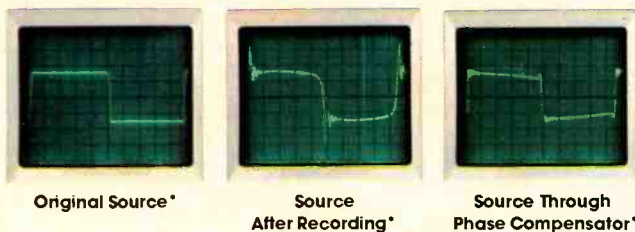
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