

Audio

Scenes
— Gifts of Future Past

THE AUTHORITATIVE MAGAZINE ABOUT HIGH FIDELITY • JANUARY 1977 \$1.00

47425 

Radio Frequency Interference

Nothing New Under The AM Sun

U0803760 0477 6061601300201312
DON L HUNTER
2608 CENTRAL BLVD
EUGENE OR 97403

UNFORTUNATELY
FOR THEM,
THIS ONE SELLS
FOR UNDER \$300.*

PIONEER STEREO RECEIVER MODEL SX-850

POWER

88

90

92

94

FM

AM

SPEAKERS

A OFF B A+B

POWER OFF

BASS

OFF

PHONES

MIN

TR

**MOST
\$600 RECEIVERS
SOUND AS GOOD
AS THIS ONE.**

PIONEER STEREO RECEIVER MODEL SX-82

POWER

FM
88 90 92 94

SPEAKERS

POWER OFF A OFF B A+B

BASS

OFF
MIN

PHONES

The average \$600 receiver sounds as good as the new Pioneer SX-650 until you start listening to prices.

If \$600 is your kind of price, an SX-650 should qualify as your kind of receiver. Not only will it give you the kind of features and sound quality you'd expect for that kind of money; it'll also leave you with roughly half your receiver budget unexpectedly unspent.

But suppose your idea of a receiver price is somewhere under \$300*. The SX-650 is going to sound better to you than anything you thought you could afford. Because it has more power, a wider frequency range, less distortion, and far greater versatility than most other receivers in that category.

All this might sound a little extravagant; but an authentic breakthrough, an achievement like the SX-650, doesn't happen often. We've learned that when our promises seem to sound especially rich, the best thing to do is simply review the facts.

It's a fact that the SX-650 provides a continuous power output of 35 watts per channel, min. RMS into 8 ohms, from 20 to 20,000 Hz, with no more than 0.3% total harmonic distortion. It also delivers each instrument and voice at its intended level, balanced within $\pm 0.3\%$ of the RIAA curve.

The facts of its stereo separation, selectivity and sensitivity, however, must be experienced: numbers are impressive, but sometimes only hearing is believing.

You'll also be impressed by what you don't hear from the SX-650. You won't hear an assortment of background noises, or the thousand miscellaneous acoustic devils that live in the limbo between FM stations on lesser receivers.

On your next visit to a high fidelity dealer, listen to a Pioneer SX-650 with any reasonably accurate speakers.

You'll find either its price or its performance amazing. Depending on which you hear first.

 **PIONEER**[®]

U.S. Pioneer Electronics Corp., 75 Oxford Drive, Moonachie, New Jersey 07074.

*For informational purposes only, the SX-650 is priced under \$300. The actual resale price will be set by the individual Pioneer dealer at his option.



STEREO

TUNING

98

100

102

104

106

108

MHz

kHz

FUNCTION

AM

FM

PHONO

AUX

MC

BALANCE

VOLUME

LOUDNESS MODE

STEREO

TAPE MONITOR

HIGH FILTER

FM MUTING

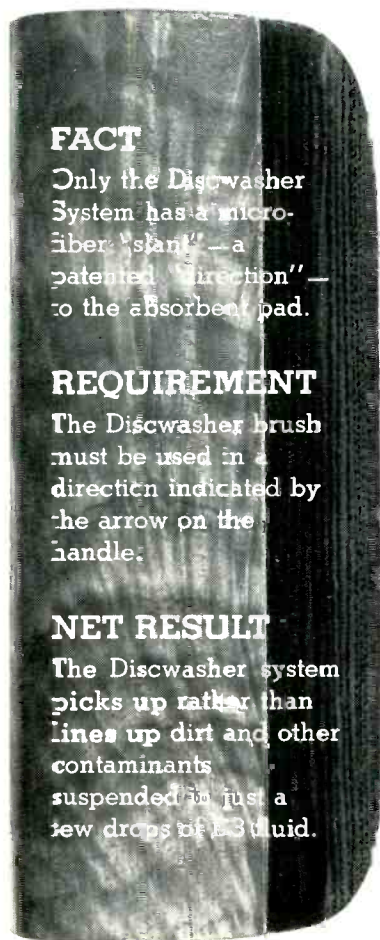
LEFT

RIGHT

NRN



Patented Direction



FACT

Only the Discwasher System has a micro-fiber "slant" — a patented "direction" — to the absorbent pad.

REQUIREMENT

The Discwasher brush must be used in a direction indicated by the arrow on the handle.

NET RESULT

The Discwasher system picks up rather than lines up dirt and other contaminants suspended in just a few drops of fluid.

Directed Research
only from:



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COLUMBIA, MO 65201

Audio

January 1977

"Successor to **RADIO** Est. 1917"

Vol. 61 No. 1

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About the cover: A close-up view of the chrome-plated tube shields from an E.H. Scott AM receiver of the 30s. The originators of AM high fidelity, these Scott receivers were individually made to customer specifications and capable of receiving broadcasts from 3,000 miles away without interference.

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.

Jay Martin, 2525 West 8th St., Los Angeles, California 90057, telephone (213) 385-2917.

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.



AUDIO Editorial and Publishing Offices,
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The DC amplifier is a rather amazing instrument. It reproduces music without phase distortion or time delay distortion. Down to 0 Hz (direct current) the response is flat. French horns sound French. A string bass sounds like a string bass. And Mozart sounds like Mozart.

Needless to say, it's sensational.

And now it comes in an *integrated* amplifier. The Kenwood 600. The first integrated DC amplifier.

With dual power supplies. At 130 watts per channel, minimum RMS at 8 ohms from 20 to 20,000 Hz with no more than 0.08% total harmonic distortion.

The perfect companion to our new 600T, the finest tuner we've ever made (and we're famous for our tuners).

For full information and specs, write Kenwood Electronics, 15777 South Broadway, Gardena, Ca. 90248; or 72-02 Fifty-First Ave., Woodside, NY 11377.



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The Best
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Empire
Phono
Cartridge
Is To
Show You
What Goes
Into One.



At Empire we make a complete line of phono cartridges. Each one has slightly different performance characteristics which allow you to choose the cartridge most compatible to your turntable.

There are, however, certain advantages, provided by Empire's unique design, that apply to all our cartridges.

One is less wear on your records. Unlike other magnetic cartridges, Empire's moving iron design allows the diamond stylus to float free of its magnets and coils, imposing much less weight on your record's surface and insuring longer record life.

Another advantage is the better channel separation you get with Empire cartridges. We use a small, hollow iron armature which allows for a tighter fit in its positioning among the poles. So, even the most minute movement is accurately reproduced to give you the space and depth of the original recording.

Finally, Empire uses 4 coils, 4 poles, and 3 magnets (more than any other cartridge) for better balance and hum rejection.

The end result is great listening. Audition one for yourself or write for our free brochure, "How To Get The Most Out Of Your Records". After you compare our performance specifications we think you'll agree that, for the money, you can't do better than Empire.

Empire Scientific Corp.
Garden City, New York 11530

EMPIRE

Already your system
sounds better.

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Audioclinic

Joseph Giovanelli

Because of the ever-increasing volume of mail this writer must handle, it is more important than ever for those who send in questions to enclose a stamped, self-addressed envelope with each letter. This speeds up the replies, as the time taken to fill out envelopes could be spent in answering the questions.

Your cooperation in this matter will insure a quicker response to your letter and will also help others receive quicker answers to theirs. Thank you for your cooperation.

While I'm at it, I wish each and every one of you a happy, healthy and prosperous 1977.—J.G.

Stylus Wear from Albums and Singles

Q. My record collection consists of both lp albums and 45-rpm "singles." I am concerned that, by playing the singles frequently, I might be significantly increasing the wear on my stylus. Do 45-rpm records cause more wear than albums? I wonder if you would recommend purchasing another cartridge for use specifically with the singles?—William H. Malashock, La Mesa, Ca.

A. I have never made any attempt to check the relative life expectancy of a stylus when playing 45s as opposed to playing lp albums. I suspect that some additional wear might be expected when playing 45s. This wear might be caused by a poorer grade of material used to press the 45s and possibly because of the higher recording signal levels used when making such records. I really cannot see, however, that these would be significant, especially with today's cartridges. A stylus

Dept. of Aux Inputs

It seems our Maxwell's Demons got loose again at the typesetters; this time they managed to delete one by-line on the profile of the Crown M-600 power amp which appeared in the November issue. Geoffrey Cook, a West Coast engineer, should also have gotten credit for the review.

Our sincere apologies, Geoff.

lasts so long these days that you can ignore any possible added wear from 45s.

Interference to AM Reception

Often, when listening to AM, an annoying "buzz" is present, especially at the low end of the dial. This is caused by the high current power supplies of associated equipment, and the fast switching of the power supply's silicon diodes. This is not present with all-tube equipment as vacuum tube rectifiers do not "turn on" quickly. What takes place is that large current loads are demanded from the power line at a rate of 120 times per second. This causes radiation or reradiation on harmonics of 60 Hz.

The cure is to place a 0.01 to 0.001 μ F disc capacitor across each silicon diode. The voltage breakdown rating of such capacitors must be 2.4 times the power supply voltage.—Michael Stosich, Bolling Brook, Ill.

Phono Preamp Input Capacitance

In your September *Audioclinic* column you were wrong in stating that phono preamplifier input capacitance always amounts to only a few pF at most. While many preamplifiers do have a stray input capacitance of under 50 pF, some designers deliberately put a 300 pF cap across the phono-graph input terminals to minimize r.f.i. problems. This was especially prevalent in amplifiers and receivers manufactured during the late '60s and early '70s, and may now become even more widespread in view of the proposed law requiring consumer audio gear to be made more immune to r.f. interference. So, depending upon one's choice of amplifier, it may not be necessary to add capacitance in order to provide an optimum load for a Shure cartridge, for example. The only way to know is to ask the manufacturer of your particular amplifier.

Peter W. Mitchell,
Technical and Marketing Advisor,
Audio-Pulse, Inc.
Bedford, Mass.

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 • JANUARY 1977

"...in the same class with a number of more expensive products, including many of the direct-drive record players we have seen."

This quote, from the Hirsch-Houck Labs' report in *Stereo Review*, refers to the Dual 510, a semi-automatic belt-drive turntable. Since direct-drive models (especially our own) are accepted as the standard of performance, Hirsch-Houck's comparison is not to be taken lightly.

We'll let someone else tell you how good our belt-drive turntables really are.

The 510 also benefits from comparison with other semi-automatic turntables. Dual's unique sensor locates the 12-inch and 7-inch lead-in grooves for you. You don't have to guess where they are. And there's no way to drop the tonearm accidentally; the cue-control lifts it automatically at the end of play and supports it until you release it.

You might also compare the 510 with your present turntable, or any other you may be considering. When you do, keep in mind the 510's many other features and refinements described below. Your old records will sound better, your new ones last longer.

Dual

United Audio Products, 120 So. Columbus Ave., Mt. Vernon, N.Y. 10553
Exclusive U.S. Distributor Agency for Dual

Dual 510. Semi-automatic, single-play. True four-point gimbal tonearm suspension. Synchronous motor, precision-ground belt, unique Vario-pulley, dynamically-balanced platter, 6% pitch-control, illuminated strobe. Lead-in groove sensor. Cue-control viscous-damped in both directions. Less than \$200.

Dual 502. Similar except less sensor, pitch-control and strobe. Less than \$160.

Dual 1249. Fully automatic single-play/multi-play. Less than \$280.



True four-point gimbal centers and pivots the tonearm mass at intersection of horizontal and vertical axes. Tonearm is dynamically balanced in all planes. The four needle-point pivots are first hardened, then honed, a process which produces microscopically smooth surfaces. The precision ball-bearing races are only 0.157 inch diameter. Bearing friction: vertical, <math>< 0.007</math> gram; horizontal, <math>< 0.015</math> gram.

Stylus force, applied by long coiled spring around vertical pivot, remains perpendicular to record even if turntable is not level.

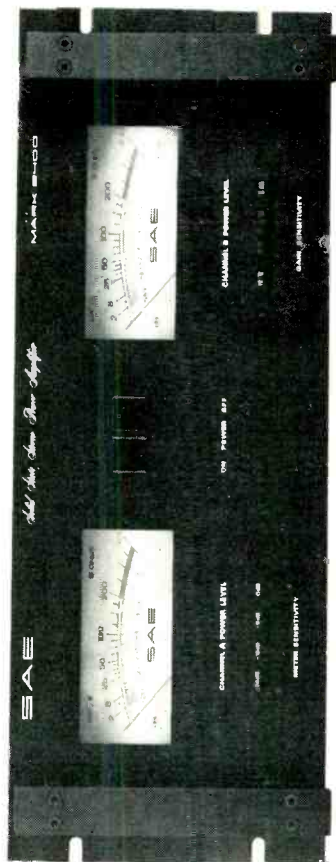


Unique Vario-pulley used in Dual's three belt-drive models is precision-machined for perfect concentricity and balance. Speeds are adjusted by expansion and contraction of pulley circumference; belt is never twisted or distorted.

Specifications (DIN B): Rumble, >63dB; Wow and flutter, $\leq 0.05\%$

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6

200 Watts RMS, per channel, both channels driven into 4 or 8 Ohms from 20Hz to 20KHz at no more than 0.05% Total Harmonic Distortion.

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Tape guide

Herman Burstein

Hiss & Scratch Remedy

Q. I have a lot of recorded tapes but they have too much hiss and scratch. Would it be worthwhile to record these tapes over on a special low-noise tape?—Mark Gedler, Atlanta, Ga.

A. I am not sure what you mean by recording your tapes over. Do you mean going back to the original sources, such as phono discs? Or do you mean copying your present tapes on low-noise tapes? If you have in mind going back to the original sources, it may be that these have excessive hiss and scratch. Then the use of low-noise tape will not improve matters. Perhaps you have been under-recording so that the noise of both your tape machine and the tape are relatively prominent compared with the desired audio signal. If so, an increased recording level—short of noticeable distortion—might be your best answer. Shifting to low-noise tape may add a slight improvement. But, if you have in mind the copying of your present tapes, you will be copying the noise along with the signal, so copying onto a low-noise tape will not help. However, you might check with local audio stores as to what single-ended noise reduction systems are available.

Tape Timer

Q. The digital timer on my tape deck shows only the approximate positions of the recording, but it does not have the accuracy of a movie camera footage counter. Isn't there a way to calculate the time the tape will cover as I often run out of tape before the program's end. Is there any device which measures the tape length?—H.S. Liu, Los Angeles, Cal.

A. Some time ago a device to measure actual tape footage was brought out but it wasn't a success. It was meant to be attached to the tape deck, but this was a rather clumsy arrangement. Most people are satisfied to find the approximate portion of the tape reel in which they are interested. A seven-inch reel of conventional tape runs 32 minutes in one direction at 7 1/2 ips, and 64 minutes at 3 3/4 ips.

The times are increased by a factor of 50 percent for the 1 mil tape, and a factor of 100 per cent for the 1/2 mil tape. Thus, you can use a timing device such as a photo timer, wrist watch, kitchen timer, etc., to tell where you are and how much time you have to go.

Way of Wear

Q. Will a tape deck with bi-directional operation wear the tape heads faster than a uni-directional deck?—Dan Moyer, APO, San Francisco.

A. A properly designed and constructed tape machine that operates in two directions will not impose extra wear on the heads.

Magnetic Protection

Q. I have a very strong permanent magnet which I use on board my boat for retrieving metal objects dropped overboard. I also have a cassette tape machine board with a goodly number of cassettes. Since there is always the possibility of these coming together in storage, is there some way I can shield them against each other?—R.J. Stephenson, Chattanooga, Tenn.

A. I suggest you write for information about shielding material to Magnetic Shield Division, Perfection Mica Co., 1322 N. Elston Ave., Chicago, IL 60622

Mike Selection

Q. I will be recording in the field and would like to ask your advice about microphone selection. Would you say that a capacitor type mike would provide significant improvement over a dynamic one in the same price range?—James Donovan, Marblehead, Mass.

A. Apart from the question of price, capacitor microphones are generally regarded as superior. But when they are in the same price range as other types of microphones, this superiority may vanish. For use in the field, it is undesirable to use a ribbon mike because of its susceptibility to wind noise and its generally greater fragility. Dynamic mikes are generally the most rugged. Perhaps you can find an

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accommodating dealer who will let you try out two or three microphones to determine which is the best for your purpose.

Half-Price Scotch

Q. A dealer offers Scotch low noise tapes at less than half price. He says they were used by studios and erased, which in no way affects the sound quality. Can this be true? If the sound isn't affected, why does the studio discard the tape?—H.S. Liu, Los Angeles, Cal.

A. If the tape is indeed Scotch and has been used only a few times, it seems that you would be getting nearly the equivalent of new tape—unless the tape has been spliced for editing. Spliced tape would be the studio's reason for discarding it.

Recorder Speeds

Q. My tape recorder operates at $7\frac{1}{2}$ and $3\frac{3}{4}$ ips. I compared the sound at the two speeds and couldn't detect a difference. The dealer told me the higher speed only extends the range beyond 12,000 Hz which is above my hearing range. My friend said that I should use the faster speed to get full use of the machine.—H.S. Liu, Los Angeles, Cal.

A. The advantages of the higher speed, in addition to better treble response, are somewhat greater signal-to-noise ratio and less chance of distortion at the higher frequencies.

Meter Mixup

Q. My Sony mixer is equipped with VU meters. These show the output signal and are affected by the master gain control. How are these to be used in correlation with the VU meters on my tape machine. So far, I have just used the mixer to set the relative levels on the microphones and have adjusted the master gain so the pots on the tape recorder don't have to be advanced more than two-thirds of maximum. Could you tell me the correct way to use them?—Howard Sanner Jr., Hyattsville, Md.

A. It would appear to be a good practice to adjust the master gain control of your mixer so that whether the microphone is fed directly into the mixer or directly into the tape recorder, the same setting is required for the record gain control of the tape machine.

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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Is it live, or is it Memorex?

The amplified voice of Ella Fitzgerald can shatter a glass. And anything Ella can do, Memorex cassette tape with MRX-2 Oxide can do.

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Audio etc.

Edward Tatnall Canby

I've always had a fetish for the minimal, the small package, both in and out of audio. I bought my first subcompact car before you ever did—a 1948 Austin A40. Back in the twenties, my family had the first bookshelf radio, only it was a mantelpiece radio. Same idea. This magazine came out in 1947, with me inside a year later, and was *it* compact. Miniaturization! The very wave of the future, not to mention the present, and it keeps our small world getting smaller even as we reach out incredibly into electronic space. But in hi fi right now I'm having a tough time keeping my fetish happy. What do we do? We get bigger and bigger.

Rack-size quadraphonic? Preamp units it takes two hands to operate, practically anchored to the floor. We never had it so big. My eyes bug out, but my fetish is frustrated.

It's not smallness itself, of course, that gets to me. Smallness on its own is nothing much. It has to be ingenious miniaturization, the have your cake and eat it sort, more out of less, the mostest with the leastest. The other day I tossed a little FM radio straight into the waste basket. It was a palm-sized miracle of cubic compactitude,

but it sounded awful. That's not the idea. What is exciting, and keeps happening again and again, is some kind of super-ratio between smallness and performance, you might say the S/P factor. But you would have to add another, since we are all consumers—ease of usage, simplicity, versatility, etc. Does this count! Like, say, in a vest pocket cassette recorder. Call it C, for convenience, and don't forget it. So now we have the SPC factor, the product of size, performance and convenience, and when it's high, my fetish does handstands.

The SPC Factor

The classic example is the one you guessed. The miniature electronic calculator, ultimate consumer realization of the IC concept and the most successful miniaturization on the consumer market. Its SPC is so high, it's like that little Roumanian gal at the Olympics, darned near perfect in an imperfect world. *Size: Tiny. Perform-*

ance: Nearly ideal and getting better. Convenience: You name it. Every time I see one such, I start dancing in the streets. And, each time, I look around to see if anyone has developed some palm-sized quadraphonic yet. Nope, two palms maybe, but not one palm.

Can you imagine what might have happened if the little calculators had been introduced to a waiting public in big rack-mount models? Well, I can tell you. The same people who now buy our superb macro hi fi would have snapped up those monsters just as fast, complete with optional heavy-duty dollies to trundle them from room to room. Good market, too? Just like ours. The P would be fantastic. But how about the S and the C!

The smallest hi-fi AM-FM tuner I have around is the Fisher Series 80, and it ain't new. How old? I don't count the years. In its time it was compact state of the art via miniature tubes, designed into a chassis a bit over a foot wide and four inches high, no more than eight inches from back to front. Thirteen tubes and still works like a charm. Plays mono, of course; this was pre-stereo. But with transistors soon to come, would you think



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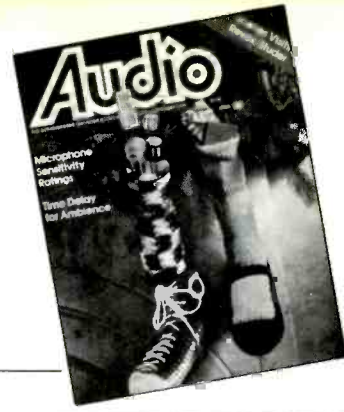
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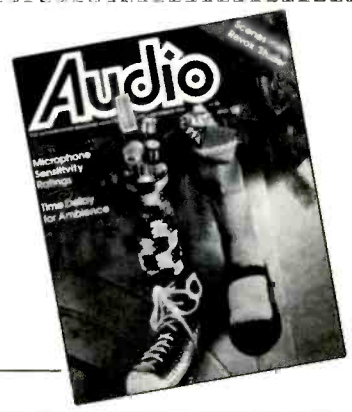
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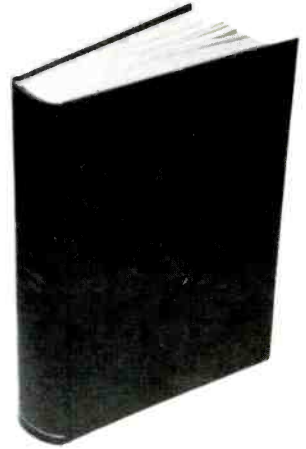
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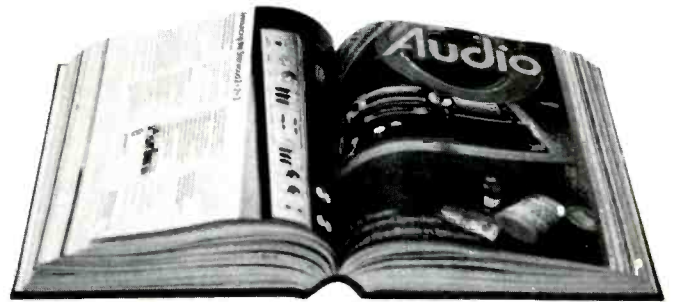
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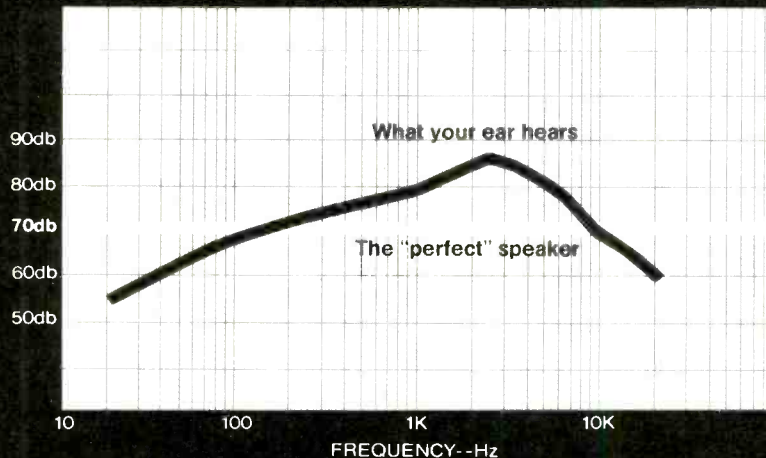
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Learn the naked truth about your phono cartridge.

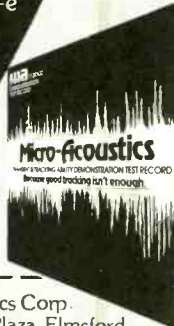
If you're the kind of music lover who wants to get the very most from your stereo system, you can't afford to be without the Micro-Acoustics Transient and Tracking Ability Demonstration Test Record. Because it does what no test record ever did before.

Until now, test records concentrated on *tracking ability*—how well a stylus keeps contact with record grooves on louder, harder-to-follow passages, at low stylus pressures.

But cartridges need good *transient ability*, as well. To accurately reproduce the sudden start-and-stop bursts of sound at all frequencies that differentiate one instrument from another... and localize instruments in space.

Micro-Acoustics' new TT-2002 test record is the only record specifically designed to test *both* abilities. On side 1 of this easy-to-use disc is a series of electronic and musical tests incorporating technology we've developed as the world's leading manufacturer of *recording styli*. Side 2 is a dramatic demonstration of quality music, played by the top names in the business.

One small catch: Our record has humbled many a proud stereo cartridge, and may well make you unhappy with what you're using. Unhappy enough to listen to our 2002-e direct-coupled cartridge—which isn't intimidated by any record. Even ours.



Micro-Acoustics Corp.
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 I'm just curious. Send free literature.

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ma
Micro-Acoustics A

that two channels would require twice as much bulk?

The jump to transistors was, as they say, quantum, and plenty of other circuit components went along with the new tiny size, maybe a tenth that of the "miniature" tube or a fiftieth, depending. Mount all these little things on circuit boards and plug them in. Take a chassis like that of the Fisher and put perhaps 10 times as much on it! Well, that's what you might have supposed.

Look back where we came from. I remember scads of the much larger full-sized, earlier tubes, and they got even bigger when beam power and 6L6s came in. Four inches high, each of them and thick and fat and hot. I used to pull out every tube I had, every so often, lay them all on a soft pillow stuffed into a suitcase and take them safely down to the store to be tested. I got into real hi fi for the first time via tubes like that, way back in 1934. It was a big Midwest radio, console model, mail order, boasting no less than 16 tubes, the big fellows. (As I remember, they lumped four tubes in parallel, maybe even eight in push-pull, to get a whopping output.) Prophetically, I opted for the massive extra-cost speaker, a solid 12-inch dynamic with a big, dangerous electromagnet around the voice coil at maybe 400 volts. Nothing miniature about that baby! It was this speaker that I later took out of its console and mounted into a separate baffle that went into my fireplace, for my first BIG BASS. That would be around 1937, I think. Move over, Avery Fisher.

Engineering Ingenuity

The trend as I say was to the miniature. From those fat four-inchers, we jumped to the skinny little tubes of the Fisher 80, only two inches from base to pointed glass tip, for a very big decrease in space and, marvelously, right along with it, a big lift in performance. *That's* what I mean! Engineering ingenuity at work. We saved a lot of over-all space on the basis of those new tubes and the Fisher remains an excellent example of the way it was done. New compactness, designed right around the tubes themselves, making the most of them. Compactness, Performance and Convenience, all three, and a new high in SPC, but by that time we were on the verge of the transistor.

True, it took a long time for transistors, etc. to take over, reliably, and maybe they haven't yet, if I read the hi-fi mind correctly. But with some famous exceptions, the tubes did van-

ish. All solid state. Now, I am wracking my memory—do I recall any great diminution in the bulk of our hi-fi gear? Did our equipment shrink in proportion?

Well, maybe for awhile, back then, we had some notably slimmer units by a few percentiles. Of course, we still had to deal with all the ancillaries of control, switching, connections, and, never forget, fingers. They don't get smaller. Good excuse. Yet I recollect no great blinding enthusiasm for further miniaturization. And after awhile we began to grow again. Just when the biggest quantum jump of all was coming up, far greater than all the other put together. The IC, the integrated circuit, the chip.

Imagine my reaction to *this* news! Yards and yards of circuitry, even a roomful, compressed to the size of a fingernail. Incredible, *unbelievable!* NOW what will we do? Some readers may remember my first printed shouts of joy, my fetish fairly leaping in a frenzy. Now, we really had it. Alice and her mushroom. Let's put everything into ICs, boys (oh so simple!). Rooms full of hi-fi in a thimble. The whole works, please, and all you'll have left to do will be to attach the handles. (Ah, there was the rub.)

So I began projecting into the hi-fi future, around about then. If we meant to use the IC for its full advantage, then we should go to logical conclusions. For a start, how about building a hi-fi amp *into the inside of a volume control?* Stereo? Plenty of room, surely, and for a dozen more channels if you really needed them. The only real problem I foresaw was purely mechanical—how in heck would you turn the volume control. You'd have to clamp it onto the arm of your chair, for leverage. Tail wags dog.

Smaller = Larger

Luckily, I stopped fantasizing at that point, or I might have gone on to put quadraphonic systems into headphones or something. The clouded crystal ball. I'm still waiting for mouse-sized hi fi out of the IC, but I wait in vain. Instead, it's rack-sized, *with* transistors, and even ICs.

I could say a lot, by the way, about that third factor in my SPC, the C for Convenience. Sometimes it is the most important of all. That Philco mantelpiece radio had a terrific SPC, and that is why so many people bought it up, including us. Miniaturization, yes, relatively speaking, up there on its mantel (or at the back of a living room table). It kept out of

8 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.

The level control, muting switch, tuning knob and input and tape selectors are all in the upper right-hand corner.

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 exclusive helps you tune more accurately.

3. A stepped level control to keep both channels equal. It guarantees unprecedented accuracy—to within 1/2 db over the whole volume range.

4. MOS FET front end electronics unitized tuning. Because it's unitized, the receiver tunes the same whether it's cold or warmed up.

And MOS FET gives it a very wide dynamic range.

5. Dolby noise reduction system.

So you can benefit from Dolby broadcasting. Instead of being an extra, it's built in—operated from the front panel.

6. Phase locked loop. It gives you better stereo separation and less distortion.

7. LEC (low emitter concentration) transistor.

This Sony exclusive in the preamp phono stage yields tight RIAA equalization, low noise, low distortion and a wide dynamic range.

8. 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.



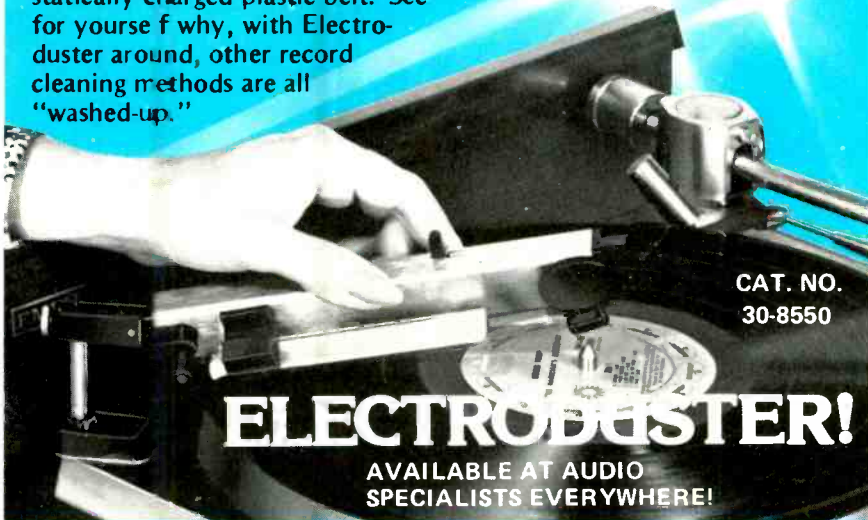
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The incredible new Electro-duster! The "clean while it plays" dust remover. Electro-duster's velour fibers lift dust and dirt from record grooves and deposit the particles on a statically charged plastic belt. See for yourself why, with Electro-duster around, other record cleaning methods are all "washed-up."



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the way and was pretty, in a Gothic sort of fashion. Parabola shaped. A respectable performance, too, through its built-in loudspeaker, so much better than the earlier tinny magnetic horns. Here was the beginning of the radio age, but one aspect of success you might not realize. That Philco *plugged into the wall*.

What? Well, we had only one radio before that, a square furniture box on spindly legs called a Kolster. A sensation in its time and the first radio of any sort that my father would tolerate. It sat in his study, the holy of holies. Why? *It, too, plugged in*. Maybe it wasn't the very first model to do so, but it must have been darned close to it.

Earlier radios ran on batteries. Good batteries, well engineered, compact—more or less—both dry and clean, but still—batteries. They ran down. They were always running down. Do you think my father, a Professor of English and a literary man, was going to horse around with *batteries*? That was for kids, for hams and nuts, or those people who always had to be first. (My grandfather was one—he had an Atwater Kent.) Not so my father! Nor a million other solid Americans. No amount of battery engineering was going to change that situation, as somebody finally realized.

Plug-in Profits

The instant a radio appeared with a real, live wall plug, joining the toaster, the waffle maker, and the Hoover, the radio biz was made. It never stopped from that moment on in its march to the big time, and out of it came the modern phono, hi fi, TV, with every last one a plug-in. *That little C factor* was worth \$-billions.

Yes, we are back to batteries now, but these are different. Miniaturized and transistorized. Suddenly, batteries, too, are Convenient. No cords. So you see how the C factor can shape us, along with the S and the P. Just tie them all together, and you have your public by the tail.

It's a long tale I have to tell, and I'll be back later with more. Meanwhile—we have quadrasonic chips. They're *here*. Where? Why, right inside those boxes, silly, can't you see them?

Now *my* idea is—hey, where did I put that waste basket? That palm-sized FM cube I threw out is *exactly* the right size for a complete quadrasonic control system, with IC chips. Speakers extra, of course.

AUDIO • JANUARY 1977

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You only hear what's on top of the platter. Not what's beneath it.



You can always distinguish the excellence of a turntable by its capability to rotate a platter precisely, at a given speed, without adding rumble, wow and flutter to the performance.

Because JVC's new JL-F45 turntable platter is directly driven by a specially designed DC servo motor, any rumble-producing effect is virtually nonexistent. The result is outstanding measurements that defy audibility. Rumble is better than 70dB (DIN B) and wow and flutter is less than 0.03% (WRMS). Even some of the most expensive turntables don't measure up to the excellence of these specifications.

In addition to the precision of direct-drive, the JL-F45 offers dual options for operation. Manual. And completely automatic. Auto Lead in. Auto Return. Auto Stop. You can even repeat play a record automatically up to six times—or infinitely.

The JL-F45's exclusively designed Tracing-Hold tonearm assures the highest degree of groove tracking with unusually low tracking error.

This is absolutely essential for today's ultra low tracking cartridges, including CD-4. The new unipoint gimbal suspension system reduces unwanted friction and overcomes unexpected jolts to the arm.

Every feature you're likely to want in a quality turntable contributes to this 2-speed unit's high level of performance. 2-way viscous-damped cueing. A 12-inch aluminum die cast platter with illuminated strobe. Anti-skating control. Direct-reading tracking force dial. And lots more.

While the JL-F45 is JVC's top of the line at \$250,* there are two other more modestly priced models. The fully automatic belt-driven JL-F35 at \$160.* And the semi-automatic JL-A15 at \$130.*

Whichever you choose, you can be sure you're getting the most turntable precision, reliability and value JVC has ever offered.

JVC America, Inc., 58-75 Queens Midtown Expressway, Maspeth, N.Y. 11378 (212) 476-8300. Canada: JVC Electronics of Canada, Ltd., Scarborough, Ont. Outside N.Y. call toll-free 800-221-7502 for nearest dealer.

*Approximate retail value, including base and dust cover.

JVC



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Bert Whyte

Behind the scenes

I see that through the time-traveling magic of publishing deadlines, I am writing for the January issue of *Audio* in the bright new year of 1977. Being a first-class, card-carrying pundit, it is my sworn obligation to make some prognostications as to whither goest audio in 1977. First though, I have a few gripes that need airing. . . .

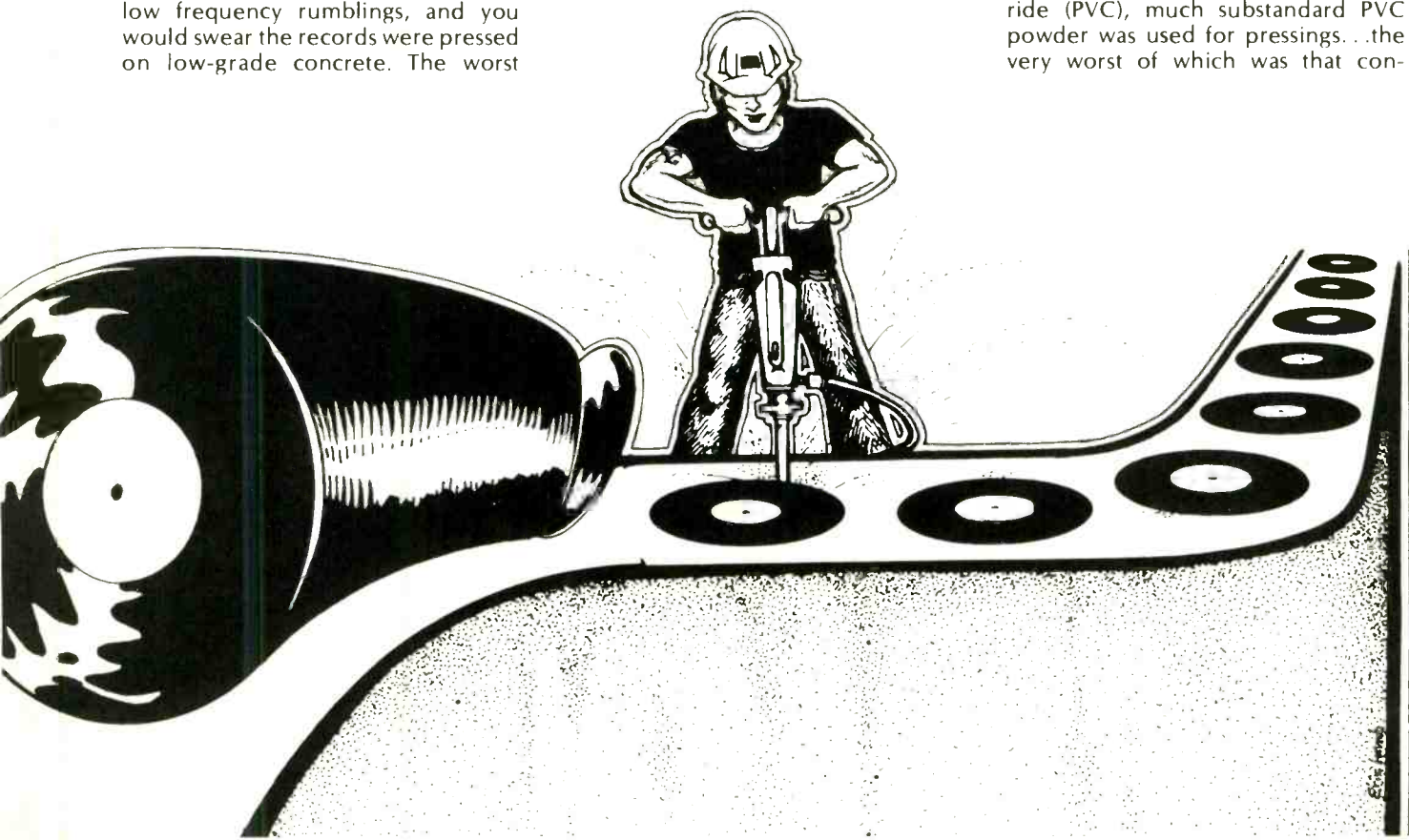
At the top of everyone's list is the abominable quality of record pressing in this country. A very high percentage of the records are simply incredibly bad, and the problem has reached epidemic proportions. Getting a record which doesn't have dish and/or pinch warpage is almost an occasion to pop a bottle of champagne. As for record surfaces. . . the Rice Krispies people ought to sue for infringement on their *Snap! Crackle! and Pop!* theme. Add to these time-honored anomalies such things as cyclic swishes and thumps with assorted low frequency rumblings, and you would swear the records were pressed on low-grade concrete. The worst

part of all this is that you can dig into your record library and find any number of records made 15 to 20 years ago which are not afflicted with the aforementioned defects. What has gone wrong with today's pressings? How has record quality reached its present low state?

Putting aside such emotional responses as "they don't give a damn" or accusing the record companies of sheer venality, there appear to be several reasons for these pressing defects. No matter how the record companies prattle on about how the "new lightweight records" have "better moulding qualities," the fact is that the discs are as much as 50 grams lighter than the records of a few years ago and consequently thinner and more flexible. . . and thus more susceptible to warpage. Because of the sales advantage of "factory-sealed vir-

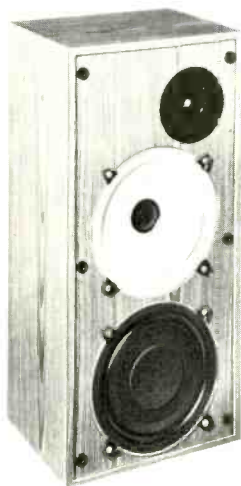
gin recordings," virtually all records today are shrink-wrapped. This process is easily capable of warping the cardboard record shucks. . . and the thin record inside the shuck as well. While there undoubtedly is much dish and pinch warpage in pressings due to mishandling in the cooling cycle, in the opinion of a number of record company engineers I've talked with, it is the shrink-wrapping which is most highly contributory to record warpage. Needless to say, the simple expedient of eliminating the shrink-wrapping runs right into the "factory-sealed" problem. What we need, then, is some new kind of seal that will guarantee the record is virgin, but will not cause warpage.

The reduction and preferably elimination of surface noise is a more formidable problem than disc warpage. During the oil embargo and the subsequent shortage of polyvinyl chloride (PVC), much substandard PVC powder was used for pressings. . . the very worst of which was that con-



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A century of leadership bridging audio's two widest gaps



Celestion UL8

Widest gap number 1: Between the signal at your amplifier's output and the sound you hear. The loudspeaker must fill this gap via mechanical translation. The vibrating element of every speaker possesses mass and inertia—and will therefore by definition be an imperfect reproducer. This is why loudspeaker distortion, frequency and transient response specifications are much poorer than those of good amplifiers.

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From Celestion's UL6 winning the 5th Japan Stereo Components Grand Prix contest, to the Celestion "Power-Range" models used by the Beatles, to the Ditton 66 studio monitors of the Olympic Radio and Television Organization, Montreal / 76, people who know how to best bridge the speaker gap—insist on Celestion.



Decca MKV1 Gold Elliptical Cartridge

Widest gap number 2: Between vinyl record grooves and the signal at your phono preamp's input. Like the vibrating element of every speaker, the phono cartridge, stylus and tonearm possess mass, inertia and friction—and can thus approach but not attain correct translation of what is really recorded on the disk.

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- 1) Decca London MKV1 Gold Elliptical or Plum Spherical Cartridges employing Decca's legendary "Positive Scanning" system. Featuring lower stylus mass, higher compliance, lower tracking force than the Decca MKV series. Decca MKV1 models offer the best transient response of all cartridges—regardless of price.
- 2) New Decca International Arm. Magnetic antiskating and damped unipivot jewelled bearing of original International Arm, plus several modifications and improvements. As close as you can get to zero friction and zero groove pressure unbalance.
- 3) Decca Record Brush and Record cleaner, "dry clean" devices utilizing Decca's unique conductive micro-fiber to clean records and drain static without the destructive properties liquid cleaners exhibit on cartridges and records. Designed especially for Decca's state-of-the-art MKV1 cartridges.

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cocted from recycled, ground-up old or surplus records. Now there is no shortage of PVC, but it appears that there are variations in the in the product from several manufacturers. Most record companies have their own formulations of pressing compounds, which contain many items besides the PVC (for example, lubricants such as lead stearate, stabilizers, plasticizers, etc.). The percentage of PVC in the compound varies, but it may surprise you to know that although records may be advertised as "100 percent pure virgin vinyl," this is rarely the case. The different pressing compounds have varying properties of melt temperature, flow viscosity, and other parameters necessary for good moulding. The idea, of course, is to eliminate such things as bubbles, voids, groove pulls, or lack of proper fill. The noise output of the record is therefore an index to the success of the moulding process.

Time = Sonic Quality

However, there is another aspect of record pressing that can have an effect on the noise of the pressing and its physical deformation. This simply is in the timing of the record pressing cycle. There is one timing called the "pop" cycle and another called the "symphonic" cycle. The symphonic cycle is of longer duration than the pop cycle and could be considered a more "careful" pressing operation. The record stampers are in more extended contact with the pressing compound, and the moulded record stays longer in the press for more controlled cooling. Generally speaking, if someone wants a higher quality pressing with minimum noise, he specifies the use of the symphonic cycle. The rub here is that such cycling is more expensive since it takes more time.

Unfortunately, the generation of noise in a recording can go all the way back to the cutting of the lacquer master. The material the cutting stylus dislodges from the groove while cutting the lacquer is called the "chip." It is usually removed by a vacuum suction device positioned very close to the stylus. Believe it or not, the way the suction tube is adjusted can effect the angle of chip removal, and if this angle approaches 90 degrees, this can generate a certain kind of noise. Far more noise can result, however, from the electroplating and processing of the lacquer master. I've gone into this before...and it can be summed up that time-accelerated plating, permitting too rapid a deposition of met-

al, and the less than careful grinding of the backs of the stampers can both cause a broad frequency spectrum of noise. It takes time, which means money, to do a careful lacquer processing job, and in the hurly-burly pressure of the mass record market, this rarely is the case.

Caveat Audiophile

Okay...so a lot of lousy records are produced...what can be done to improve this situation? It has been argued that the record buyers in the mass market have neither the quality of playback equipment nor the aural discrimination to be bothered by defective records. Be that as it may, component hi-fi equipment continues to be sold to a great many people, and this has been going on for quite some years. By now, there is enough good equipment in use to constitute at least a "mini" mass market. Unquestionably, thousands of these people have complained to their record dealers and to the record companies about defective records...to no avail. Unless the record companies start to receive complaints by the *hundreds of thousands*, nothing is likely to change. Even though such mass protests would be for their ultimate benefit, by the perverse nature of things, it is unlikely that many people would embark on such a crusade.

If the record companies claim that special time-consuming processing is necessary to produce high quality pressings, which means extra costs, the only way to get such recordings is in the establishment of special "Audiophile" or "Super-Fi" editions of recordings. These would cost a dollar or so more than the standard pressings, but their quality would be guaranteed by the companies issuing such recordings. Before you vent your spleen on me for such an outrageous suggestion, please remember we had a precedent for just this sort of thing in the Westminster Lab Series of the late 1950s, which were specially mastered, processed, and packaged. There are many superb recordings being made today, and if it takes a special high quality pressing to do them justice, albeit at a premium price, it would seem to me that this is a worthwhile idea. Well, I got that off my chest...so on to the prognostications.

Fidelity Forecasts

In general, audio in 1977 will be a year of proliferation of high-end equipment, with ever increasing technological sophistication and of equip-

Technics introduces components designed for professional use only.

The SE-9600P. Regulated stereo power amplifier with a lot more than just power. Like 100% constant-current and voltage power-supply regulation. Which means complete freedom from transient I/M distortion. It also means high-level transients introduced in one channel won't affect the other. There's also only 0.08% I/M distortion. A frequency response of 5 Hz to 150kHz (+0dB -3dB).

A S/N ratio of 110 dB. A 4-step damping factor control. *And 110 watts per channel, minimum RMS, into 8 ohms from 20 Hz to 20 kHz with no more than 0.08% total harmonic distortion.*

The SU-9600P. The stereo preamplifier that performs as well as it looks. Starting with an unheard of magnetic phono overload tolerance of more than 1 1/3 volts (1350mV RMS at 3mV sensitivity). An equally impressive phono-2 S/N ratio of 76 dB (referred to 3mV input). Virtually non-existent total harmonic distortion (0.02%). As well as bass and treble negative-feedback tone controls calibrated in 2.5 dB steps. With turnover pushbuttons at 125 Hz and 500 Hz as well as at 2kHz and 8kHz.

The SH-9090P. The Universal Frequency Equalizer that has no equal. You get 12 dB of boost or attenuation for 12 bands (10 Hz to 32 kHz). Plus the center frequency of each band can be continuously shifted by as much as ±1 octave. In addition, the bandwidth (Q) for each of the 12 bands is continuously variable from 0.7 to 7. The result: You have more control over response shaping than with any other single instrument. (Configuration: one in, one out.)

The SP-10MKII. In every respect, it's everything you want in a professional turntable. So much torque it only takes 0.25 of a second to reach the exact playing speed at 33 1/3 RPM. Our lowest wow and flutter (0.025% WRMS) and rumble (-70 dB DIN B). A quartz-locked frequency generator DC servo motor. And, of course, the reliability of Technics direct drive. The system that radio stations use. And discos abuse. Supplied without tone arm.



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ment with new "convenience" features. There will be a great increase in the use of digital technology, much of which will be applied to some rather exotic remote control devices. In fact, remote control of many additional audio functions will be the big "in" thing in '77.

You will see more open-reel and cassette recorders using digital logic in their transport systems. Also becoming a more common feature on these tape machines will be the easy adjustment of azimuth together with front panel adjustments for bias and

equalization. In spite of a general "wait and see," lukewarm attitude toward the new Elcaset format, I predict that by this time next year, the Elcaset will be firmly established. A large part of the reason for this will be the availability of prerecorded Elcaset, which will be not only a viable alternate to the disc, but superior to it in many respects. The Elcaset is also likely to play an important role in the "second coming" of quadrasonic sound. There is much "behind the scenes" activity in four-channel sound, with several significant advances in record-

ing technology, and you will see very advanced demodulators and decoders, new high-powered four-channel receivers, and some definite action in the quadrasonic FM broadcast situation.

There will be increasing use of time delay in audio systems, with several new devices appearing on the market. This also aids and abets the revival of four-channel sound, since time delay requires the addition of another stereo amplifier and a pair of speakers. Once Joe Audiophile has this set-up, it most certainly will occur to him that for a very modest outlay he can acquire a demodulator or a decoder and have quadrasonic facilities as well.

The power race in receivers will continue with some models topping 200 watts per channel. Their makers might offer a small fork-lift as an option to handle these behemoths. Oddly enough, in the separate power amplifier category, while there won't be any dearth of super power output units, the emphasis will be more on refinement and sophistication, rather than power. You can look for more class A amplifiers and amplifiers in which much careful design work has been done towards the reduction or elimination of TIM with emphasis on fast rise times and slew rates. In pre-amps, there will be models with all the multi-function "whistle and bells" facilities, but here too you'll see a trend towards simple and more technically sophisticated units. Moving-coil phono inputs will be built-into many pre-amps, and you look for wider use of stepped, detent-type tone and volume controls.

More turntables will boast quartz oscillator, phase-lock-loop circuitry and will have more massive bases. Tone arms will emphasize low mass and lower friction. One arm we know of will use 24 ruby bearings and have a compensating device to control resonance interaction between differing cartridges and the arm.

Loudspeakers will show a definite trend to larger size, as in days of yore. However, enclosures will be the result of much advanced measurement and computer technology. You can also look for more speakers that are bi- and tri-amplified with their designs predicated on this concept.

In the "dark horse" department, the money is on several new noise reduction devices. And finally, 1977 will see quite an emphasis on direct-disc recording—with at least one *major symphony orchestra* making this type of recording! 1977 looks to be a banner year for audio! Happy New Year!

Could the ultimate system be all Crown?



It depends on how you define "ultimate." But Crown may be the only top-quality, state-of-the-art manufacturer whose components could build a complete, ultimate hi-fi system.

For instance: A CX-824 tape deck, world-renowned for reliable performance. Connected to an IC-150A pre-amp. With the signal amplified by a DC-300A power amp, proved in many thousands of hours of professional use. Output controlled, monitored and switched by an OC-150A. Possibly a VFX-2 for personal control of crossover points. And sound faithfully reproduced by ES-212 electrostatic speakers.

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AUDIO • JANUARY 1977

The Sensuous Speaker.

Yamaha's new two-way beryllium dome NS-500.

A very responsive speaker with a rich, luscious sound. A deeply involving sound. Highly defined, finely detailed.

The NS-500 is created from the same advanced beryllium technology that's made Yamaha's revolutionary NS-1000 Series speakers, in the eyes and ears of many audio experts, the highest standard of sound accuracy. (Specific benefits of Yamaha's beryllium technology have been documented in a paper presented to the 52nd Convention of the Audio Engineering Society.)

With the NS-500, you get all of beryllium's advantages (transparency, detail, and lack of distortion that go beyond the best electrostatic speakers), but at a price roughly half that of the NS-1000. Only \$500 the pair, suggested retail price.

The joy of beryllium.

The ideal dome material for a high frequency driver must respond instantly to changes in amplitude and frequency of the input signal. So the ideal dome material must be virtually weightless as well as extremely rigid.

Beryllium is the lightest and most rigid metal known. Its density is less than two-thirds that of commonly used aluminum, and its rigidity is almost four times as great—thus preventing dome deformation and consequent distortion. What's more, beryllium's sound propagation velocity is twice that of aluminum.

The beryllium dome found on the NS-500's high frequency driver is the world's lightest—about half the weight of one petal of a small sweetheart rose. Which is one of the reasons for this speaker's exceptional sensitivity and response. And for its sensuous sound.

A closer look.

To be able to offer the sophistication of beryllium at a more affordable price, without sacrificing quality of performance, Yamaha designed the NS-500 as a two-way bass reflex system.

This gives the NS-500 a trace more emotion at the low end than the resolutely objective NS-1000. But it also gives the NS-500 more efficiency (91dB SPL at one meter with one watt RMS input). Which means you don't have to invest in the highest powered amplifiers or receivers in order to drive the NS-500 to its full rated output.

For an optimum match with the beryllium tweeter, Yamaha developed a very light, very rigid "shell" woofer. And a special hermetically-sealed air core LC crossover with a carefully selected 1.8kHz crossover point.

As a result of these design parameters, the NS-500 boasts an insignificant 0.03% THD below 50 dB SPL, from 40 Hz to 20 kHz, making it the perfect complement

to Yamaha's state-of-the-art low distortion electronics.

Underneath the sleek monolithic styling of its solidly crafted enclosures, the NS-500 is full of many exclusive Yamaha features and distinctive Yamaha touches of craftsmanship.

But to fully appreciate the beauty of the NS-500, you really should visit your Yamaha Audio Specialty Dealer.

Which brings us to something else.

Something more than just another speaker pamphlet.

Yamaha's *Reference Handbook of Speaker Systems* is a very thorough guide encompassing all aspects of speaker design, performance, and evaluation. Starting with a detailed explanation of speaker design principles, the discussion then turns to a solid base of objective criteria, written in easily understood language, to help you properly evaluate any speaker in any listening environment. Already a much sought-after reference work among audio professionals, Yamaha's *Reference Handbook of Speaker Systems* is available at your Yamaha Audio Specialty Dealer. At \$5.00 a copy, it's well worth the cost.

However, if you clip out the coupon in the bottom corner of this page, take it to your Yamaha Audio Specialty Dealer and hear a demonstration of the exciting NS-500 or any other Yamaha speaker, the book is yours for half the price.

And if you're not familiar with the name of your local Yamaha Audio Specialty Dealer, drop us a line. In turn, we'll also send you a free preprint of the Audio Engineering Society paper on Yamaha beryllium technology mentioned above.



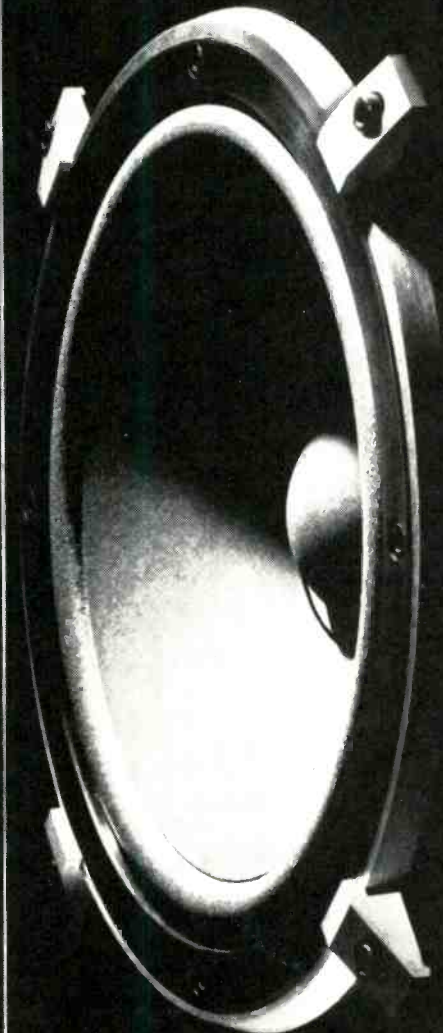
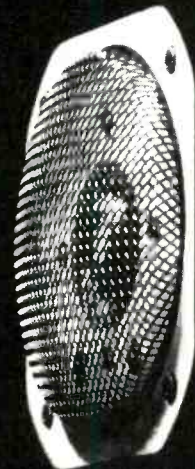
This coupon is worth \$2.50 off the \$5.00 suggested retail price of Yamaha's *Reference Handbook of Speaker Systems*, when presented to any participating Yamaha audio dealer, with a demonstration of any Yamaha speaker system. Offer expires March 1, 1977.



YAMAHA

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What's new

Sabor Meter

The Meguro MK-668C is a wow-and-flutter meter with a built-in digital frequency meter and selectable calibration for reading peak, average or effective values to conform with ANSI, CCIR, DIN, IEC, NAB or JIS standards. Accuracy of the frequency counter is ± 1 Hz, and the 4-digit unit is usable in the 10-to-9999 Hz range. Two input voltage ranges are available: 0.5 mV to 30 mVrms, and 5 mV to 30 Vrms; with a wow-and-flutter of 0.003% to 10% at inputs above 30 mVrms and 0.01% to 10% from 0.5 mV to 30 mVrms. Measurements can be at 3.15 kHz for DIN, IEC, or ANSI, and at 3.0 kHz for JIS, NAB or CCIR. Price: \$975.00.

Check 90 on Reader Service Card



Empire Turntable

The Model 698 turntable is a belt-driven unit with an anti-acoustic feedback suspension, a tonearm using a photo-electric cell to trigger lift without use of mechanical linkage, and cueing

through a damped solenoid. Specifications for the unit are a claimed speed accuracy of 0.25 per cent, and a weighted wow and flutter of 0.04 per cent. Price: \$400.00.

Check 93 on Reader Service Card



Audio-technica Insulators

The Model AT-605 is a package of four insulators, finished in brushed chrome, with a small bubble-level for exact adjustment. Designed to fit under speakers and turntables, the insulators help to prevent unwanted low-frequency vibrations and acoustic feedback. Price: \$25.00.

Check 91 on Reader Service Card

Epicure Preamp

The Model Four is a stereo preamplifier with a claimed THD of less than 0.005 per cent and a S/N of -100 dB for the phono section, and a rated output of 2.5 V rms. There are two pairs of inputs for phono, two pairs for tape, and one each for tuner and

auxiliary equipment. Frequency response is a specified 20-20,000 Hz ± 0.25 dB for phono, and 10-100,000 Hz ± 0.25 dB high level. The unit comes with either a 19-in. rack mount or walnut panel ends. Price: \$449.00.

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Heathkit Catalogue

Listing some 400 electronic kits, including professional quality harmonic and IM distortion analyzers, Fall 1976 96-page catalogue is available free from the Heath Co.

Check 92 on Reader Service Card

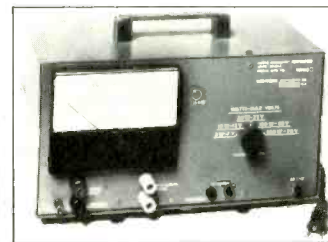
BGW Amp

The Model 100 stereo/mono amplifier is rated at 40 W stereo and 80 W mono, with a THD of 0.1 per cent to 30 W in stereo and 80 W in mono. Frequency response is from 20 Hz to 20 kHz, ± 0.25 , with a noise level of -106 dB below rated output into 8 Ohms. Price: \$319.00 with phone jack inputs and \$339.00 with Cannon input connectors.

Check 94 on Reader Service Card

Wattmeter

The APM 176 Audio Wattmeter is a solid-state unit for measuring the frequency-vs.-power delivered signature of loudspeakers and audio systems. Full scale values are from 3-to-300 W in five ranges with a 0-to-10 dB reference scale; claimed accuracy is 0.5%, response is 20-to-20,000 Hz ± 0.1 dB and to 100 kHz ± 1.0 dB. Price: \$349.00.



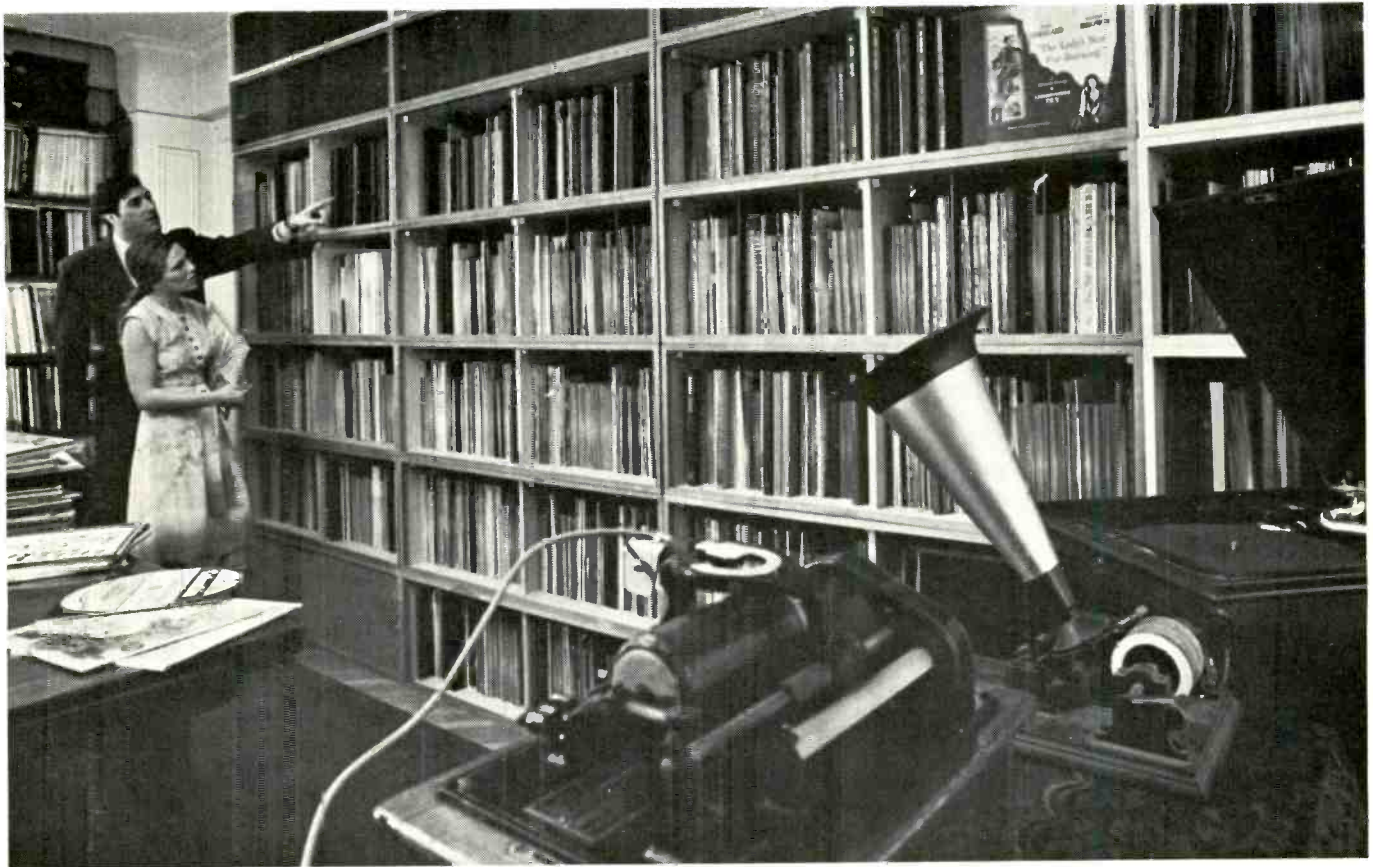
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Micro-Acoustics Test Record

The TT-2002 test record is designed to demonstrate the tracking and transient ability of phono cartridges. It includes a multi-level, tracking-ability test using complex percussion waveforms, plus a series of transient ability tests using computer generated high- and low-frequency tones which move upwards and downwards in controlled pitch sequences, as well as from channel to channel. Price: \$3.50.

Check 96 on Reader Service Card

No matter how young or old the recording, the Institute of the American Musical, Inc. relies on Stanton for playback.

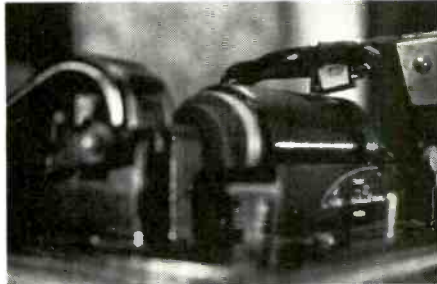


Miles Kreuger, shows a portion of the extensive collection to a scholar.

23



Mr. Kreuger and Mr. Albert Husted, Vice President, show visitors how a Stanton 681 is installed on an original Edison Standard phonograph.



Close-up of the Stanton 681 with special stylus in position on the original Edison Standard phonograph.



Music scholar following the score of *Show Boat* while listening to original cast performances.

Speaking of problems, how would you like to be faced with the need to accurately reproduce the sound from Edison Diamond Discs, Pathés and Aeolian-Vocalions? That's just what the Institute is faced with — and that's precisely why they turned to Stanton cartridges.

The Institute collection consists of approximately 35,000 recordings, from just about every American theatre or film musical since the Berliners of the 1890's through to the latest stereo and quadrasonic recordings. The collection (not counting hundreds of cylinders) is roughly evenly divided between 78's and 33 rpm's. They have original, historic machines to play these accurately, but the arms are heavy and the old styli insensitive and somewhat worn. Furthermore, the acoustic playback does not permit them to filter the surface noise or tape these rare records.

Miles Kreuger, President of the Institute, discussed his problem with other famed and experienced archivists. They all agreed that the Stanton calibrated 681 Series was the answer. Naturally, it is the 681 Triple-E for critical listening and taping with more recent discs; the special 681 stylus for LP's; and, for the old ones, a 681

cartridge, especially wired for vertical response (with a 1 mil stylus).

Today, thanks to Stanton, the scholars, authors and researchers, who are dependent on the Institute's materials to pursue their projects, can get perfect to adequate reproduction of any of the material in the collection. The Institute, which is crowded into small quarters, is open by appointment only to qualified people. For the future, it looks forward to the day when it will have the space in its own building to make its collection more readily available.

The work of the Institute is important work... Stanton is proud to be an integral part of it.

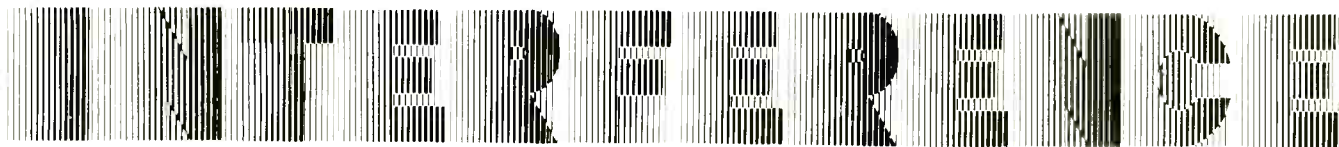
Whether your usage involves archives, recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the Stanton 681 Triple-E.

Write today for further information to:
Stanton Magnetics, Terminal Drive,
Plainview, N. Y. 11803.



Check No. 38 on Reader Service Card

REMEDYING RF



Joseph Giovanelli

Radio communication plays an important part in our lives, and this has never been truer than today when we find ourselves surrounded by radio and television receivers. Most of us tend to think of the world of radio communications as centering around radio and television broadcasting, but there are many other types of communications which employ similar radio frequency transmitters. These are called point-to-point communications systems and are used by school systems (via microwave TV), police and fire departments, and ship-to-shore communications, along with the growing class of hobby communications.

There are two classes of hobby communications; one is known as citizen's radio service or citizen's band (CB), and the other is amateur radio service. As more people take advantage of the ability to communicate without wires, it is important to note that more and more sources of radio frequency energy are being constructed and put into service. Because most of these communications cannot be received on conventional AM/FM receivers, they go relatively unnoticed, but when something goes wrong and we do notice them, we call them interference, a situation that has become all too frequent of late.

Within all our high fidelity equipment, there are common elements which comprise a radio receiver. We have tubes and transistors which amplify tiny signals, and these same tubes and transistors can also rectify these signals, that is convert them in pulsating d.c. to make the radio frequency signals into audio frequency signals which then pass through the various stages of the high fidelity system. At times our hi fi will pick up and amplify signals not intended for it, and the purpose of this article is to discuss the sources of such interference and how to combat them.

Sometimes the source of the interference is unclear; all the listener knows is that some peculiar sound that he doesn't want to hear is being produced by his music system. It may sound as though someone was speaking like Donald Duck but, in reality, the amplifier in the system was detecting radio frequency energy in the form of a single sideband, suppressed carrier transmission, not found on conventional AM/FM equipment. These signals cannot be truly understood since one of the components which makes up the conventional AM signal is not present.

One common type of interference is from the audio portion of the television broadcast, since stereo amplifiers can receive television signals under the right conditions. Sometimes the video portion is detected and comes out of the loudspeaker sounding something like a 60 Hz hum whose character is constantly changing.

CB Interference

Another common source of radio frequency interference to audio equipment is produced by the radio hobbyist using radio frequency transmitting equipment in his home in a residential area. Of the two classes of radio hobbyists referred to earlier, the most numerous are citizen's radio service. These operators, by law at least, are limited to a power input of five watts. However, when signals are transmitted from locations not too far from yours, the chances are very good that your audio equipment will receive and detect them.

To make matters worse, many of the operators use their CB radio in an illegal manner. A license issued by the Federal Government is required to operate this radio service, but unfortunately (in this country at least) no proof of license is required by dealers when people buy CB equipment. And since people begin operating without

NOW ONE TAPE GIVES YOU THE PEACE AND QUIET OF THE CHROME POSITION. WITHOUT THE HEADACHES.



Use TDK SA in the chrome position and you'll hear a lot less noise and a lot more sound.

Ordinarily, using the chrome position results in a decrease of anywhere from 4 to 5 dBs of background and tape noise. Of course, that's not a problem. It's a blessing.

The problems, or rather the headaches, begin with your choice of tape.

If you used any normal range bias ferric-oxide tape in the chrome position, you'd sacrifice a significant amount of high-end signal.

If you used chrome tape in the chrome position, you'd sacrifice something else. What you'd wind up hearing was weaker low- and mid-range dynamic response and more distortion.

But with TDK SA you don't have to sacrifice a thing.

You see, TDK SA is the first

non-chrome tape compatible with chrome bias/equalization. Unlike any ferric-oxide-based tape, it gives you superior high-end performance.

Unlike chrome, it gives you greater dynamic range at low- and mid-range frequencies with far less distortion.

In fact, SA used in the chrome position will put you in a better position to hear your system with brilliance and clarity that you've been missing with other tapes.

You won't get headaches from TDK's Super Precision Cassette shells either.

In addition to making what is probably the world's finest cassette tape,

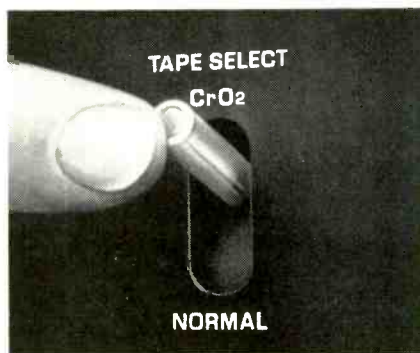
TDK makes one of the world's most advanced cassette shells. It's precision-designed to prevent uneven winding, jamming, and tangling, to assure perfect head touch, to eliminate oxide shedding and dropouts as well as wow and flutter. That's why you hear your tape loud and clear.

Try TDK SA in the chrome position. You'll like the peace and quiet.



Wait till you hear what you've been missing.

TDK Electronics Corp., 755 Eastgate Boulevard, Garden City, N.Y. 11530. Also available in Canada.



The chrome position on the tape selector is designated differently on different machines: CrO₂, Chrome, Special, SX, Position 1, High or 70 μ s.

a license, the temptation to carry things one step further quickly arises —i.e., linear amplifiers. When this is connected between the CB radio and its antenna, the power obtained is far in excess of the legal five-watt limit, and a 100 to 1500 watts is not uncommon. If you are located in the vicinity of such a high-powered station, interference to your audio equipment is almost unavoidable.

The legally licensed CB user is required to use his assigned call letters. The illegal operator, not having such call letters, doesn't use them. Furthermore, he won't use his correct name, instead substituting colorful appellations or "handles" such as "The Boston Eagle," "Big Rabbit," "The Bartender's Wife," etc. to separate him from other illegal operators.

It's a shame that this situation has gotten so completely out of hand, since CB radio would enable the average citizen to use a portion of the crowded radio frequency spectrum for his personal or business communications without having to pass difficult examinations or spend huge amounts of money on radio equipment —indeed an excellent and valid concept. Any motorist stranded on the road but equipped with CB radio will tell you the value of this service.

Yet another type of interference to audio equipment is produced by the amateur radio (ham) operator. Again, because this is a hobby, such operators are often found in residential areas. An operator who uses this particular class of radio service must be licensed to do so by the federal government. In order to obtain even the simplest class of license, the ham operator must pass a relatively difficult examination which demonstrates proficiency with International Morse code, the technical aspects of radio transmitting and receiving equipment, and government regulations which must be observed by users of this class of radio communication.

All too often, the illegally operating CBer is mistaken for the legitimate ham operator. For this reason, amateur radio service as a whole often receives an undeserved bad name. In general, the ham operator, like the audio enthusiast, is very much concerned with both the harmonic and intermodulation distortion of his equipment. And when the ham operator has adjusted his transmitter to have a minimum of harmonic and intermodulation distortion for him, the chances are that his transmitter will produce less interference than one which has not been properly adjusted.

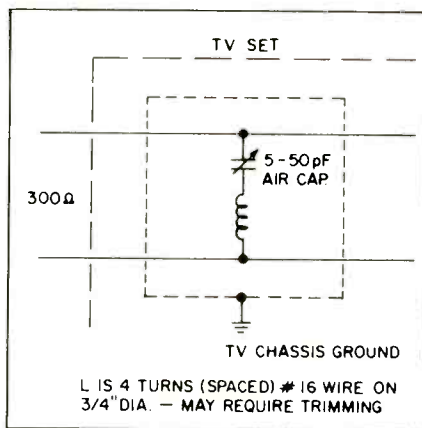


Fig. 1—Series resonant antenna trap with resonance at interfering signal frequency.

Wideband Disruption

It is also worth noting that any equipment designed to receive radio signals can also be subject to interference from them, and television receivers are perhaps the most notable examples. Because of the wide bandwidth required for the reception of video information, it is economically difficult to design front-end input circuitry which will reject the strong signals produced by nearby radio transmitters in the frequency range of 20 to 200 MHz.

High quality FM receivers are less susceptible to this kind of interference since their front ends are generally designed to have a narrower bandwidth than it is possible to use in television receivers. Even so, a strong local transmitter can degrade performance on an FM set.

Much of the interference to television receivers is produced by transmitters operating at frequencies considerably lower than the lowest of television channels, Channel 2, which has a lower band edge of about 54

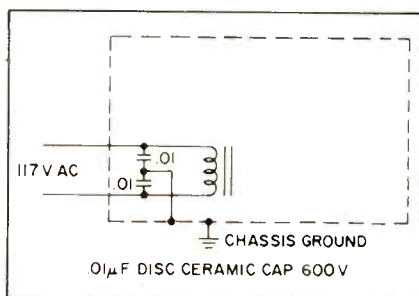


Fig. 2—Power line bypassing. If the frequency of interference is above 50 MHz, the values may be reduced to avoid self-inductance.

MHz. The undesired signals enter the set and simply overload the circuitry. To eliminate these lower frequency signals, all that is required, in most cases, is the use of a high-pass filter so designed that it will either eliminate or greatly weaken the signals falling below Channel 2.

Because not all TV set owners are affected, manufacturers do not usually include such filters as part of their designs. However, some manufacturers do make such filters available at nominal cost. In addition, some high-pass filters are available from other sources, and these include the R.L. Drake Model TV-300-HP and Finco's Model 3013.

Television receivers may also be affected by FM stations which transmit in a portion of the spectrum which lies just above Channel 6, the standard 88 to 108 MHz band covered by FM. Again, filters designed to eliminate this source of interference are available. Some makes and models of FM band reject filters are the JFD Model TR-FM, Drake Model 300 FMT, Finco Model 3006, and Drake Model 300FMS, the last of which is useful for interference from stations in the low end of the FM band where reception of Channel 6 is desired. The first three filters will cause a 10-dB reduction of signal strength from Channel 6, so if you live in a fringe area, this signal loss may not be tolerable.

FM stations transmit on a frequency band which falls between the higher edge of Channel 6 and the lower edge of Channel 7. There are other radio sources which also share space within these boundaries, the public service station at 154 MHz, for example. Should a signal of this kind start to degrade television reception, it can be eliminated by the use of a series-resonant filter shown in Fig. 1. This trap should be mounted in a metal container which is grounded to the chassis of the TV set. The input leads of the trap should be connected directly across the antenna terminals of the tuner itself where practical. By making the connections in this manner, rather than to the regular antenna terminals on the rear of the set, this eliminates signal pick-up by the leads which interconnect the binding posts to the actual tuner. In order to make such a trap successful, it is necessary to know the frequency of the interfering signal and tune the trap to that frequency.

FM sets, because of their "tighter" front ends, are less subject to interference from off-frequency radio transmitters. However, such interference

MICRO SEIKI



**Conspicuously
inconspicuous**

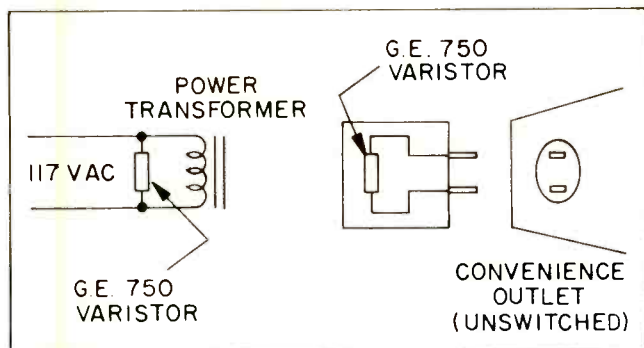


Fig. 4—Interference suppression on the a.c. power line.

Cable Connectors

Cables connecting the hi-fi system components can also pick up radio frequency signals. Such cables can be shielded against stray 60 Hz hum fields, but the shield is not always effective against r.f. interference. If the frequency of the interfering station is over 100 MHz, you might try Fig. 3D. (The ferrite beads can be salvaged from a discarded television set of recent design.) Where the frequency of the interference is low, a conventional r.f. choke can be used. Every attempt should be made to keep interconnecting cables as short as possible. In no event should their length be a multiple of a quarter wave of the signal causing the interference.

The interconnecting wire between the speaker and amplifier can also act as an antenna, since the signals can find their way back into some early stage of the amplifier through the feedback loop. Directly connected to the "hot" speaker output on the amplifier is a capacitor whose other lead terminates at some early point in the amplifier, and this provides an easy path for the entry of r.f. energy, which will be rectified and amplified through the remaining stages of the amplifier and heard through the loudspeakers. Although solid-state units exhibit more of a tendency to rectify signals than vacuum tube units, the problems exist in both and the cures are the same. Take some of the excess speaker wire and wrap it around a transistor radio antenna coil. Long ferrite rods are best and should be used near the amplifier chassis. Where this is not sufficiently effective, Fig. 3E should do the trick. This circuit may have some strange aspects, as the capacitor is put from the ground side of the speaker terminal back to ground. This is done because, while the ground is a good one for audio frequencies, it is not a good r.f. return. The ground systems for audio ampli-

fiers are laid out to minimize hum and noise so the input connectors are not mounted directly to the chassis. This is the reasoning behind both Figs. 3C and 3E. Figure 3C has been introduced because sometimes interference is picked up by the shield of an interconnecting cable and enters the amplifier because of inadequate r.f. grounding. The small bypass shown here will provide the r.f. grounding necessary, yet not disturb the audio grounding required for good hum reduction.

Often, no matter how we try, the interference still persists. To overcome this, install bypasses to short out the rectifying junctions of transistors, *but only for r.f.* See Fig. 3A; note that Fig. 3B is the same arrangement; for vacuum tubes, and because of the higher impedances of this circuit, the values shown in 3B are much lower than 3A. To minimize performance degradation, bypassing should be performed on as few stages as possible.

Interference is generally heard on both channels of a sound system, but you should only modify one channel at first and then compare the sound on that channel with the unmodified channels to hear if any degradation has occurred. It may be possible to reduce the values of bypassing and still have sufficient interference rejection. Once you know that the modified channel is working well, you can modify the other channel with equally good results, both in terms of r.f.i. suppression and maintaining a high level of audio quality.

At no time in the discussion have we alluded to the possibility that the radio transmitter itself was at fault, because in 90 per cent of our complaints the deficiencies proved to be within the receiving or audio equipment. However, where it is suspected that the radio transmitter is at fault, it is a good idea to locate the source of such

radio interference and report it directly to the Federal Communications Commission. This report should be sent to the field office nearest you. Some help in this regard may be obtained by writing for FCC Bulletin No. 15 at your nearest field office.

Not all interference in receiving equipment is produced by radio transmitters, as equipment operated on the a.c. power line can often generate interference. This can be eliminated by use of a surge protector, such as the GE MOV-750, installed directly across the power line terminals. This must be done *inside the equipment* as shown in Fig. 4.

Design Problems

Sometimes the ageing of components within the amplifier will give rise to unwanted sounds from the loudspeaker. Poorly designed AM and FM tuners or receivers may pick up all sorts of undesired sound from the loudspeaker. Poorly designed AM and FM sets may receive all sorts of undesired signals, especially at night. This can be the result of poor design, especially in regards to front-end selectivity and AGC design.

Where the surge protector does not completely eliminate the problem, bypassing, along the lines of Fig. 3A and 3B, will generally prove effective, but when possible, surge protecting varistors should be placed across the line of the offending equipment. The reason that line interference can be treated in the manner of r.f.i. suppression is that transient pulses produce a wide frequency spectrum, acting as radio transmitters not too different from the old spark wireless of the early radio days.

No article of this kind can hope to list all the causes and cures for radio interference. However, those with an experimental turn of mind should be able to successfully use this information when confronted with the majority of radio interference problems. Those not sufficiently trained in the field of electronics are encouraged to consult either a service technician or the equipment manufacturer.

Some excellent material has been published by both the U.S. and Canadian governments. You may wish to write for FCC Bulletin Nos. 15, 24, and 25, N.Y.-L34 (41), and Statement to Television Receiver Owners-41-WB. Canadians may write to the Canadian Department of Communications (DOC) for Circular TRC-19. A

If your system has less than 40 watts per channel, turn this page.

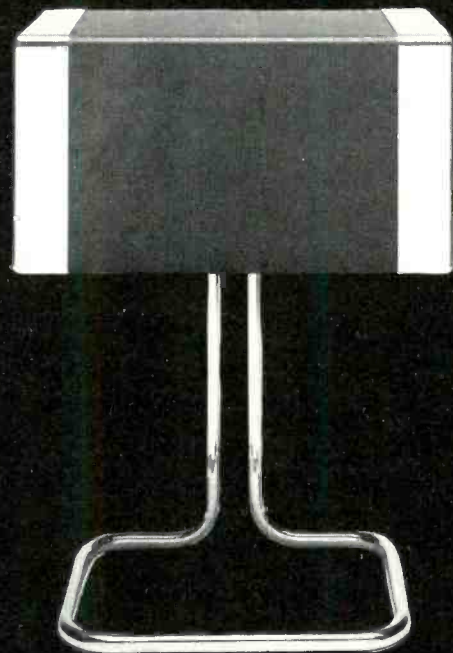
If you own a receiver or amplifier of less than 40 watts per channel the Gale 401 loudspeaker is not for you!

If your system is just for background music to create a pleasant atmosphere, not for serious listening, the Gale 401 loudspeaker is not for you!

However, if you demand the best from your audio equipment

- ... insist on hearing everything that's on the record or tape you're playing
- ... insist on having your sound without distortion when it's very loud or very soft
- ... insist on a speaker system capable of safely handling 200 watts, and are willing to pay the price . . .

Then consider the Gale 401 loudspeaker.



33

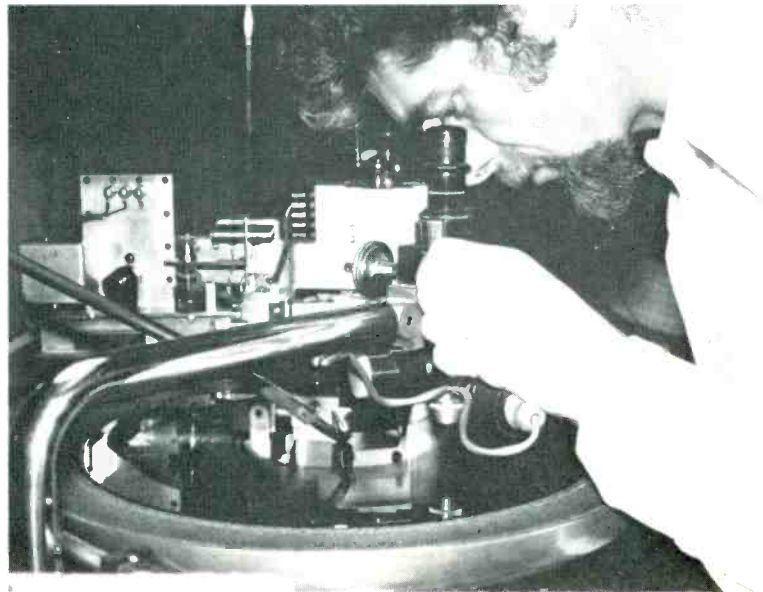
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AmericanRadioHistory.com

THE SHEFFIELD STORY

Andrew P. Teton



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The first time an audiophile hears a Sheffield Lab direct-to-disc record on his own music system, his jaw usually drops in astonishment because his system never sounded better. When you tell him how this was accomplished, his jaw will drop again. The "secret" is decades old—Sheffield Lab entirely avoids the use of tape recorders, instead using the signal of the studio's microphone mixing console to directly drive the record cutting lathe. In the last two years they have expanded and diversified their record catalog from two to seven albums, all cut direct-to-disc. Thanks to their disc's recent popular success and widespread use by hi-fi stores and audio firms, Sheffield Lab is finally emerging from its low profile status. Their latest release, **The King James Version**, featuring Harry James and His Big Band, should further enlarge public awareness of direct-to-disc records and prove to be a delight for both audiophiles and big band buffs alike.

Sheffield Lab is the child of Doug Sax and Lincoln Mayorga, who have shared a personal and professional interest in music and recording since the late 50s. Sax is the head of The Mastering Lab in Hollywood, which he and Mayorga own. Record companies send their master tapes to The Mastering Lab, which cuts the master lacquers used to form pressing stampers which manufacture the final discs. The Mastering Lab is the facility that makes Sheffield Lab direct-discs possible.

Mayorga has been a studio musician for almost 20 years and his arrangements and piano playing are featured on the first three Sheffield direct-disc albums. As avid record collectors, both Sax and Mayorga were intrigued by the fact that many records made before 1945 had greater presence and dynamic range than later records. They wondered if the advent of tape recorders in the 40s had somehow eliminated these characteristics. In 1959 they tested this hypothesis by recording a piano with the signal from the microphone being fed directly to the cutting lathe, which normally receives the signal from the master tape. When they played back this test lacquer, they heard the phenomenonally "live" sound they were looking for.

In the early 60s Sax and Mayorga made several attempts at direct-disc recording, though limited by the fact they were both working full time and had to finance everything themselves. When they did manage to line things up, they discovered a host of technical problems in trying to resurrect a 20-year-old recording technique—lathes, amps, mikes, transmission lines, and lacquers were faulty or simply not up to the demanding nature of direct-disc recording. By 1966 Sax and Mayorga realized they would need their own state-of-the-art mastering facilities to record a direct-to-disc album. In 1968 they opened The Mastering Lab, which was designed by Sax's brother, Sherwood. Sherwood custom designed the electronics,

which are heavily tube oriented, and even the monitor speaker crossovers.

In November, 1968, just one month after installing one of the first operational Neumann SX-68 stereo cutter heads, they recorded **Lincoln Mayorga and Distinguished Colleagues-Vol. 1** (Sheffield Lab catalog number S-9), featuring Mayorga's arrangements of pop tunes accompanied by session musicians. The recording took place in the Producer's Workshop studio located in the back of The Mastering Lab building. This allowed the signal output from the mixing console to be sent literally down the hall to the Lab's cutting lathe.

The first sessions were plagued with technical difficulties such as blemished lacquers, mysterious radio interference signals, and other problems that demanded instant solutions. Mayorga and Sax discovered that the most difficult aspect of direct-disc recording was the exacting nature of recording totally live music in real time, which differs greatly from standard recording production technique.

Typical Record Production

The advances in multi-track tape recording during the last two decades have allowed the record producer to isolate musical instruments on individual tracks. At any time, the record producer may add to or subtract from any given track, and he may layer them and remix them to the point where a pop album may need six months or more of studio time just for

If you can see a difference, imagine what you'll hear.



Magnified, you can see record vinyl wearing away.

With same magnification, record vinyl shows no wear.

You're looking at the solution to one of the oldest problems in audio—how to protect records from wear, while at the same time preserving full fidelity.

It's called Sound Guard,* and it's remarkable.

Independent tests show that discs treated with Sound

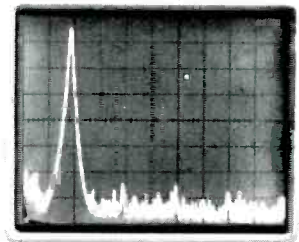
distortion as "mint condition" discs played once.

A by-product of dry lubricants developed for aerospace applications, Sound Guard preservative is so smooth it reduces friction, yet so thin (less than 0.000003") it leaves even the most fragile groove modulations unaffected.

Len Feldman in Radio Electronics reports "At last!

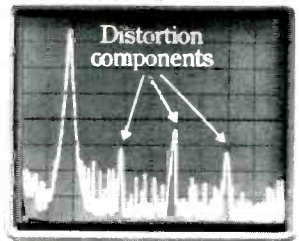
The long awaited record-care product has arrived. It preserves frequency response

in a kit complete with a non-aerosol pump sprayer and

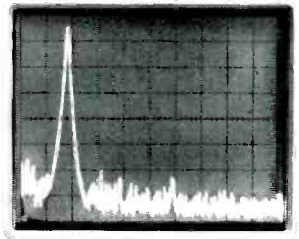


Test record played first time

35



After 100 plays without Sound Guard.



Identical test record after 100 plays with Sound Guard.

Guard preservative played 100 times display the same full amplitude at all frequencies and the same absence of surface noise and harmonic

while reducing distortion and surface noise." It's effective and safe for all discs, from precious old 78's to the newest LP's.

Sound Guard preservative,

velvet buffing pad, is available in audio and record outlets.

Sound Guard™ keeps your good sounds sounding good.



*Sound Guard is Ball Corporation's trademark for its record preservative. Copyright © Ball Corporation, 1976.



Thelma Houston singing for *I've Got The Music In Me*, and being congratulated by Lincoln Mayorga after the final session.

the tapes to be reworked and finalized.

Typically a producer has musicians record the primary rhythm tracks of the song first. These tracks serve as a reference for both the producer and later musicians, who record in small groups while listening to headsets. The producer gradually builds up layers of instruments and vocals on the remaining tracks of a 16-, 24-, or 32-track tape machine. The producer can alter any track by use of a host of effects, such as echo, compression, phase shift, equalization, etc. Usually the vocalists add their tracks last, using as many takes as they wish, and they may even record phrase by phrase.

After the sessions are done, the producer may spend weeks or months modifying the tapes during the mix down to the final two-track master tape.

Recording Direct-to-Disc

Sax and Mayorga feel the repeated dubbing, editing, transferring, and signal processing of the standard technique dramatically increase the noise and distortion of the final record, which is often a patchwork of many different takes. They also feel the primary victim of this preoccupation with technology has been live music. Most so-called "live" albums are enhanced by some reworking of the tapes, and, of course, there are usually several different performances of a given tune to select

from. By foregoing the primary advantage of tape, Sheffield Lab's direct-disc recording by definition means their musicians play absolutely live, and the takes are completely unaltered.

When recording **Vol. 1**, the musicians and technicians found out that recording live for 17-minute takes is brutal. The engineer must mix all his takes live in real time. The lathe operator must manually adjust the groove spacing to get as much music as possible on each side, and, of course, the musicians must play flawlessly. Despite these difficulties, the disc turned out to be state-of-the-art fidelity. The album was sold primarily by mail order and in selected hi-fi stores.

Recording Volume Two

Late in 1971 Sax and Mayorga recorded **The Missing Linc - Vol. II** (Sheffield Lab catalog S-10). Despite their previous experience, many new problems cropped up, with damaging and costly delays, because in a direct-disc situation nothing is accomplished until the entire ensemble has played the 17-minute take perfectly and it has been successfully cut on the lacquer.

For **Vol. II** a second cutting lathe was mechanically linked to the primary lathe to produce a duplicate lacquer and double the pressing potential. While a 30-ips tape was made for checking performance and mix quality, it is not used for generating additional lacquers. Thus, the number of



Sheffield albums is automatically limited by the number of lacquers cut during the actual sessions, and because it is a limited edition, each Sheffield record is an instant collectors item, with both **Vol. I** and **Vol. II** now out of print. Sometimes Sheffield Lab is able to record more than one performance on each side successfully, and these alternate takes increase the sales potential, plus being sought after by record collectors.

How to Succeed By Really Trying

In November 1973 Sax and Mayorga recorded **Lincoln Mayorga and Distinguished Colleagues - Vol. III** (Sheffield Lab catalog Lab 1). Bud Wyatt, the design engineer for the

THE TAPE THAT'S TOO GOOD FOR MOST EQUIPMENT.

Maxell tapes are not cheap.

In fact, a single reel of our most expensive tape costs more than many inexpensive tape recorders.

Our tape is expensive because it's designed specifically to get the most out of good high fidelity components. And unfortunately, there's not much to get out of most inexpensive tape recorders.

So it makes no sense to invest in Maxell unless you have equipment that can put it to good use.

And since even a little speck of dust can put a dropout in tape, no one gets into our manufacturing area until he's been washed, dressed in a special dust-free uniform and vacuumed.

(Yes, vacuumed.)

Unlike most tape-makers, we don't test our tape every now and then. We test every inch of every Maxell tape.

Which is why every Maxell tape you buy sounds exactly the same. From end to end. Tape to tape. Year to year. Wherever you buy it.

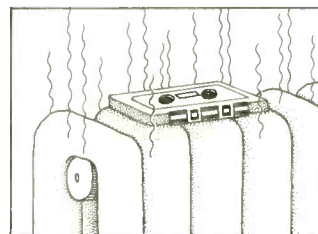
And Delrin rollers. Because nothing sticks to them.

A lot of companies weld their cassettes together. We use screws. Screws are more expensive. But they also make for a stronger cassette.

Our tape comes with a better guarantee than your tape recorder.

Nothing is guaranteed to last forever. Nothing we know of, except our tape.

So our guarantee is simplicity itself: anytime you ever have a prob-



Our guarantee even covers acts of negligence.

Give our tape a fair hearing.

You can hear just how good Maxell tape sounds at your nearby audio dealer.

(Chances are, it's what he uses to demonstrate his best tape decks.)



No other tape sounds as good as ours because no other tape is made as carefully as ours.

For example, every batch of magnetic oxide we use gets run through an electron microscope before we use it. This reveals the exact size and proportions of individual particles of oxide. Because if they're not perfect, the tape won't sound perfect.



Every employee, vacuumed.

We clean off the crud other tapes leave behind.

After all the work we put into our tape, we're not about to let it go to waste on a dirty tape recorder head. So we put non-abrasive head cleaning leader on all our cassettes and reel-to-reel tapes. Which is something no other tape company bothers to do.

Our cassettes are put together as carefully as our tape.

Other companies are willing to use wax paper and plastic rollers in their cassettes. We're not. We use carbon-impregnated material.

No other tape starts off by cleaning off your tape recorder.

lem with any Maxell cassette, 8-track or reel-to-reel tape, you can send it back and get a new one.

You may be surprised to hear how much more music good equipment can produce when it's equipped with good tape.



Maxell Corporation of America, 130 West Commercial Ave., Moonachie, New Jersey 07074



Harry James wails for *The King James Version* at the Wylie Chapel with other sessionmen at the final cutting.

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Producer's Workshop, revamped the entire microphone console for higher and cleaner signal levels, and the engineer for this album was Grammy award winner, Bill Schnee. The ensemble included a full brass section as well as several top-flight pop and jazz musicians.

The sessions ran into problems almost immediately. The combination of Schnee's aggressive mixing, the impact of the brass, and the unusually clean electronics of the board gave the lathe operator too much signal to fit all 20 minutes of material on one side. Rather than use electronic limiting, one song was deleted from each

side to allow room for wider groove spacing. Upon its release, **Vol. III** met with critical acclaim as well as enthusiastic public response.

In early 1975 Sheffield Lab recorded **I've Got The Music In Me** (Sheffield Lab catalog Lab 2). Rather than featuring just instrumentals, Sax and Mayorga wanted to try something in a more contemporary vein. Bill Schnee's previous experience with Sheffield and his background in rock music made him the logical choice to produce and engineer this album. Another first-time experience for Sheffield Lab was the use of a vocalist. Through the auspices of Motown



THE COST/PERFORMANCE EQUATION: HOW MUCH TAPE RECORDER IS ENOUGH?

Essentially, a tape recorder is a machine you can use to capture your talent and faithfully reproduce it. Practically, the more you make demands on a tape recorder, the more demands it can make on you.

Put another way, a tape recorder can be your wings or an anchor. It can work for you or it can work against you.

At \$1,299.95 the investment you make in the Dokorder 1140 gets you a partner instead of a handicap. Compare what it does to what it costs and you won't find a better tape recorder anywhere.

The 1140 lets you concentrate on your music as art. Much of the concern you have about your music as signal is handled for you automatically.

The 1140 has logic circuitry that takes care of getting you in and out of Sync and in and out of Source automatically. It makes knowing where you are in multi-track recording a whole lot easier.

The 1140 also has an automatic cue-up function, called Program Memory. Once it's set up, the Pro-

gram Memory automatically brings you back to the beginning of material and either stops or plays it again, depending on what you tell it.

The transport controls on the 1140 are digital logic-operated so you can go from one mode to another directly except in Record and there is a motion sensing system which lets you go into play from fast forward or rewind when the reels stop.

Bias controls are up-front on the transport and there is a built-in pink noise generator which supplies a test signal to each channel. This unusual device makes biasing simple but extremely accurate.

There is a lot more hardware to the 1140: peak level indicators, discrete playback and record amplifiers, 62-Volt record drive circuit, wide band sync response, etc.

All to make it easier to put music on tape.

DOKORDER 1140

5430 Rosecrans Avenue Lawndale, CA 90260



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Records, Thelma Houston and a group of six background vocalists were used.

I've Got The Music In Me, by Thelma Houston and Pressure Cooker (as the band came to be called), was released in May, 1975 and achieved almost all the musical and technical goals set for it. The energy of a rock band coupled with superb vocals produced an outstanding level of both fidelity and immediacy, and because of its popular orientation, the disc's domestic and foreign sales were the quickest and largest of any Sheffield Lab record.

Recording The Harry James Album

Sax and Mayorga wished to diversify their catalog by featuring well-known musicians as guest artists, so they did a recording of Harry James and his big band in March, 1976. But going on location with two enormous cutting lathes to record in the sort of hall such a group would normally perform in was virtually impossible. By a coincidence more favorable than they had a right to expect, there was the Wylie Chapel, with the right acoustics, a block and a half from the Mastering Lab. After the necessary tests and arrangements were made, a 600-foot line was run from a portable mike mixer in the chapel through the parking lots and across the street to The Mastering Lab itself. All the sound was derived from a single stereo mike's perspective, and engineer Ron Hitchcock's only other mikes were on the bass and piano.

The test pressings from the March sessions were very good in all regards except one, Harry James' trumpet. The technicians spent many weeks trying to analyze what went wrong and why, and by July they had performed all the necessary modifications for the sessions to begin again in Wylie Chapel. These sessions started off poorly, with the first six hours producing nothing usable. Finally everything got together, and the result was **The King James Version** (Sheffield Lab catalog Lab 3). James says he has never been so pleased with a recording, and the Sheffield staff feels that audiophiles and big band lovers alike will be delighted with the album.

Why They Sound So Good

The most usual question and audiophiles ask is why are the Sheffield Records capable of such fidelity? The first factor is the special amalgam of



Dave Grusin, at keyboards, and members of his Jazz Quintet (from top) Harvey Mason, drums; Lee Ritenour, guitar; Ron Carter, bass; and Larry Bunker, percussion.




talents and chemistry when an entire group of musicians are recording live.

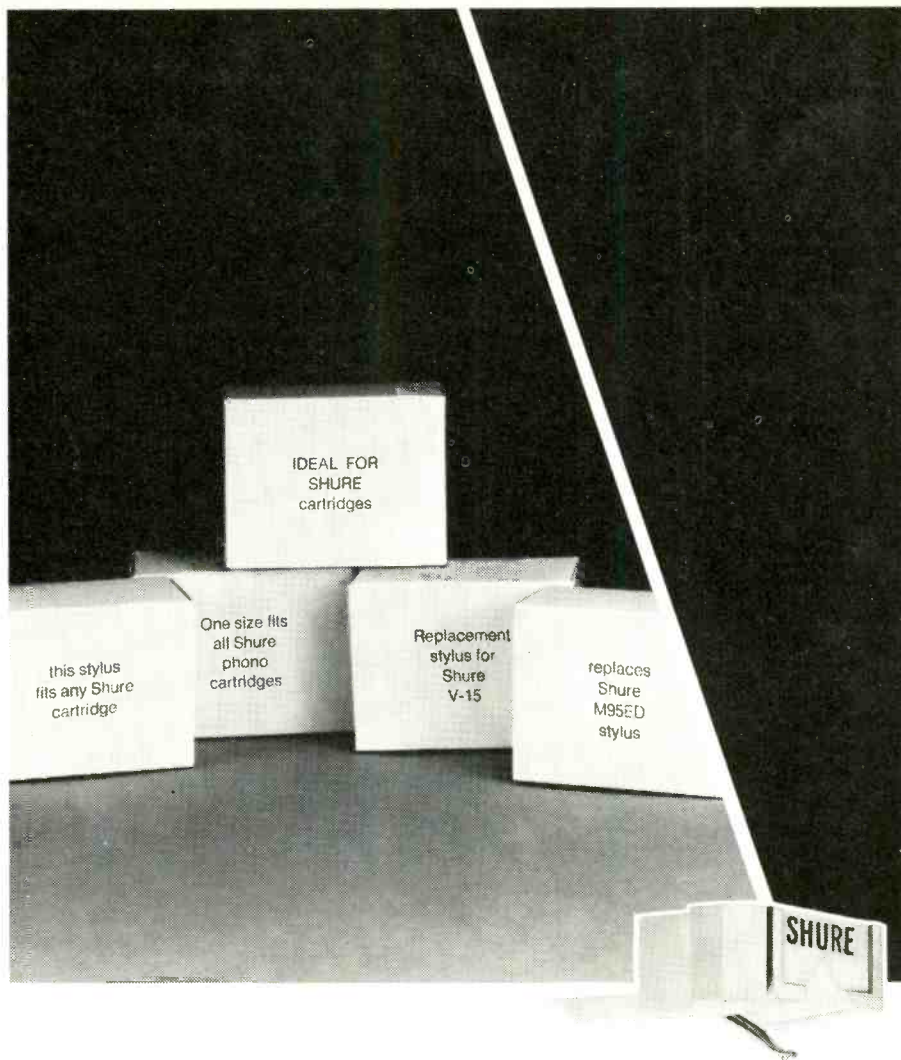
In addition, there are numerous technical advantages in recording direct-to-disc; the process has greater recording headroom which permits an increase in the dynamic range, the most obvious characteristic of Sheffield Records. The full instantaneous peak energy of most instruments, particularly percussive ones, is somewhat higher than any standard meter can indicate, and it is these transient peaks which saturate the tape and create distortion. To avoid this problem, most all conventional albums use some type of compression or peak limiting, which results in a distortion-free recording but one with limited dynamic range.

Direct discs also benefit from a significantly lower phase shift because two generations of tape have been eliminated. Of course, direct-disc recording also removes two entire generations of tape electronics. Doug Sax feels the electronics and hardware of The Mastering Lab play an important role in Sheffield Lab. Not only is state-of-the-art and custom designed equipment used throughout the Lab, but each component in the system has been carefully modified to function properly as part of an interdependent electronic system.

Audiophiles may wonder why more musicians don't record direct-to-disc. While there have been several other direct-discs produced recently, few musicians or record companies are willing to submit to the unforgiving circumstances of direct-disc recording. The James' sessions in March, 1976, are an example of the sort of failure that can occur in even the most carefully planned sessions. Also record companies would not be pleased with the limited pressing potential, particularly in view of the costs and chance elements involved, as it is not only quite difficult to record direct-to-disc, but the album isn't likely to produce much profit.

The release of the Harry James album, as well as the forthcoming release of Mayorga's classical piano album, plus a jazz quintet album featuring Dave Grusin, represents a desire to expand the musical directions of Sheffield Lab. These direct-disc albums represent a pinnacle of achievement in many ways, but Doug Sax and Lincoln Mayorga continue to be motivated to expand beyond the accomplishments of their current albums. As for the audiophile, Sheffield Lab Records offers him a much fuller appreciation of his music system. 

AUDIO • JANUARY 1977



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Needle in the hi-fi haystack.

Even we were astounded at how difficult it is to find an adequate other-brand replacement stylus for a Shure cartridge. We recently purchased 241 random styli that were not manufactured by Shure, but were being sold as replacements for our cartridges. Only ONE of these 241 styli could pass the same basic production line performance tests that ALL genuine Shure styli must pass. But don't simply accept what we say here. Send for the

documented test results we've compiled for you in data booklet #AL548. Insist on a genuine Shure stylus so that your cartridge will retain its original performance capability—and at the same time protect your records.

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MANUFACTURERS OF HIGH FIDELITY COMPONENTS, MICROPHONES, SOUND SYSTEMS AND RELATED CIRCUITRY

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Equipment profiles

Nikko Model 9095 AM/FM Stereo Receiver



MANUFACTURER'S SPECIFICATIONS

FM Tuner Section

IHF Usable Sensitivity: 1.8 μ V (10.3 dBf), mono.
50-dB Quieting Sensitivity: Mono, 3.0 μ V (14.7 dBf).
Selectivity: 70 dB.
S/N: Mono, 70 dB.
Image Rejection: 85 dB.
I.F. and Spurious Rejection: 100 dB.
AM Rejection: 50 dB.
THD, 1 kHz: Mono, 0.2 per cent; stereo, 0.5 per cent.
Frequency Response: 20 Hz — 15 kHz, +0.5, -1.5 dB.
Stereo Separation: 1 kHz, 40 dB.
Sub-Carrier Suppression: 60 dB.

AM Tuner Section

Sensitivity: Ext. antenna, 250 μ V/M.
Selectivity: 25 dB.
S/N: 55 dB.
Image Rejection: 60 dB.
I.F. Rejection: 60 dB.

Amplifier Section

Power Output: 63 watts per channel, 20 Hz to 20 kHz, 8 ohm loads. 68 watts at 4 ohms.

Rated THD: 0.3 per cent.

Rated IM: 0.3 per cent.

Damping Factor: 40 at 8 ohms.

Input Sensitivity: Phono, 2.1 mV; Aux 1 and Tape Mon. 1&2, 200 mV; Aux 2, 350 mV.

Phono Overload: 170 mV.

S/N: Phono, 75 dB, IHF A weighted; Mike, 70 dB; High Level, 90 dB.

Bass Range: ± 10 dB @ 70 Hz.

Treble Range: +10 dB @ 10 kHz.

Mid-Range Control: ± 6 dB @ 1 kHz.

Low Filter: -7 dB @ 70 Hz.

High Filter: -6 dB @ 7 kHz.

General Specifications

Power Consumption: 300 watts.

Dimensions: 19 in. (48.26 cm) W x 6 1/2 in. (16.5 cm) H x 15 1/4 in. (38.7 cm) D.

Weight: 36.3 lb. (16.5 kg).

Price: \$519.95.

Nikko's top receiver joins the growing list of all-in-one components which offers audiophiles a convincing argument against the need for separate amplifiers, pre-amplifiers, and tuners. Its price is in line with other receivers of its power output capability, and its designers have taken pains to include enough switching and control features to gladden the hearts of most inveterate knob twirlers and button pushers. In deciding upon front panel layout, Nikko seems to have taken a mid-course between the traditional "black out" dial and the newer, highly visible, light-colored

dial arrangements which many manufacturers have begun to use in recent years. The background color behind the dial glass is light in color, and therefore the frequency scales are somewhat visible even with power turned off. When power is applied, however, the background color recedes and the vivid blue numbers predominate. Neither the FM nor the AM frequency scales are linearly calibrated (though the FM is close to being so), and while the frequency demarcations are visually attractive, they do not lend themselves towards accurate pin-pointing of selected frequencies—especially in

our crowded listening area where stations are seldom more than 400 kHz apart.

Above the frequency scales are illuminated notations which indicate program source selection as well as stereo FM reception. To the left of the scales are a pair of tuning meters. Only the signal strength meter is illuminated when AM is chosen, while both meters are lit when FM is being tuned in. For other program sources, the meters go dark. A tuning knob, coupled to a flywheel and pointer, is located at the right of the dial area. The tip of the pointer is illuminated when either AM or FM program sources are selected.

Rotary control knobs along the lower section of the panel include a speaker selector switch (which also turns on power), with positions for various combinations of one or two out of three possible pairs of speaker listening and an "off" position for the headphones-only listening; bass, midrange, and treble tone controls; volume control, and program selector. Pushbuttons in this panel area activate low- and high-cut filters, mono/stereo switching, FM muting circuits,

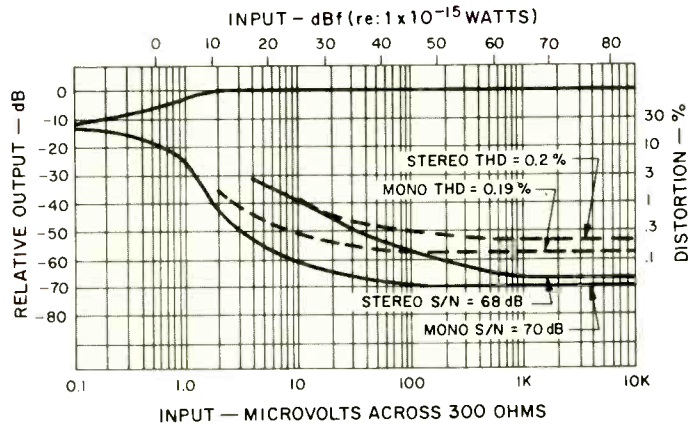
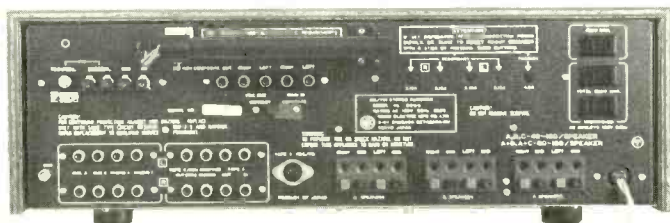
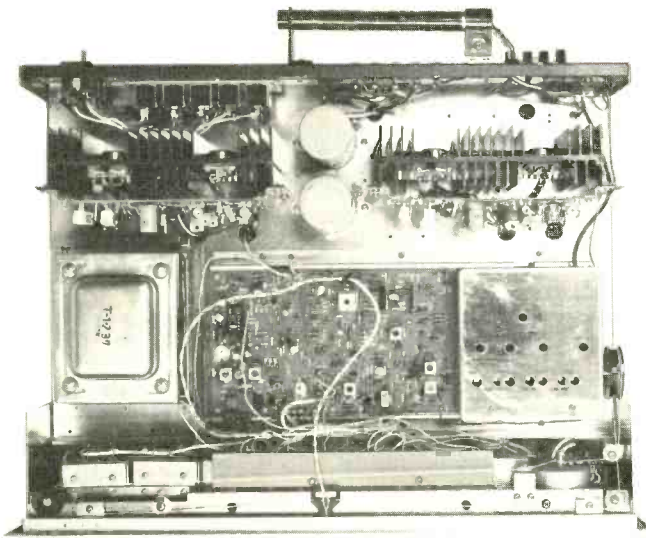


Fig. 1—FM quieting and distortion characteristics.

loudness circuit, and two tape monitor circuits. It is in the tape monitoring circuit configuration that Nikko might have provided a bit of additional utility for, although dubbing is possible from either one or two decks to the other, when the dubbing function is selected (by means of the main program selector), it is not possible to listen to anything but one of the tape decks (unlike the case with some other albeit higher priced receivers and amplifiers where dubbing can take place while listening to still another program source, such as records or AM/FM).

Along the bottom edge of the panel are phone jacks, tape 2 in and out jacks (duplicating those on the rear panel for front access), and a microphone (mono) input jack. Next to the mike input jack is a slide mike level control which works independently of the master volume control and therefore permits mike mixing with any of the other available program sources. A center-detented slide control takes care of left-right channel balance.

The rear panel of the 9095 features three sets of speaker push-terminals which, when depressed, permit insertion of the stripped speaker wire ends into tiny holes. Preamp-out and main amp-in jacks are internally interconnected (or disconnected) by means of an adjacent slide switch. A jack labelled "composite output" is intended for future use with 4-channel FM adaptors. A coaxial connector is provided for 75-ohm line connection, while conventional screw-cap terminals are available for 300-ohm and external AM antenna connections. Five tiny circuit-breaker re-set buttons eliminate the need for replaceable line and power supply fuses. Even though the program selector shows only one Aux position, there are two sets of Aux input jacks, each having a different input sensitivity. The user chooses one set (but not both) to more closely match loudness levels of other internal sources or the phono levels when connecting a program source to Aux. Two turntables can be used with the receiver. In addition to the tape-in and tape-out jacks, there is a familiar DIN multiple pin socket to take care of decks equip-

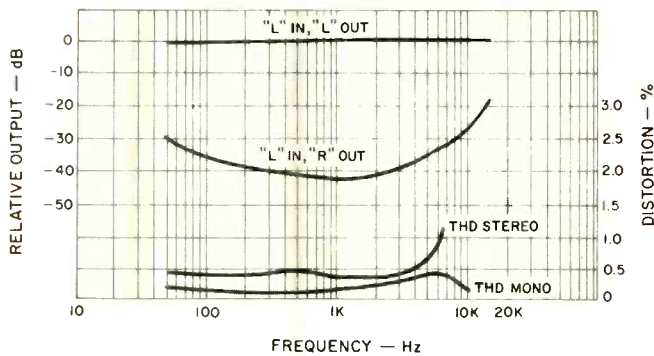


Fig. 2—Separation and distortion vs. frequency.

ped with that type of connector. One switched and two unswitched a.c. receptacles, a chassis ground terminal, and a pivotable AM ferrite bar antenna complete the rear panel layout.

Internal layout of the Nikko 9095 may be seen in the accompanying photo. The entire tuner section, including multiplex circuitry, is contained on the largest of several P.C. boards, with the shielded r.f. front-end mounted directly to that major assembly. Two identical power amplifier modules are integrally tied to heat sink assemblies near the rear of the unit. The owner's manual contains no information regarding the circuitry of the receiver (nor is a schematic diagram supplied) other than to tell us that "the system embodies many of the most advanced technological accomplishments—including FET (Field Effect Transistors), IC (Integrated Circuit), and the exclusive Nikko Circuit Breaker System." Physically, the layout seemed quite orderly and logical, and power supply parts seemed adequate for the rating of the receiver. During our subsequent lab measurements we noted that a fair amount of heat developed at the rear of the chassis and the power transformer was rather warm even after short periods of high-power testing.

FM Measurements

Significant quieting and distortion measurements are plotted in Fig. 1. Usable sensitivity was reached with a signal input of $2.0 \mu\text{V}$ (11.2 dBf) in mono and was determined by

the switching threshold ($12.0 \mu\text{V}/26.6 \text{ dBf}$) in stereo. The 50-dB quieting mark required $3.5 \mu\text{V}$ (16.1 dBf) of signal in mono, $40 \mu\text{V}$ (37.2 dBf) for stereo. S/N reached its best value of -70 dB in mono for strong signals, while in stereo, best S/N obtained was -67 dB , after filtering out a very small amount of sub-carrier product from the output waveform. Distortion at 1 kHz measured 0.17 per cent in mono, 0.37 per cent in stereo, both measurements exceeding published claims.

Capture ratio measured 1.5 dB, a bit better than claimed, while selectivity, image, i.f., and spurious rejections were all almost exactly as claimed. AM suppression exceeded claims, measuring some 53 dB.

Stereo separation at 1 kHz measured 42 dB, decreasing to 35 dB at 100 Hz, and to 26 dB at 10 kHz. Separation as well as distortion versus frequency for mono and stereo are plotted in Fig. 2.

AM Measurements

AM sensitivity, measured via the external antenna input, measured $20 \mu\text{V}$, while selectivity was a bit better than claimed, with readings of 27 dB at 1 MHz. Signal-to-noise ratio with strong signals was 50 dB, short of the claimed 55 dB but still excellent for any AM circuit in a self-contained receiver. Distortion measured 1.2 per cent for 30 per cent modulation in AM, and both image and i.f. rejection exactly measured the 60 dB claimed.

Amplifier Measurements

As we might have guessed from the unusual power rating given to the 9095 by its makers (63 watts—neither 60 watts nor 65 watts), this per channel rating turned out to be just exactly what the amplifier can deliver with both channels driven, at 20 Hz and 20 kHz, the FTC power band which they specify. At mid-frequencies, the amplifier delivered 66.1 watts at the rated THD of 0.3 per cent. Were we sitting in Nikko's shoes, however, we would have been more inclined to rate the unit at 60 watts per channel, from 20 Hz to 20 kHz, 8 ohm loads, for the 0.3 per cent THD level, since it is entirely possible that out of 100 units, one might not squeak through and would read, say, 62.5 watts at 20 Hz, providing a "test case" for the FTC to pounce on. The IM distortion (plotted along with THD in Fig. 3) just made the 0.3 per cent rated value for an equivalent power output of 63 watts, as claimed. Of course, at all lower power output levels, THD drops to insignificant levels.

Fig. 4 shows THD at different frequencies for the rated power output level of 63 watts. At mid frequencies, the level

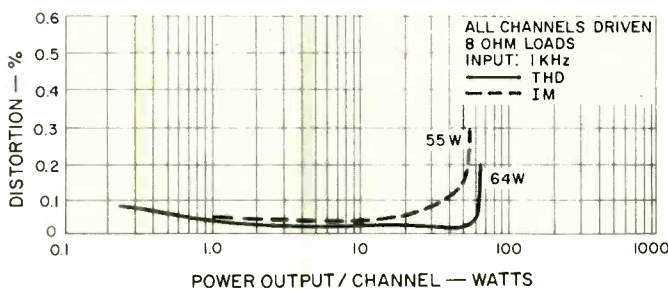


Fig. 3—Harmonic and intermodulation distortion characteristics.

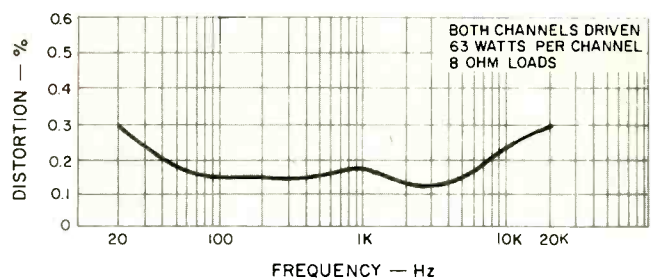


Fig. 4—Distortion vs. frequency, both channels driven 63 watts into 8 ohms.

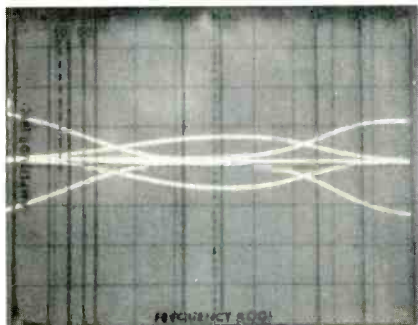


Fig. 5—Bass, mid-range, and treble control range.

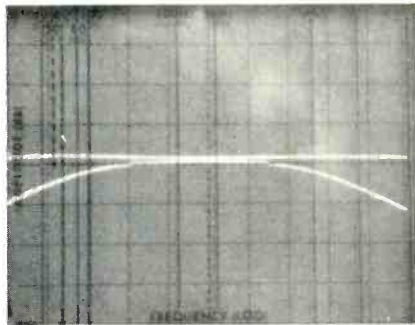


Fig. 6—Low- and high-cut filter response.

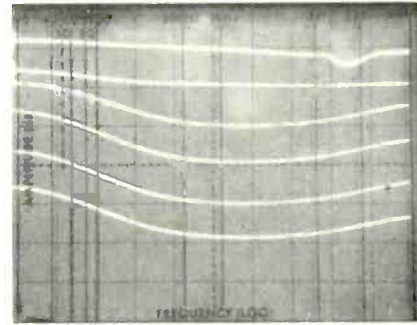


Fig. 7—Loudness control characteristics.

of THD hovers around the 0.15 per cent point for that power output level.

The phono inputs required 2.7 mV of signal input (at 1 kHz) to drive the receiver to rated output. Overload was evident with signal inputs of 150 mV, a bit short of the 170 mV claimed, but more than adequate to accommodate a wide variety of cartridges playing even the most heavily modulated record grooves and recorded transients in music. RIAA equalization was accurate to within 0.5 dB from 30 Hz to 15 kHz. Phono hum and noise, measured without any weighting, was 73 dB below rated output, referenced to input sensitivity (2.7 mV). This is an excellent measurement which, if translated to a 10 mV input signal reference used by many competing manufacturers, would become 84.4 dB—and that without any weighting network!

The two sets of Aux inputs had input sensitivities of 180 mV and 350 mV, and hum and noise of these high-level positions was some 85 dB below rated output. At minimum volume settings, hum and noise decreased to a -88 dB below rated output.

The range of the bass, treble, and mid-range tone controls of the Nikko 9095 was plotted by means of a sweep system in our spectrum analyzer and recorded on the scope face. The photo of Fig. 5 shows the range of each of these controls as a composite series of traces. In our opinion, the mid-range control operates over too wide a portion of the audio spectrum, affecting upper bass and lower treble to a degree not commonly associated with "presence" controls. This, however, is a matter of personal taste, and one can, of course, use this or any other tone control with discretion—or not at all. As for the low- and high-cut filters (action of these controls is shown in the scope photo of Fig. 6), they are about as effective as scratch or rumble filters as the bass and treble controls would be, because action (beginning of "cut") extends too far into the useful mid-range region for each filter.

Loudness compensation circuits include both bass and treble emphasis in the Nikko 9095, and response in 10-dB increments (beginning with the control fully clockwise) is shown in the scope photo of Fig. 7. (Note: The "glitch" in the top curve resulted from instrumentation and not from any odd quirk in the receiver.)

Use and Listening Tests

In listening to the FM performance of the Nikko 9095, we were at once aware of what, to us, seemed like slightly over-emphasized highs. Checking frequency response, we dis-

covered that the de-emphasis was a bit off and that at 15 kHz (where most receivers actually roll off more than the prescribed amount—17.07 dB), de-emphasis resulted in a roll-off of only 13 dB. In other words, at 15 kHz there was about 4 dB of net treble boost. One downward click of the treble control (which has detented or click-stop positions) corrected this flaw and things sounded fine. Sensitivity was excellent, and there was no trouble from alternate channel interference at any point on the FM tuning dial. Muting threshold was a bit on the high side (we had measured it at 14 μ V/28.1 dBf), which meant that we had to forego the luxury of interstation noise muting to pick up those really weak signals we use to check product sensitivity, in a practical way, at our listening location. On the other hand, since muting is set at just about the same point as stereo switching, one can almost use the muting feature as a means of insuring that those stereo stations which manage to overcome the muting threshold will also be heard in full stereo without having to worry about stereo switching sensitivity.

Whether you choose to rate the Nikko 9095 as either a 63 watt or a 60 watt per channel receiver, it is a powerful audio component, one which can drive some of the more familiar high-quality acoustic-suspension speaker systems to good, solid sound levels with no evidence of clipping, either aurally or visually with a scope connected to monitor what's happening on transient peaks.

Under musical listening conditions, the heating condition experienced during bench testing was not a problem at all, proving once again that sine-wave testing shows relatively little about the thermal capabilities of a given piece of equipment when it is called upon to amplify musical signals.

Front panel controls work smoothly and are arranged for ease of use and understanding. Aside from the tape-dubbing limitation, the tape facilities are good, and the availability at the front panel of the tape 2 in and out jacks make it easy to connect a friend's tape deck for tape copying without having to climb around the rear of the unit, if it is installed in a fixed location. The extra mike input, though mono, provides added flexibility for those few who want to perform as well as listen (only high impedance mikes are suitable, however).

At its suggested retail price, the Nikko 9095 certainly offers a great deal of control flexibility, as many inputs as one might reasonably expect to find even on some of the better "separates," and performance that warrants the asking price.

Leonard Feldman

Check No. 80 on Reader Service Card

Celestion UL-10 Loudspeaker

MANUFACTURER'S SPECIFICATIONS

Type: Three-way, acoustic suspension.

Speakers: One 10-in. woofer, one 2-in. dome midrange, and one ¾-in. dome tweeter.

Frequency Response: 40 Hz—20 kHz \pm 2 dB.

Power Rating: 50 watts continuous rms sine wave.

Impedance: 8 ohms nominal, 4 ohms minimum.

Crossover Frequencies: 700 Hz and 5 kHz.

Size: 12½ in. (31.75 cm) W x 15 in. (38.1 cm) D x 26½ in. (67.3 cm) H.

Weight: 50 lbs. (22.68 kg).

Price: \$349.50.

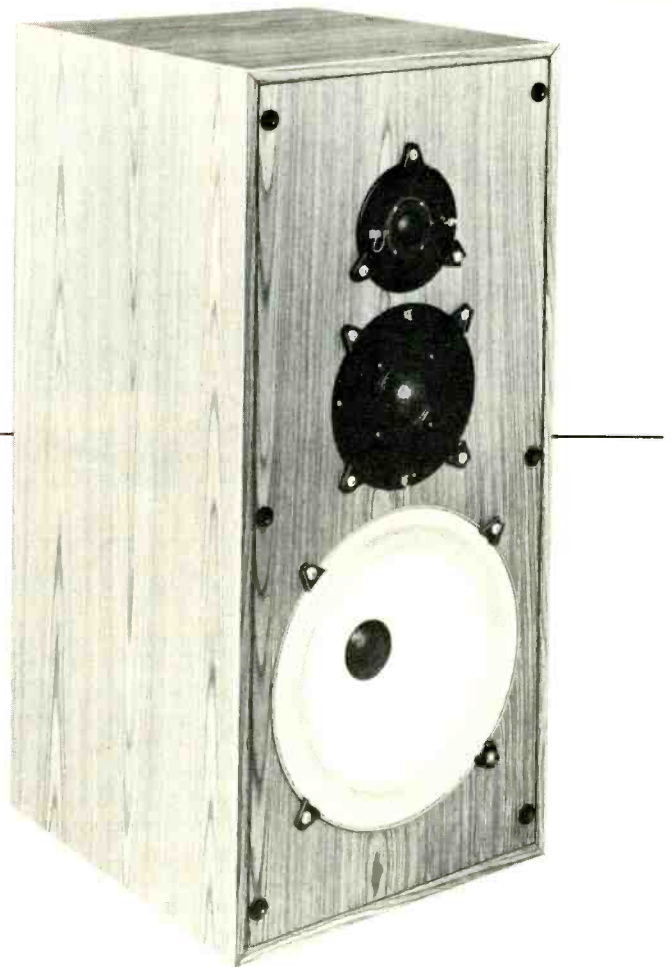
The Celestion UL-10 is a three-way loudspeaker system utilizing a 254 mm (10 in.) woofer, a 51 mm (2 in.) dome midrange driver, and a 19 mm (¾ in.) dome tweeter. The acoustic suspension mode is used for the woofer, which handles frequencies up to the first crossover at 700 Hz, with the midrange extending from 700 Hz to 5 kHz and the tweeter taking over above 5 kHz.

The enclosure is finished in walnut on the sides and top, and a black cloth grille accents the front surface. The enclosure has a tall and lean look, standing 673 mm tall (26½ in.) and measuring only 317.5 mm wide (12½ in.) and 381 mm deep (15 in.). At 22.68 kg (50 lbs), one might want to assure themselves that any off-floor mounting surface, such as a bookshelf, was capable of safely handling the weight. If this speaker is mounted off the floor, I recommend that snubbers or some other method of preventing the unit from sliding off its mounting surface be provided in the event there are toddlers around, who might pull a speaker off such a shelf.

Access to the speaker terminals is by means of well-marked, five-way terminals placed in a recessed cavity on the rear of the enclosure.

Technical Measurements

The terminal impedance which the Celestion UL-10 presents to a power amplifier is shown in Figs. 1 and 2. Unlike most loudspeakers, the highest impedance peak in the



audible spectrum is not the bass resonance rise, but rather the midrange impedance peak at 400 Hz.

From the standpoint of amplifier loading, the lowest value of impedance is 5 ohms, resistive, at 2kHz, while the most severe phase angle is approximately 45 degrees, lagging, at a frequency of 800 Hz. I would recommend that this speaker be treated as though it were 5 ohms, which means that par-

46

Fig. 1—Magnitude of impedance.

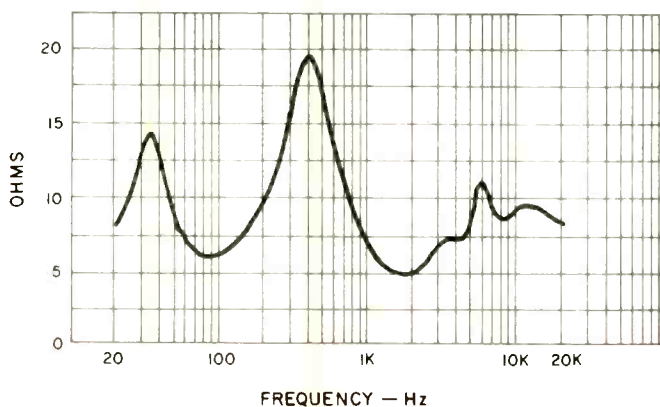
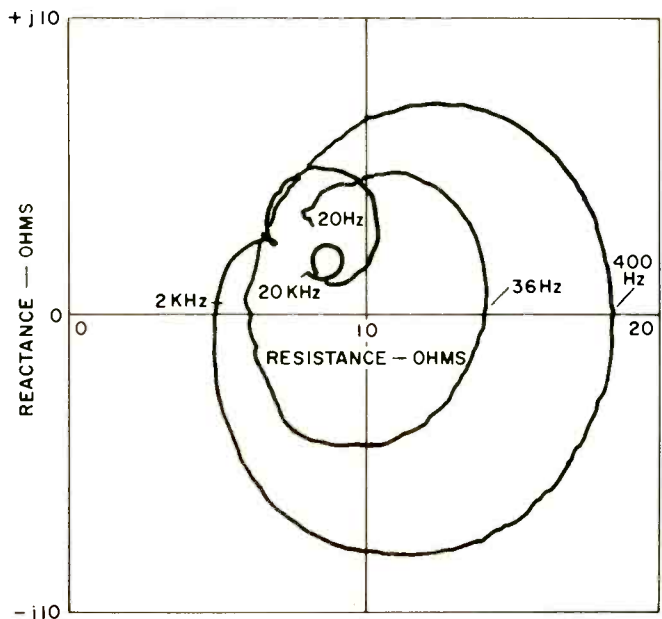


Fig. 2—Complex impedance.



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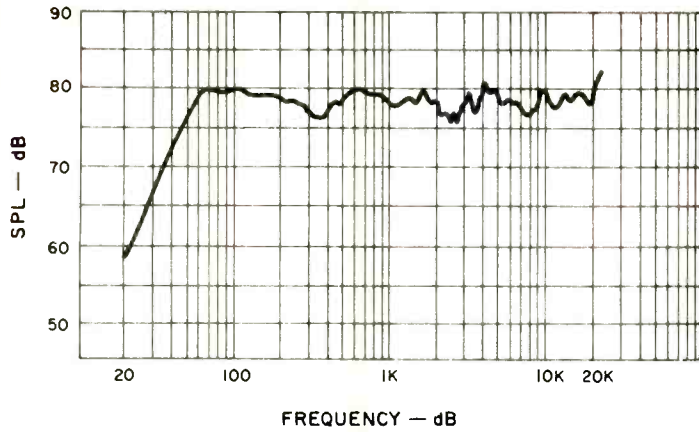


Fig. 3—One-meter, axial SPL for one-watt average drive.

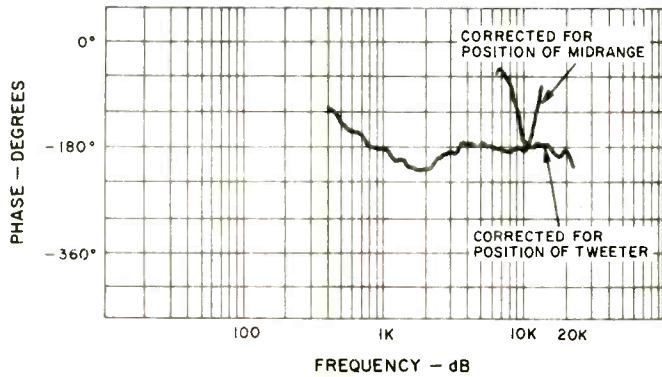


Fig. 4—One-meter, axial phase response.

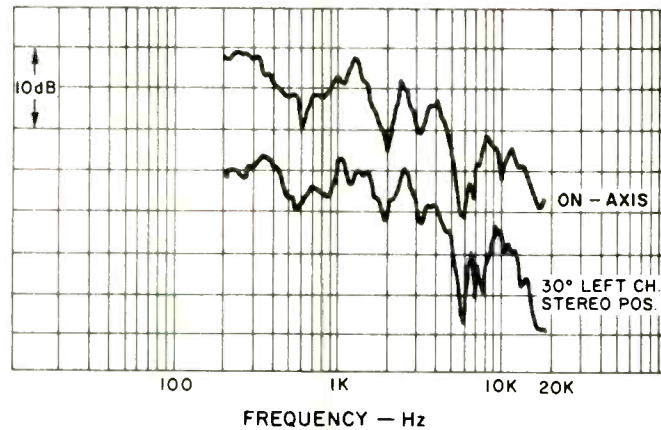
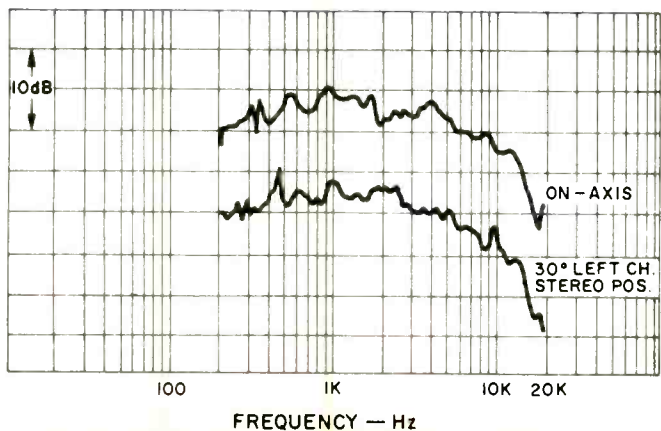


Fig. 5—Three-meter room response, speaker on floor, curves displaced 10 dB for clarity.

Fig. 6—Three-meter room response with speaker 67 cm (26 in.) off floor, curves displaced 10 dB for clarity.



allel hookup to a single amplifier terminal is to be avoided and heavy gauge wire used for connection. With these simple precautions taken, there should be no difficulty driving this loudspeaker from any quality amplifier.

The one-meter anechoic frequency response is shown in Fig. 3 for the amplitude of sound pressure level with a one watt average drive, and Fig. 4 is the measured phase angle under the same conditions. The amplitude response is unusually flat from 50 Hz to above 20 kHz; this response was measured directly on axis. The output is moderately low at a one-watt average level so that a higher powered amplifier may prove necessary if you prefer very loud listening. Celestion recommends that 40 watts minimum be used. I think this may be marginal, since this speaker can soak up the output from many super power amplifiers without sounding too loud.

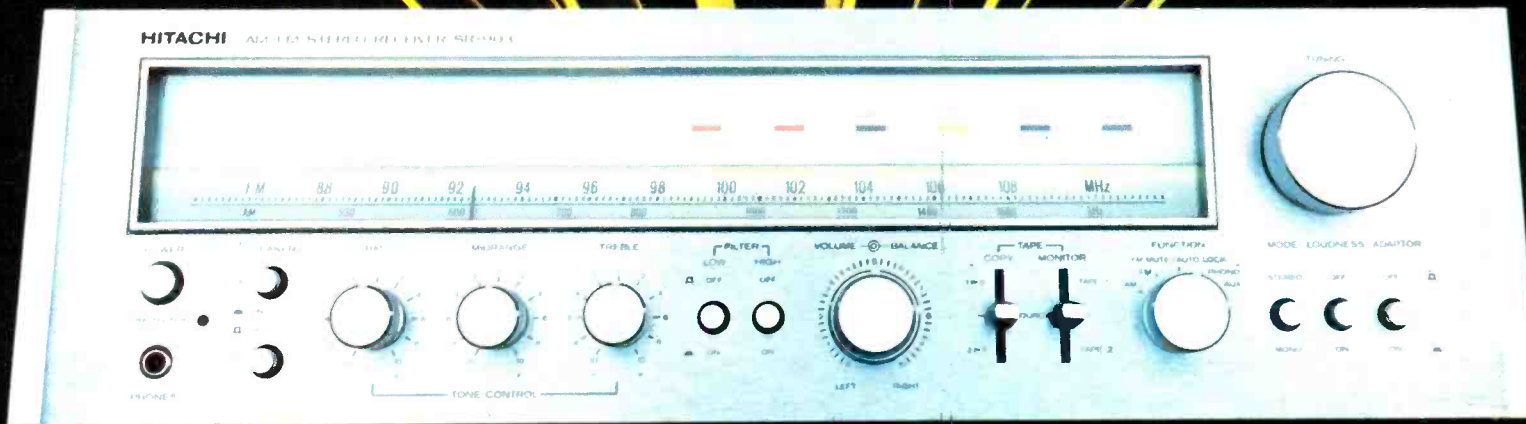
The phase response of Fig. 4 is also extremely uniform, and the response is principally minimum phase with exception of the crossover frequency ranges around 1 and 10 kHz. Two measurements were made for the data shown here. The lower frequency phase curve is corrected for the acoustic path length of the midrange driver, while the higher frequency curve is corrected for the acoustic distance to the tweeter. These curves reveal that the acoustic position of the midrange driver is 37 mm behind that of the tweeter. The acoustic position of the woofers lies, in turn, behind the midrange unit, as shown by the increase in phase slope below 1 kHz. Both the midrange and tweeter are phased at 180 degrees with respect to the woofer, which means that a positive-going voltage applied to the loudspeaker terminal in the polarity indicated by Celestion will produce a pressure increase for the sound contributed by the woofer, and a pressure decrease for the sound contributed by the midrange and tweeter.

The results of the three-meter room response measurement are shown in Figs. 5 and 6 for two separate loudspeaker positions. Fig. 5 is the response measured for the loudspeaker placed on the floor and against a back wall, while Fig. 6 is the same configuration, but raised 67 cm (26 in.) above the floor to place the system at normal listening ear level. A comparison of this measurement with the anechoic response, Fig. 3, shows the results to be quite different. The reason is that the anechoic response shows what the loudspeaker is capable of doing when there are no wall or floor reflections, while the room test is intended to measure the spectrum balance perceived while listening in a room. The tonal of these room measurements is in good agreement with the impression which I had while performing the earlier listening test. When the speakers were placed on the floor, I sensed that the bass was heavy and the response fell off with increasing frequency. For best tonal balance, therefore, I recommend that the Celestions be elevated to ear level and rotated toward the listening area.

The polar response is shown in Figs. 7 and 8. It is apparent that there is a good left-right symmetry, and that the sound is launched slightly upward. The substantial amount of sound launched upward indicates that this speaker should not be placed close to overhanging shelves or other structures that might cause sound to be reflected back into the listening area. Lateral stereo imagery should be reasonably good, as indicated from this data.

Harmonic distortion for the tones of E1 (or 41.2 Hz), A2 (110 Hz), and A4 (440 Hz) is shown in Fig. 9. With the exception of the higher level reproduction of 41 Hz, the harmonic distortion is quite low and indicates clean response for solo instruments.

Intermodulation of A4 by E1 (440 Hz by 41 Hz) is shown in Fig. 10. At low levels, the intermodulation is principally due to amplitude modulation of A4, while at higher levels the



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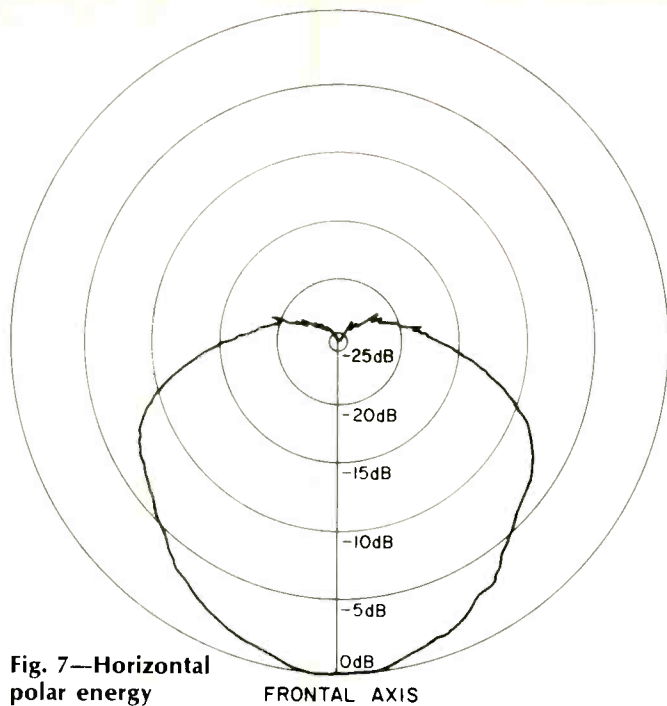


Fig. 7—Horizontal polar energy response.

FRONTAL AXIS

TOP

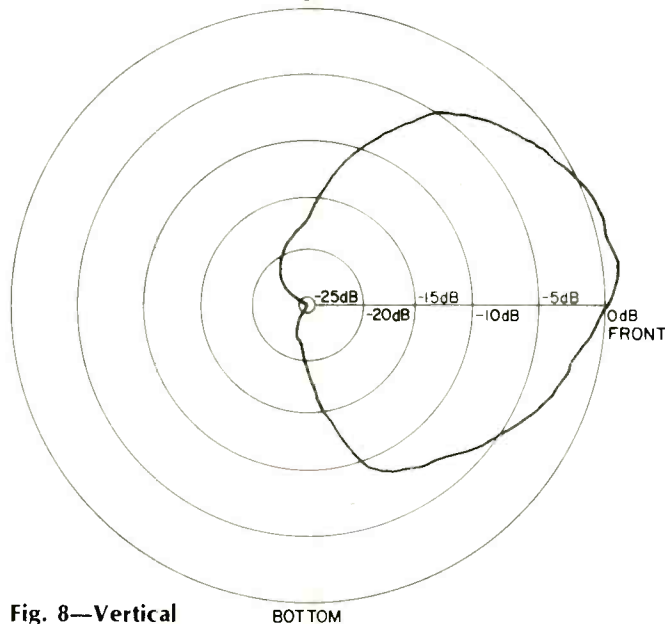


Fig. 8—Vertical polar energy response.

BOTTOM

characteristic changes to phase modulation. At 10 watts average drive, there is 2 per cent peak-to-peak amplitude modulation and 5 degrees peak-to-peak phase modulation, while at 40 watts the phase modulation has increased to 18 degrees peak to peak with no increase in amplitude modulation. This indicates that some small change of instrumental timbre may be experienced at high levels when there is substantial bass energy present.

The Celestion UL-10 is remarkably free of distortion in its linearity of response to single tones. A one-decibel increase in voltage produces almost exactly a one decibel increase in sound pressure level throughout the range from one-tenth watt to 100 watts for tone bursts of middle C (262 Hz) and A4 (440 Hz). This is a measure of acoustic transfer-gain uniformity and indicates that stereo placement of solo instruments should not be effected by changes in dynamics of that instrument.

The Celestion was not as good in its ability to handle a large number of incoherently related tones, such as orchestral peaks, as indicated by our crescendo handling test. An inner musical voice at middle C is reduced by one-half dB when a random noise signal of 2 watts average level is superimposed. At A4 or 440 Hz, the effect is stronger, and 2 dB of compression occurs for a superimposed noise of one-half watt average. In both cases, the inner musical voice had an average level of 20 dB below that of the noise when measured over the frequency range from 20 Hz to 20 kHz at the loudspeaker terminals. The interpretation of this measurement, in conjunction with the other distortion measurements, is that the subjective effect will be that of a gain compression amplifier in the system which tends to cause some lateral blurring of the stereo illusion during loud orchestral passages.

The energy-time response, which is the amount of time-spread of a perfect impulsive signal, is shown in Fig. 11 and indicates a moderately good reproduction of the attack on transient sounds. The tweeter signal arrives at 3 milliseconds, for a one-meter air path, and the main peak at 3.1 milliseconds is due to the midrange unit. The higher-frequency contribution from the woofer arrives at around 3.3 milliseconds and is followed by small and probably unimportant diffraction peaks for the next millisecond.

Listening Test

The physical configuration of the Celestion UL-10 is such that it may be placed either on the floor or on a shelf. Both positions were tried for the listening test, and it was clearly evident that off-the-floor mounting is to be preferred from the standpoint of producing the better tonal balance. I also found that I preferred the speakers placed against a back wall and rotated so as to point toward the listening area.

With this position, it was my opinion that there was a mild dominance of mid-bass, around 100 Hz, and a roll-off of response with increasing frequency. I found that I could produce what seemed to be a more balanced sound by setting my Marantz preamp tone controls for a bass drop of 2 dB at 100 Hz and a treble rise of 3 dB at 10 kHz.

The average response of the UL-10 is reasonably uniform from the octave below middle C to about 10 kHz, though in *continued on page 73*

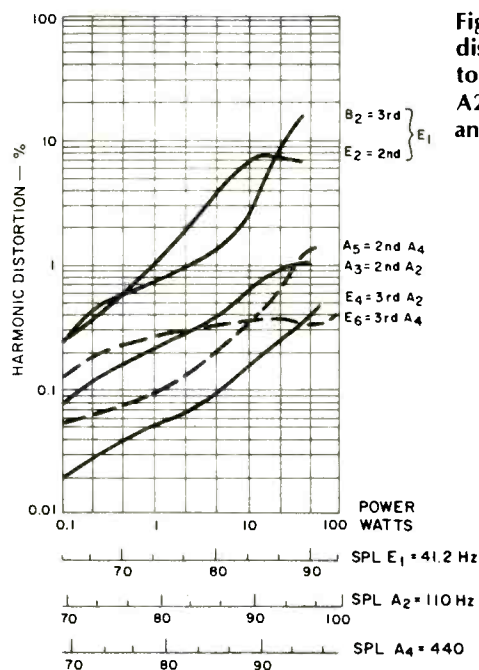


Fig. 9—Harmonic distortion for the tones E1 (41.2 Hz), A2 (110 Hz), and A4 (440 Hz).

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And at the low end of the frequency range, the 901 III produces the deepest bass notes with accuracy, clarity, and dynamic range clearly distinguishable from conventional speakers.

The heritage of the Bose 901 Series III.

In 1956, a university study began which totally redefined the criteria for the design and evaluation of loudspeakers. That research led to the formation of Bose Corporation and, in 1968, to the introduction of the unconventional Bose 901. The worldwide acclaim of both music lovers and critics of high-fidelity equipment has made the 901 a legend in the high-fidelity world.

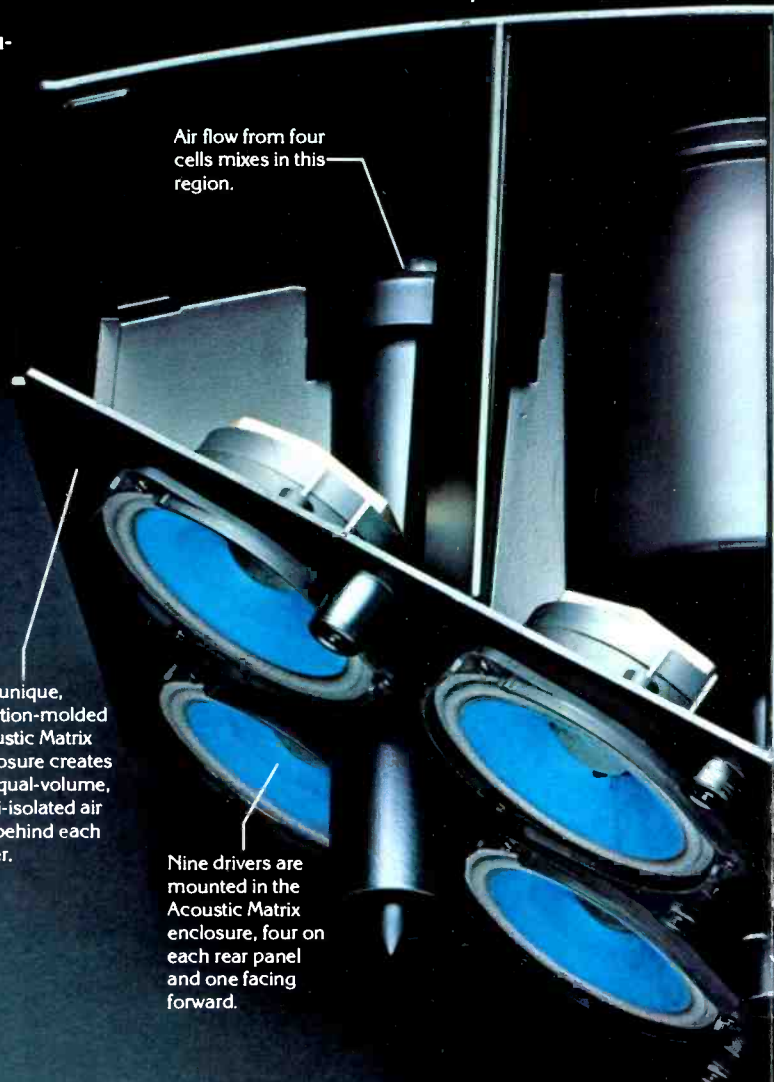
Technical innovation.

Then, in 1972, Bose began to develop the 901 Series III, in order to realize even more fully the potential inherent in the concepts proven in the 901. Two major advances are critical to the spectacular performance of the 901 Series III: the

Acoustic Matrix™ enclosure and a new high-performance, high-efficiency driver.

The new Acoustic Matrix™ enclosure.

The Acoustic Matrix enclosure is a unique, molded structure which yields performance unattainable with a standard wood enclosure. The Acoustic Matrix enclosure creates nine, equal volume, semi-isolated cells, one behind each driver, to provide a balance of coupling and isolation between drivers. The enclosure also incorporates three Reactive Air Columns, which drastically reduce cone motion at low frequencies, allowing the 901 III to produce the lowest bass notes with clarity and accurate timbre readily distinguished from conventional speakers.





A new full-range driver.

The new 901 Series III full-range driver combines an ultra-high-efficiency aluminum helical voice coil, a unique injection-molded basket, and a high-efficiency magnet structure to achieve greater efficiency, smoother, more precise frequency response, and lower distortion than the previous 901 driver, an extraordinary

performer in its own right. In fact, the 901 III can produce the same loudness level with a 15-watt amplifier that previously required a 50-watt amplifier.

Proven concepts.

In addition to these important innovations, four critical design concepts first implemented in the original 901 are essential to the performance of the new 901 Series III.

Multiple, full-range drivers.

First, the 901 III employs nine matched full-range drivers instead of the conventional woofers and tweeters. As a result of the complex acoustic coupling of the nine drivers, the many small imperfections in response inherent in any speaker are averaged across all nine drivers, yielding clear,

smooth response across the entire frequency range.

Active equalization.

Second, the 901 Series III system includes an active equalizer, a compact electronic signal processor precisely programmed to automatically adjust, frequency by frequency, power input from the amplifier to the speakers. The result is constant sound output through-



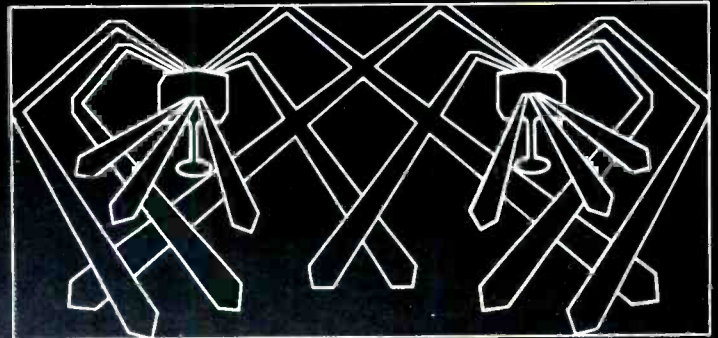
out the frequency spectrum. The equalizer also has high-frequency and midbass contour controls which let the listener adjust the output of the speakers to the acoustics of the listening room.

Reflected and direct sound.

Third, the 901 III is a Direct/Reflecting® speaker. Instead of beaming sound directly at the listener, like a conventional direct-radiating speaker, the 901 III reflects most sound off the back and side walls of the listening room. This surrounds the listener with a combination of reflected and direct sound, just as in a live performance. The resulting spacious, realistic sound contrasts to the harsh, "hi-fi" sound of conventional direct-radiating speakers.

Uniform acoustic power radiation.

Fourth, the 901 Series III speakers and equalizer are designed so that the total acoustic power radiated into the room (not just the energy radiated from the front of the speaker) is in correct balance at every frequency. This "uniform power radiation" design criterion results in more accurate reproduction of instrumental timbre.



The 901 Series III creates in a living room the high proportion of reflected sound experienced in a live performance.



A tapered Reactive Air Column radiates the lowest bass from the four drivers on each rear panel.

A concentric core, extending the full length of the Reactive Air Column, smooths air flow in the column.

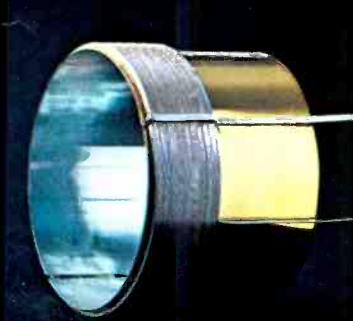
A third Reactive Air Column radiates deep bass from the single front-facing driver.

And, we submit, the finest speaker engineering and manufacturing capability in the world.

Over the years, Bose has developed manufacturing capabilities, facilities, and processes that are unique. We believe that no other speaker manufacturer could build a speaker of the precision and performance of the 901 Series III.

Building a second-generation driver.

The extraordinary performance demands placed on the 901 Series III loudspeaker system call for innovative approaches to both design and manufacturing of every component in the system.



The helical voice coil—a study in precision manufacturing.

For example, the voice coil is the heart of any driver. In a conventional voice coil, round copper wire is wound on a paper cylinder. Round wire leaves relatively large gaps between windings, resulting in poor utilization of energy in the magnetic field, and thus relatively poor efficiency in the speaker. In the 901 Series III helical voice coil, a flat ribbon

of aluminum wire is precisely wound, on edge, on an aluminum core, leaving no gaps between windings, and helping make the 901 Series III driver more than three times as efficient as its predecessor.

Production of this high-precision voice coil was simply not possible using existing methods and equipment—so Bose developed new methods for flattening and insulating wire and a proprietary, computer-controlled winding process.

Similarly, the 901 III injection-molded plastic basket is far more precisely manufactured than a conventional steel basket, resulting in less magnetic leakage, a stronger structure, and tighter assembly tolerances.

A unique speaker construction technique.

Early in the 901 III program it was clear that the complex enclosure needed to meet our design goals could not be built using conventional wood con-



The Acoustic Matrix enclosure.

struction. Therefore, the decision was made to invest in the large design effort and tooling cost to develop the injection-molded Acoustic Matrix enclosure. Each part of the Acoustic Matrix enclosure is precision injection molded from a high-strength plastic and then bonded into a strong, vibration free, airtight structure, using special bonding techniques developed by Bose engineers. The result is a unique, highly functional enclosure that sets the 901 Series III far ahead of the performance limitations of woodworking technology.

Bose advanced quality control systems.

The sophisticated design of the Bose 901 Series III would be to no avail without equally advanced techniques for quality control on the production line.



The components of the 901 Series III loudspeaker system.

For every critical performance characteristic of the speaker system, Bose has developed its own specialized test systems to provide a degree of quality control unmatched in the high-fidelity industry. In addition, the 901 Series III speakers and equalizer are covered by a full five-year warranty.

Your enjoyment.

In the end, technology is only of academic interest if the final product does not bring you closer to the experience of live music. With truly accurate music reproduction, you will have this experience, know it, and remember it, whether you are an audiophile, a musical connoisseur, or a novice. At such time, the thought of hi-fi and loudspeakers will be overshadowed by the music experience.

If we can produce a loudspeaker that can accomplish this, that indeed is our ultimate pride. And we rest our reputation with the best we have to offer—the Bose 901 Series III.

To appreciate the spectacular performance of the Bose 901 Series III, visit an authorized Bose dealer and ask him to play the 901 III in comparison to any other speaker, regardless of size or price. For a full color, 16-page brochure on the 901 Series III, write Bose, Box PV32 The Mountain, Framingham, Mass. 01701. If you are interested in more detailed technical background, enclose \$1.00 and you will also receive the 20-page 901 Series III owner's manual and a copy of Dr. Bose's articles "Sound Recording and Reproduction," reprinted from *Technology Review*.

For the name of the Bose dealer nearest you, call toll free (800) 447-4700. In Illinois, call (800) 322-4400.

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NOTHING NEW UNDER THE AM SUN

Michael N. Stosich

In a previous article on AM high fidelity in *Audio* (Jan. 1975, pg. 28), mention was made of a 1936 E.H. Scott receiver. Many readers may not completely believe the assertion that it was a high-fidelity receiver. The trend towards modern component hi fi, however, actually began during that period, and E.H. Scott was the foremost manufacturer of custom high-fidelity component systems, being the Crown or McIntosh of his time. Custom is not an idle word either; Scott aligned tuners to work better for different geographical locations and added or subtracted controls to suit the purchaser.

Scott was born in New Zealand in 1887, orphaned at 14, and while in the Australian Army Corps, invented an automotive trouble shooting device which eventually brought him \$46,000. After World War I, he migrated to Chicago where he wrote auto maintenance articles syndicated in 50 U.S. and Canadian newspapers. His interest soon gravitated to radio, and he began to write articles on that subject too. On a holiday in New Zealand in 1924, he took with him a set specially constructed for the occasion, to receive U.S. broadcasts while there. The feat of having received 117 programs from 19 stations, all at least 9,000 miles distant, with his World Record 9 receiver eventually put him into the radio manufacturing business.

His high fidelity receivers were bought the world over by those famous in musical circles. Scott owners included Sir John Barbirolli, Eugene Goossens, Tullio Serafin, Lauritz Melchior, Al Jolson, Eddie Cantor, Deems Taylor, Guy Lombardo, Rudy Vallee, and Arturo Toscanini. These names attest to the authenticity of the sound reproduced for that period. Other



owners included Prince Otto von Bismarck, the Baron de Rothschild, and the Chicago Tribune's Colonel McCormick. The Hearst press used Scott receivers to monitor world news events. A Scott tuner was used to receive one of the earliest experimental television broadcast demonstrations during the early 30s in Chicago.

From his earliest receivers on, Scott emphasized good tone, realistic sound, and the custom look. There were always several different super-crafted console cabinets available for both the receivers and speaker systems. All but the very first were sold directly from the factory to the customer. Each set was built to order by an individual technician, and all sets were "burned in" before final testing. The Scott look lasted until the late 50s, that is, lots of chrome and massive construction. As the chassis and all coil and tube shields were heavily chrome plated, many owners bought only the basic component equipment, the tuner, power amplifier, and

speakers. They would then, as now, proudly display their component equipment on shelves or table tops with the speakers mounted in the walls or in speaker enclosures, either custom built or made by Scott. This, by the way, was in the early 1930s.

But, what of the technical quality of the Scott receivers? How does this obviously archaic equipment compare with modern components? Well, first of all, Scott was initially bound to AM for radio reception, and he was forced to develop AM receivers to the technical limits of the period. His tuners, unlike most modern tuners, had an audio bandwidth that permitted the reception of everything being transmitted. For instance, my last \$300 tuner had an AM response of a mere 1,500 Hz. My new \$400 tuner with a new IC AM circuit has an audio response of 4,000 Hz. However, my 1930 Scott Air-Wave 12 had a response of 4,000 Hz. I should add that the list price of the Scott was \$600, during the Depression years to boot.

The early sets had a fixed, flat-topped i.f. response, and consequently fixed wide-band audio response, just like the modern solid-state super tuners. The use of a broad i.f. is fine for local stations which transmit wide-band information, but distant stations or limited bandwidth stations require progressively narrower i.f. bands. Soon Scott introduced a stepped i.f. bandwidth and later a continuously variable i.f. control. This allowed the user to adjust the i.f. to suit both the station and the atmospheric conditions. These controls are actually very simple to use. Once on a station, the user opens up the i.f. with the "fidelity" control until the background noise and squeel become objectionable. This control per-

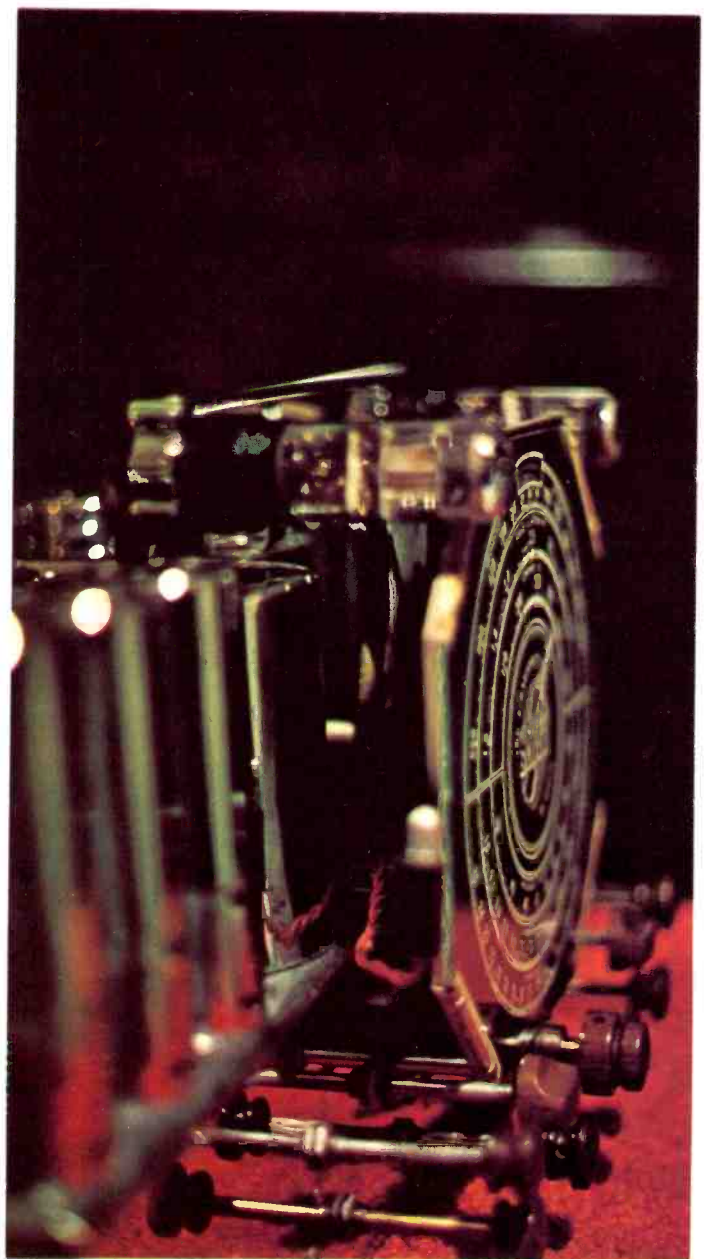
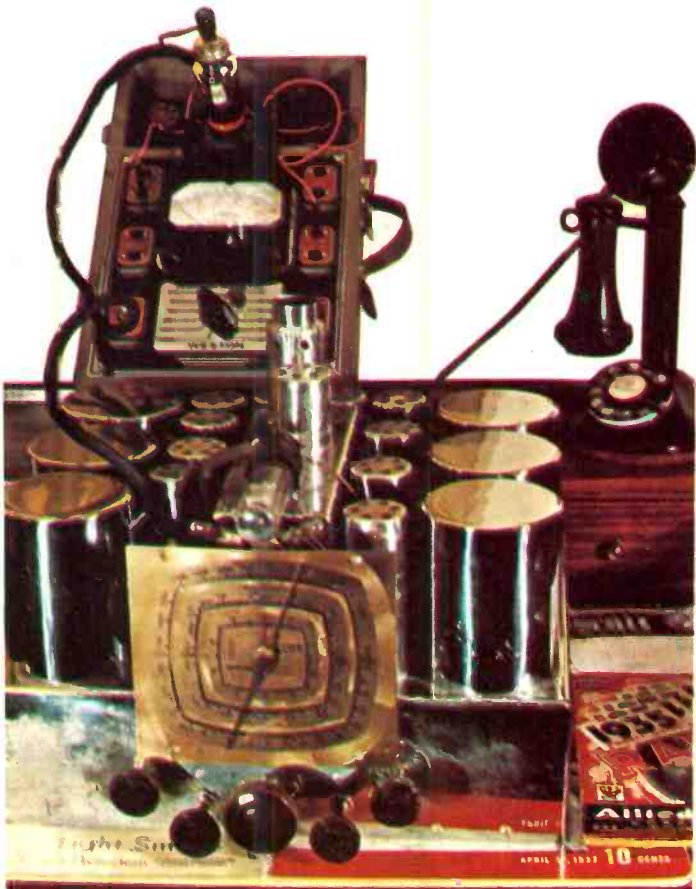
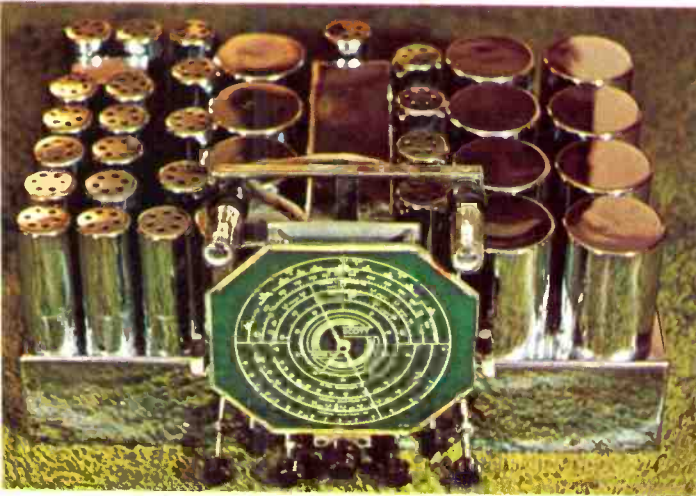
mitted near perfect compromises between fidelity and selectivity. The only modern AM tuners with this 45-year-old feature are the new McKay-Dymek line. One respected kit manufacturer is now making an AM/FM tuner with a narrow, medium, and broad "bandwidth" switch. The control only operates a redundant treble cutoff and doesn't improve i.f. characteristics for better distant reception. All pre-World War II Scott receivers had push-to-connect antenna terminals just like the modern Japanese sets.

Enter High Fidelity

The year 1937 saw the introduction of one of the best high-fidelity AM receivers ever built and, I imagine, to

this day, unexcelled. To approximate it today you might purchase the following: a McKay-Dymek AM tuner, a DBX-119, a Burwen 1201 Noise Reduction unit, and an Audio Research tube amp.

The 1937 Scott 30-tube Philharmonic receiver came standard with features many of us are now seeing newly reintroduced and rediscovered. This set had two tuned r.f. stages and four audio i.f. stages. The audio i.f. response was continuously variable and flat topped at all points but the narrowest, from between 4 kHz and 32 kHz wide, which permitted 16 kHz audio. Sensitivity was advertised as 0.5 μ V. Just as with the latest Luxman \$900 tuner, this set had effective AM muting, only it was continuously variable.



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The i.f. was front-panel adjusted by a control mechanically linked to each stage and trimmed each transformer, primary and secondary, to accomplish stagger tuning.

The Philharmonic employed both i.f. AGC and delayed r.f. AGC. Each AGC voltage was separately derived by an extra tuned gain stage and rectifier. It could almost be said there were three i.f.s in the set, one for audio, one for r.f. AGC, and one for i.f. AGC. The use of tuned AGC amplifiers reduced the effects of modulation on the AGC voltage. That is, you do not hear the station breathe at you as the AGC voltage follows a broadcaster's voice. This problem just recently became apparent with another kit manufacturer's top-of-the-line receiver which boasted a super AM. So acute was its problem with r.f. AGC breathing, caused by rectifying wide band audio for AGC voltage, that this manufacturer just recently introduced "improved AGC." The improvement was to tie the r.f. amp's AGC gate to a fixed potential, leaving only i.f. AGC. It also saved two transistors and numerous other parts.

Noise Reduction System

Quite a bit of audio processing was employed in the Scott Philharmonic. Besides the usual bass and treble controls and loudness compensated volume control, there was also a dynamic range expander and an automatic noise reduction system. The ± 20 dB bass control, by the way, had a ganged 60-Hz notch filter to correspondingly minimize hum with the bass boost. The dynamic volume range expander utilized a "Magic Eye" tube to indicate the degree of expansion, somewhat as its solid-state counterpart does on a DBX unit. It also had a continuously variable expansion control as does the DBX.

The Scott noise reduction system is usually ascribed to H.H. Scott and is said to have been invented by him in 1946. This is not true. H.H. Scott (no relation) described in his 1947 Electronics article how he improved the time constants of the earlier 1937 E.H. Scott Radio Laboratory Automatic Needle Scratch Suppressor in developing his DNS. It has been suggested in AES literature that Burwen used the H.H. Scott DNS for inspiration in developing his now famous product. This, of course, was a standard feature of the Philharmonic.

Other features of the Philharmonic were a 10-kHz audio notch filter, a 40-watt class-A power amp employing

push-pull output devices, and a two-way speaker system employing a 15-in. woofer and two five-in. tweeters. The set was constructed on two welded, heavy gauge, chrome-plated chassis, one for the tuner and control section and a second for the power amplifier/supply section. Later versions included a third chassis which contained an LC crossover network. Dial calibration was advertised as 0.2 per cent.



The 1937 Scott Philharmonic, then, was quite advanced even for 1977! However, it was missing one important feature which Scott had had in limited production in 1936 (and Sony and Crown in 1976)—tri-amplification. One channel was used for each of the following ranges, 30-125 Hz, 100-600 Hz, and 3-16 kHz. This set was the 40-tube, later 48-tube, and still later a 57-tube Quaranta. Besides employing an 18-in. woofer, two 12-in. midranges and three tweeters, some Quarantas came equipped with a disc-cutting lathe and ribbon microphone. At up to \$5,000 in cost, its production must have been very limited.

Technical Competitors

E.H. Scott had several competitors. The most significant among them was a dashing young genius named McMurdo Silver. Silver was a continuous contributor of technical articles to *Radio News* magazine (the predecessor of *Popular Electronics*) throughout the 30s. He was a polo player, gun collector, and is said to have been quite a *bon vivant*. Formerly the president of Silver-Marshall, Inc., he set up the McMurdo Silver Corp. and began building custom high-fidelity receivers

in competition with Scott. While good, his receivers were never quite the equal of Scott's. One of Silver's most famous owners was Dr. Lee DeForest, inventor of the vacuum tube. DeForest owned a Silver Masterpiece V and praised it in the final chapters of his autobiography.

Throughout the 1930s, Scott's and Silver's advertisements would do battle trying to "one up" the other's in technical achievement. Features were stolen and lawsuits initiated. Finally, Scott won the battle and bought out the failing Silver in 1940. Scott then introduced a new, bottom-of-the-line receiver and designated it as the Scott Masterpiece. I do not know if the gesture was meant as a tribute to his archenemy or to rub salt in the wounds. Silver eventually committed suicide in 1947.

Later Scott high-fidelity receivers came with 40 MHz FM, 100 MHz modern band FM, and push button, motor-driven remote-control tuning. By 1947, the last great Scott receiver was built—the AM/FM Model 800B, but the company was in advanced decline. Because of Scott being eased out of his company and the advent of post-World War II TV, Scott Radio Labs died in the early 50s.

Most audiophiles are skeptical about the concept of high-fidelity AM radio. An owner of modern "high-fidelity" equipment is almost guaranteed to get the mistaken impression of AM's potentialities because of archaic modern equipment. With a vintage Scott, however, one gets sibilant announcer voices, thunderous bass, the sounds of triangles and cymbals, plus wide dynamic range, low noise and distortion, and still excellent selectivity. One can also tune in a station 3,000 miles away without interchannel chatter.

I would like to point out to any owners of a vintage E.H. Scott receiver, that if it has not been overhauled recently, it is almost guaranteed to work extremely poorly. Almost any old Scott receiver required 15-to-30 capacitors, cleaning and lubrication, vintage tubes, and complete realignment. Sadly, almost no service technician has the knowledge, experience or patience to perform the kind of work required; besides the cost would be prohibitive. Probably the only way to tackle the problem is by yourself, given some technical knowledge and a good library. While a non-overhauled set may appear to work well, it is only because of your point of reference. A

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Total Concept Kit

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Aerosol foam dissolves hardened contaminants and restores records to original condition. Simply spray on record, allow to bubble, then wipe dry with Record Purifier. Cat. No. 30-8530



Record Plus

Dual purpose spray dissolves finger smudges and other harmful deposits as well as lubricating record grooves to prevent wear. Leaves a microscopic layer of silicone lubricant that contains an anti-static agent and fungus inhibitor. Simply spray record, then gently wipe surface. Cat. No. 30-8525



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Blue Max

Velous fibers remove dust and other foreign particles from record grooves as well as absorbing excess lubricating liquid. May be used hand held or while record is on turntable. Comes complete with storage container and nylon brush for cleaning Blue Max. Cat. No. 30-8540

Available At Audio Specialists Everywhere.

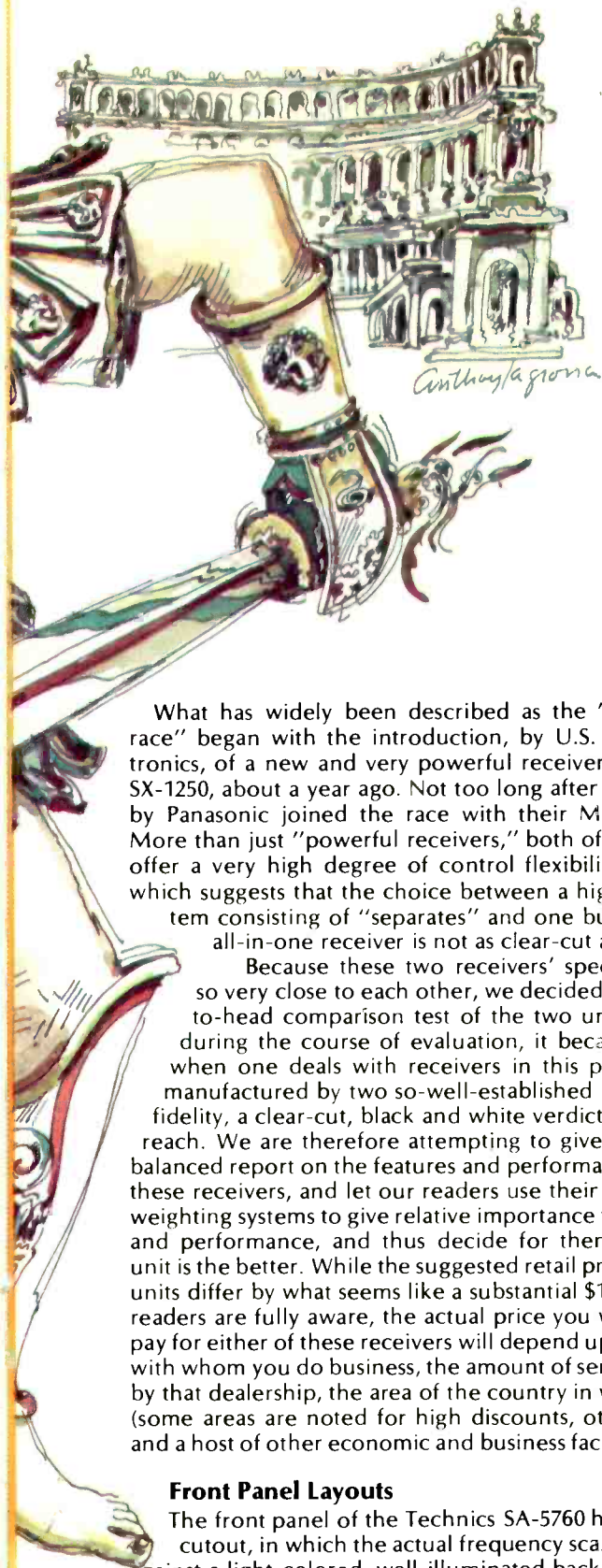
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BATTLE OF THE TITANS





What has widely been described as the "audio power race" began with the introduction, by U.S. Pioneer Electronics, of a new and very powerful receiver, their Model SX-1250, about a year ago. Not too long after that, Technics by Panasonic joined the race with their Model SA-5760. More than just "powerful receivers," both of these models offer a very high degree of control flexibility, a situation which suggests that the choice between a high fidelity system consisting of "separates" and one built around an all-in-one receiver is not as clear-cut as it once was.

Because these two receivers' specifications are so very close to each other, we decided to do a head-to-head comparison test of the two units. However, during the course of evaluation, it became clear that when one deals with receivers in this price category, manufactured by two so-well-established names in high fidelity, a clear-cut, black and white verdict is not easy to reach. We are therefore attempting to give an objective, balanced report on the features and performance of each of these receivers, and let our readers use their own personal weighting systems to give relative importance to the features and performance, and thus decide for themselves which unit is the better. While the suggested retail prices of the two units differ by what seems like a substantial \$100.00, as most readers are fully aware, the actual price you would have to pay for either of these receivers will depend upon the dealer with whom you do business, the amount of service provided by that dealership, the area of the country in which you live (some areas are noted for high discounts, others are not), and a host of other economic and business factors.

Front Panel Layouts

The front panel of the Technics SA-5760 has a large dial cutout, in which the actual frequency scales are printed against a light-colored, well-illuminated background, while the rest of the cutout area is framed in a contrasting dark

background color. Within this dark area are framed to two tuning meters (signal strength and center of channel), as well as a series of function indicator lamps and the usual stereo indicator. A large tuning knob coupled to an effective flywheel tuning system is at the right, while at the extreme left of the darker area is an overload indication lamp which illuminates when the protection circuits have operated for any reason, such as the presence of a speaker short. Calibration, on both FM and AM, is linear, with calibration marks provided for every half a Megahertz on FM.

The lower section of the SA-5760 panel is equipped with a stereo headphone jack, located just below the power on/off pushbutton at the extreme left. Two speaker selector pushbuttons come next, followed by 11-position detented bass and treble controls which flank three pushbuttons. These last select bass turnover frequencies of either 250 Hz or 500 Hz, treble turnover points of either 2.5 kHz or 5 kHz, and defeat or bypass the tone control circuits when that is desired. Low- and high-cut filter buttons come next, followed by the balance control, and a 26-position attenuator type master volume control, calibrated in 2 dB steps from -40 to 0 dB. Five pushbuttons to the right of the volume control handle loudness circuits, 20-dB audio muting, FM muting, insertion of a sophisticated low-pass filter for FM tape recording (about which more later), and selection of stereo or mono listening mode. A rotary tape-mode switch comes next, with positions for tape monitoring of either of the two tape monitor circuits as well as copying from one deck to the other and vice versa. A rotary program selector switch comes next, and finally comes a phono impedance switch which selects 25k-, 50k-, or 100k ohm input impedance for both of the available sets of phono input circuits.

Pioneer's front panel is all light-colored, with frequency scales printed in dark letters upon a background color which matches the rest of the front panel. The FM frequency scale is linear, with calibration marks at every 200 kHz, while the AM scale uses the conventional non-linear frequency distribution. The two tuning meters are positioned above the center of these scales, while to either side of the meters are speaker indicator lights, stereo indicator, and program source indicating lights. A large flywheel-coupled tuning knob is located at the right.

Still within the framed dial area, and below the dial scales, are a series of pushbuttons, a phone jack, and microphone input jacks at the right. Three buttons take care of speaker selection, though only two sets of speakers can be selected at any given time. Two more buttons in this row take care of low and high frequency filter selection. The next two buttons take care of FM muting and selection of a circuit which permits you to audibly "tune" or orient your antenna for least multipath distortion on FM or stereo FM. The remaining five buttons in this group are used to select desired program sources. Microphone selection is made by depressing the *Phono 2* button. When microphones are connected, the rear-panel phono 2 inputs cannot be used, though a second turntable may remain connected to them for use when the mike plugs are removed.

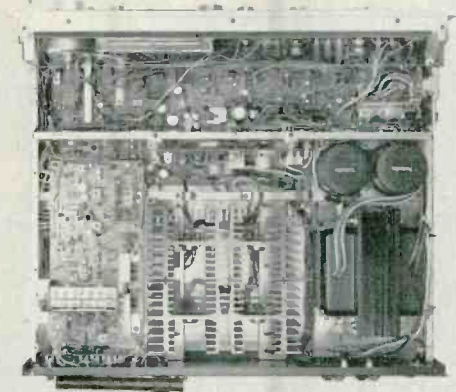
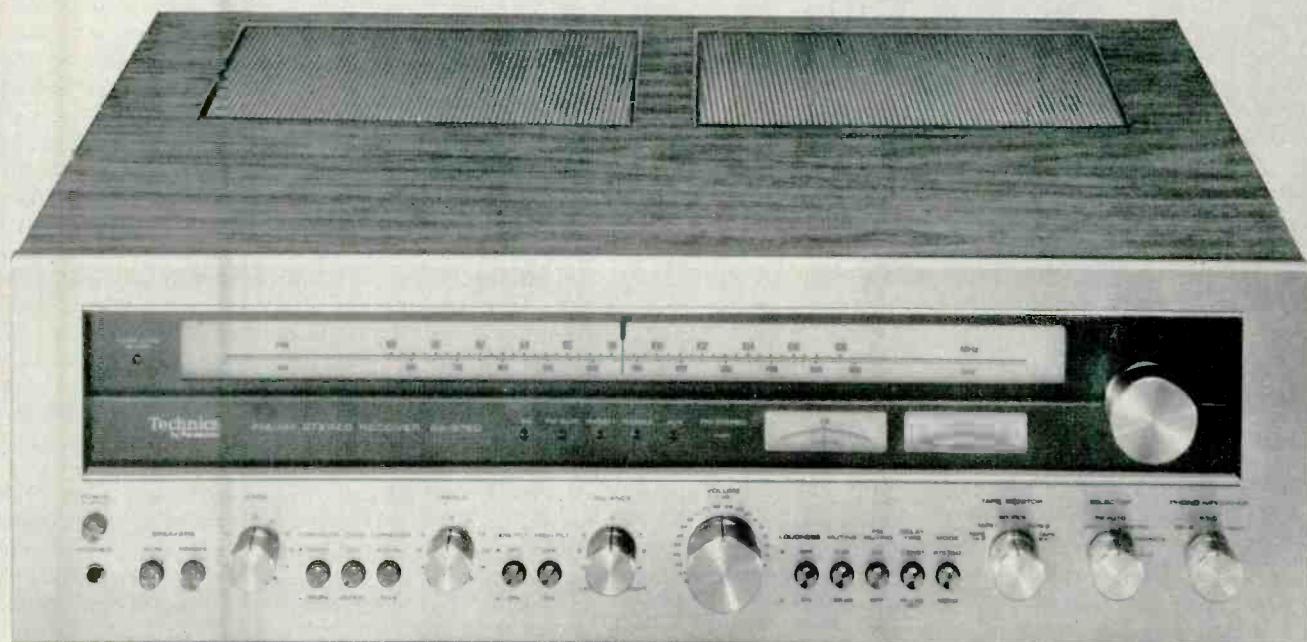
The lower section of the panel contains a power on/off switch, main and sub bass rotary controls, a tone-defeat toggle switch, main and sub-treble controls, balance control, and a master volume control with click-stop positions and calibration marks from 0 dB to -70 dB (plus "infinite attenuation"). All tone controls are also equipped with fixed, repeatable, click-stop positions. Additional toggle switches interspersed between the rotary controls just mentioned include a loudness switch, a stereo/mono mode switch, a 20-dB audio muting switch, and four switches associated with the tape monitor and adaptor connection circuits found on

the rear panel. One of these switches permits dubbing from one tape deck to another.

The rear panel of the Pioneer SX-1250 is equipped with input and tape output jacks (two sets of phono inputs are provided), and with an adaptor in/out combination of jacks that really constitutes a third "circuit interruption point" in the signal chain and is intended specifically for such add-on devices as noise reduction systems, expanders, graphic equalizers, etc. Ground terminals are located below the phono inputs. A DIN socket parallels the function of the *Tape 2* in and out jacks. Spring-loaded speaker terminals permit con-

nection of as many as three pairs of stereo speaker systems, though only two sets can be selected for listening at once. Jumpers interconnect preamp outputs and power amp inputs and may be removed for separate use of these receiver sections. Antenna screw-terminals are provided for 75-ohm, 300-ohm, and AM external antennas. An FM-detector output jack is also provided for possible future use in connection with four-channel FM adaptors. A slide switch changes FM de-emphasis from 75 microseconds to 25 microseconds for proper Dolby FM listening (which requires the use of a separate Dolby decoder). One switched and two

Technics by Panasonic SA-5760 Stereophonic Receiver



MANUFACTURER'S PUBLISHED SPECIFICATIONS

	SA-5760	SX-1250
TUNER SECTIONS, FM		
IHF Sensitivity, Mono, μV (dBf):	1.8 (10.3)	1.5 (8.7)
IHF Sensitivity, Stereo, μV (dBf):	N/A	2.9 (14.5)
50-dB Quieting, Mono, μV (dBf):	2.4 (12.8)	2.1 (11.5)
50-dB Quieting, Stereo, μV (dBf):	33.4 (35.7)	35.0 (36.0)
THD, Mono, 100Hz/1kHz/6kHz, %:	NA/0.1/NA	0.1/0.1/0.3
THD, Stereo, 100Hz/1kHz/6kHz, %:	NA/0.15/NA	0.25/0.2/0.3
S/N, mono/stereo, dB:	85/75	80/74
Selectivity, Alt. Ch., dB:	80	83
Capture Ratio, dB:	1.0	1.0
Image Rejection, dB:	85	110
I.F. Rejection, dB:	100	120
Spurious Rejection, dB:	100	110
AM Suppression, dB:	60	60
Stereo Separation, 1kHz/100Hz/ 10kHz, dB:	45/NA/38	50/35/35
TUNER SECTIONS, AM		
Sensitivity, Ext. Ant., μV :	30	15
Selectivity, dB:	22	40
Image Rejection, dB:	47	65
I.F. Rejection, dB:	40	85

unswitched a.c. receptacles are located beneath the speaker terminals. A fully pivotable AM ferrite bar antenna near the antenna terminals completes the Pioneer rear panel layout.

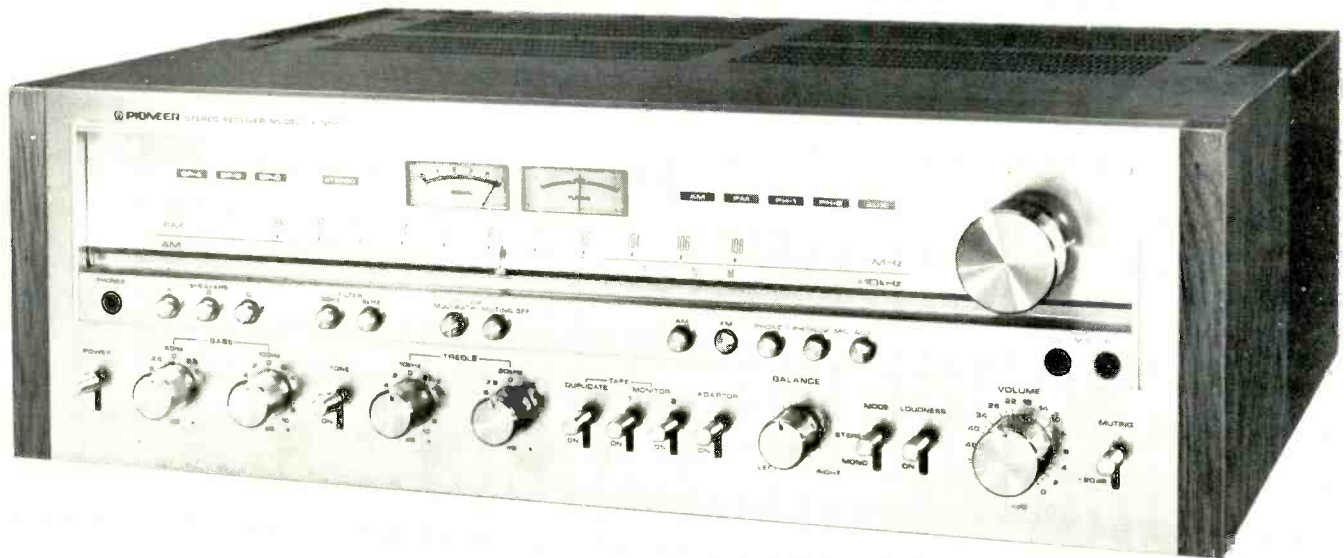
Somewhat simpler in layout, the Technics rear panel has all its input and tape in/out jacks located at the lower left of the panel. Again, two sets of phono inputs are provided, as well as dual tape-monitor circuits. Antenna screw terminals for 75-ohm, 300-ohm, and external AM antennas are also located in this area of the rear panel, as are the pivotable built-in AM ferrite bar antenna and the four-channel "detector" output jack. At the opposite end of the rear panel are two

a.c. convenience outlets (one switched, the other unswitched), and two sets of spring-loaded speaker terminals which accept connections from "main" and "remote" pairs of speakers. A single ground terminal serves for both possible turntable grounds and for AM antenna ground return.

Circuit Highlights, Technics SA-5760

A view of the internal layout of the SA-5760 can be seen in the accompanying photo. A four-gang capacitor is used for FM tuning, while two additional gangs take care of the AM tuning circuits. Four-pole, dual-gate MOS-FETs are used in

U. S. Pioneer SX-1250 Stereophonic Receiver



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AMPLIFIER & PREAMPLIFIER SECTIONS

Rated Output/Channel, W, 8 ohms/
4 ohms:

Rated Harmonic Distortion, %:

IM Distortion at Rated Power, %:

Damping Factor, 8 ohms:

Input Sensitivity, Phono, mV:

Input Sensitivity, High Level, mV:

S/N, Phono, "A" Weighted, dB:

S/N, High Level, "A" Weighted, dB:

Phono Overload, mV:

Phono Frequency Response,
RIAA +—dB:

Freq. Response, High Level:

Mike Input Sensitivity, mV:

Max. Bass Control Range:

Max. Treble Control Range:

Low Filter Cut-off & Slope:

High Filter Cut-off & Slope:

GENERAL SPECIFICATIONS

Power Consumption, watts:

Dimensions, inches, W x H x D:

Net Weight, lbs (kg):

Nationally Advertised Value, \$:

SA-5760

165/205

0.08

0.10

60

2.5

200

78

95

250

0.2

20 to 20K

N/A

+12dB @ 50Hz

+10dB @ 10kHz

30Hz, 12dB/oct.

7kHz, 12dB/oct.

430

21½x67½x19½

50.7 (23.0)

800.00

SX-1250

160/200

0.10

0.10

30

2.5

150

75

90

500

0.2

10 to 50K

6.5

+10dB @ 100Hz

+10dB @ 10kHz

30Hz, 12dB/oct.

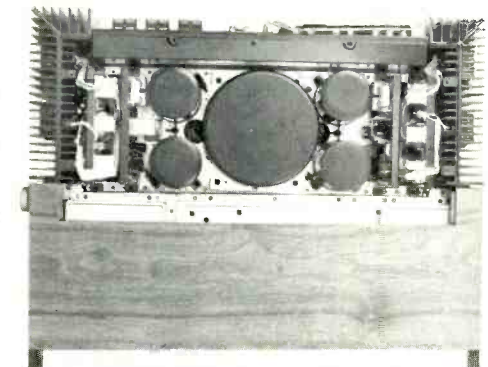
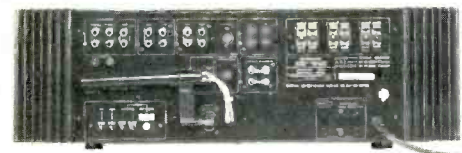
8kHz/12dB/oct.

650

217½x73½x18¼

64¼ (29.2)

900.00



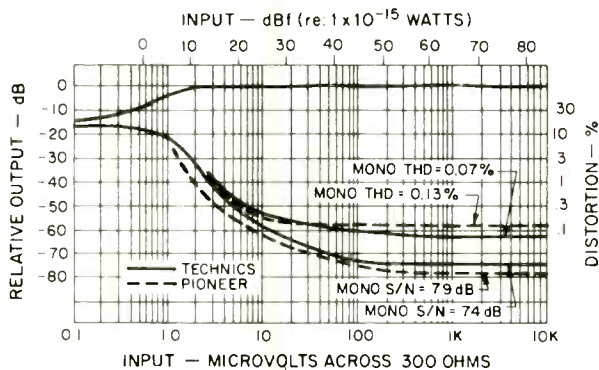


Fig. 1—Mono FM quieting and distortion characteristics for the Technics by Panasonic SA-5760 and Pioneer SX-1250.

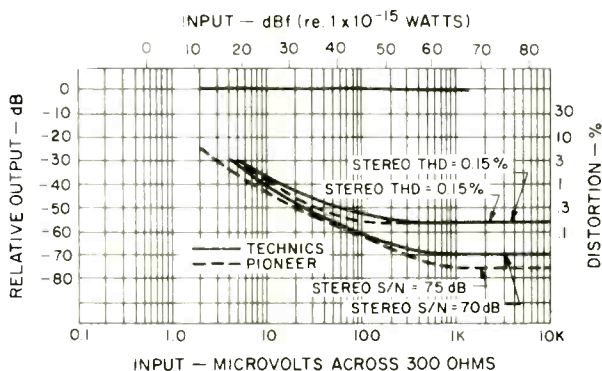


Fig. 2—Stereo FM quieting and distortion characteristics.

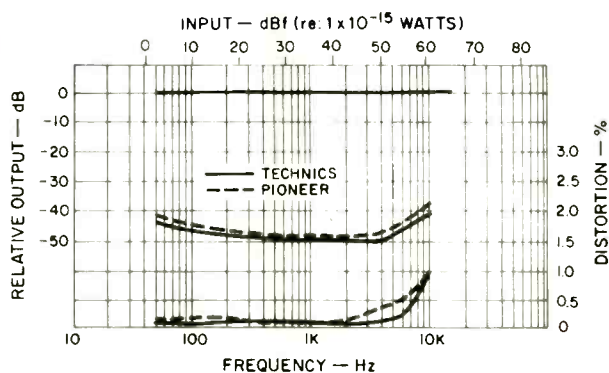


Fig. 3—Stereo separation and distortion versus frequency.

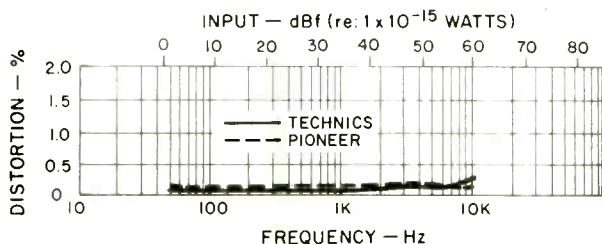


Fig. 4—Mono distortion versus frequency.

both the r.f. and mixer stages of the front end. The i.f. section (FM) uses six stages of differential amplification (combining three ICs plus discrete stages), along with two four-element "flat group delay" ceramic filters. Control signal path (associated with the reed-relay operated, interstation muting circuit) is completely separate from the main i.f. signal path. A high-linearity ratio detector of Technics' own design provides the required linearity for low-distortion recovery of the composite stereo or mono audio signals. Phase-locked-loop circuitry, combined with double-differential multiplex switching detection, is used in the stereo decoder section. The entire PLL circuit has been incorporated in an LSI IC. The audio stage, following the multiplex section, has been designed to withstand high levels of over-modulation without introducing additional distortion.

The switch identified as *Time Delay* on the front panel activates a Chebyshev-type, low-pass filter for the elimination of sub-carrier output products. Interestingly, in our subsequent tests we were quite pleased to note that even when this sub-carrier rejection filter is inserted (as for taping FM programs, where high amounts of sub-carrier output beating with low-frequency tape bias oscillators might produce beats in the recording), frequency response of FM remained virtually perfect out to 15 kHz, while carrier leakage was attenuated practically down to residual noise level. In our opinion, Technics might well have left the filter in the circuit at all times, since response was so accurate with it in, but they obviously wanted to provide the option of perfect response to beyond 15 kHz for the purists who might object to a deviation from 75 μ S curves by even a fraction of a dB at 15 kHz. All our tests were conducted with this special filter circuit in the "on" position, for with it off, sub-carrier outputs are too high in level (though, of course, inaudible) to make proper S/N and THD measurements. The AM circuitry is largely contained in a monolithic IC designed for that purpose, and includes a double tuned LC filter in the i.f. section.

The first stage of the preamp-equalizer circuitry is a differential amplifier with current-mirror load. A class-A amplifier follows, which in turn drives a single-ended, push-pull output circuit. Tone control circuitry consists of a three-stage, direct-coupled configuration with stabilized differential amplifiers in the first stage and single-ended, push-pull output circuitry in the final stage.

A differential amplifier is used as the first stage in each channel's power amplifier section, followed by emitter-follower stages. Pre-driver stages are constant-current loaded, class-A amplifiers, and a parallel push-pull design is used in the output stages, which are direct coupled. Power supply for the power stages features a pair of 22,000 mF capacitors for filtering the positive and negative voltages required in this output-capacitorless configuration. According to the manufacturer, the power transformer in this receiver alone weighs 22 lbs—and from the looks of it, we have no reason to doubt the figure.

Three forms of protective circuitry are incorporated in the SA-5760. A current limiter is activated in the event of a speaker short (or if load impedance drops below 2.0 ohms), and a relay opens, disconnecting speakers loads and lighting the front-panel alarm light. If a d.c. voltage (or a very low frequency a.c. signal) appears at the output, relays switch off all speakers, thereby protecting them. In addition, a five-second delay upon turn-on prevents "pop" noises in the output, permitting all voltages to stabilize before sound is heard.

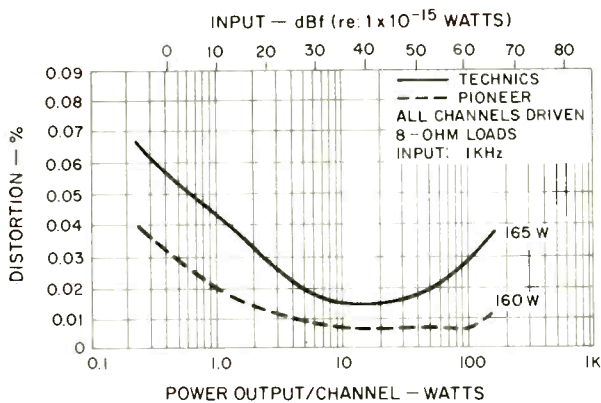


Fig. 5—THD characteristics (note expanded percentage scale).

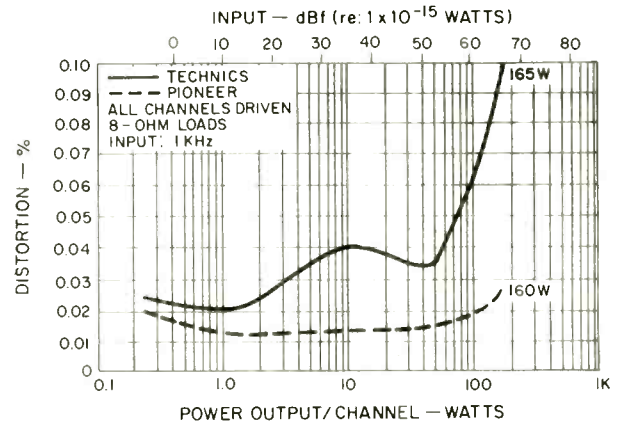


Fig. 6—IM distortion characteristics (note expanded percentage scale).

Circuit Highlights, Pioneer SX-1250

Three dual-gate MOS-FETs are used in the front end of the SX-1250 (two in the r.f. amp section, one for the mixer). A five-gang variable capacitor is used for FM tuning, while a three-section capacitor is used for the AM section. The front end and the i.f. sections are both shield-covered, as can be seen in the accompanying photo. Four two-element, phase-linear ceramic filters are used in the i.f. section. Active elements include two ICs for the differential amplifier and a large-scale integrated circuit. The stereo multiplex decoder section uses a phase-locked-loop circuit IC, along with a three-element, low-pass filter which reduces carrier products at the output. FM muting is accomplished by means of a reed-relay. AM circuitry is largely contained in a single IC.

A three-stage, direct-coupled, single-ended, push-pull circuit in the preamp-equalizer section uses a dual polarity supply and a differential amplifier. Output stage of this section operates in the class-A mode. Dual polarity voltages are used in the tone control section supply. The tone control section also includes a class-A circuit as the input-buffer amplifier and a flat amplifier which employs an FET. As for the power amplifiers, they employ a two-stage, class-A, differential amplifier, push-pull circuit with a current-mirror circuit in the pre-driver stage. A three-stage, Darling-ton, direct-coupled circuit is used in the driver stages, followed by a parallel push-pull circuit in the output stages. A toroidal-core power transformer has separate windings for the two stereo channel supplies, each of which is filtered by a pair of 22,000 mF capacitors.

Protection circuitry in the SX-1250 includes a power relay which helps prevent damage to speakers or transistors from power-related mishaps. The relay, located in the primary circuit of the transformer, helps to reduce the amount of in-rush current which would normally flow when the unit is first turned on. Heat sinks are located along the sides of the unit, near the rear of the receiver, and each is thermally connected to its appropriate and separate power amplifier module.

FM Performance Measurements

Major monophonic performance characteristics of the FM sections of the two receivers can be compared by examining Fig. 1. IHF sensitivity was identical for both units (1.8

μV , or 10.3 dbf) as against the greater claim made by Pioneer, 1.5 μV (8.7 dbf). The 50-dB quieting point was reached with a signal input of 4.0 μV (17.23 dbf) in the case of the Technics receiver, 3.3 μV (15.6 dbf) for the Pioneer unit. Mono THD reached a low of 0.13 per cent on the Pioneer, 0.07 per cent for the Technics receiver. Best S/N in mono was 74 dB for Technics, 79 for Pioneer.

Referring to Fig. 2, best stereo S/N measured 70 dB for the Technics unit, 75 dB for the SX-1250, while THD in stereo (at 1 kHz) measured 0.15 per cent for both tuner sections. The 50-dB stereo quieting point was reached with a signal input of 30 μC (34.7 dbf) for the Pioneer, 33 μV (35.6 dbf) for Technics. Capture ratio measured as claimed for both units (1.0 dB). Selectivity was exactly the 83 dB specified for the Pioneer, while in the case of the Technics it measured 82 dB, a bit better than claimed. We could not confirm readings for image, i.f., or spurious response rejection in the case of the Pioneer, since our measurement capability is limited to a 100 dB maximum for these specs. The i.f. and spurious rejection for the Technics unit measured at least 100 (again limited by our test equipment), while image rejection measured 85 dB, as claimed. AM suppression for both units was approximately 60 dB, as claimed.

Muting threshold for the Technics unit was set at 5.5 μV (20 dbf), while in the case of the Pioneer model muting threshold was measured as 2.4 μV (12.8 dbf). Switching from mono to stereo took place with an input signal strength of 5.0 μV (19.2 dbf) for the Technics receiver, while 2.2 μV (12.0 dbf) was required for the Pioneer. Stereo usable sensitivity for the Pioneer measured 3.3 μV (15.6 dbf), 4.0 μV (17.2 dbf) for the Technics model.

Figure 3 compares stereo separation and stereo distortion for the two FM tuner sections and shows the Technics receiver as having slightly greater separation and slightly lower THD in stereo over most of the audio frequency band measured. In Fig. 4, a plot of mono THD versus frequency, results are extremely close, though this time Technics is slightly ahead except at the extreme high-frequency end of the spectrum measured (10 kHz). On our test samples, calibration of FM on the Technics model was just about perfect, while in the case of the Pioneer unit, calibration was off by anywhere from 0.3 Mhz to 0.5 MHz, with worst error at the low end of the dial.

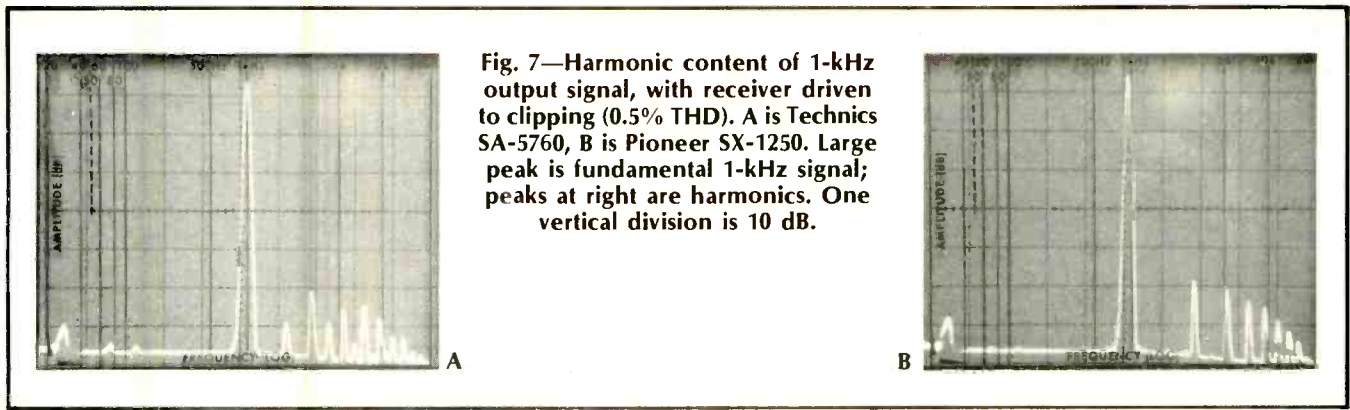


Fig. 7—Harmonic content of 1-kHz output signal, with receiver driven to clipping (0.5% THD). A is Technics SA-5760, B is Pioneer SX-1250. Large peak is fundamental 1-kHz signal; peaks at right are harmonics. One vertical division is 10 dB.

Amplifier Measurements

The power amplifier sections of each receiver easily met published specifications with regard to rated power output and harmonic distortion. The Technics unit delivered 188 watts per channel before the rated value of 0.08 per cent THD was reached, using 8-ohm loads, both channels driven, while the Pioneer delivered 180 watts per channel for its rated THD of 0.1 per cent. Figure 5 compares measured harmonic distortion within the specified FTC power range from 0.25 watts to full rated output. Note that the vertical axis has been vastly expanded in this figure (compared with our usu-

repeated for the Pioneer unit (Fig. 7B). We noted here that amplitudes of fifth, seventh and ninth harmonics were somewhat higher, but there were no significant contributions of even order (second, fourth) harmonics in the case of this receiver. Thus, while both receivers measured 0.5 per cent THD for this "clipping" condition, the composition of the distortion components is seen to be quite different between them.

Figure 8 compares harmonic distortion at full rated output (160 watts for the Pioneer, 165 watts for the Technics) at different frequencies, and any differences observed are primarily at the high end of the audio spectrum, where audible significance is doubtful.

It should be noted that since each manufacturer quoted power output ratings for 4-ohm operation, as well as 8 ohm, we did measure power output capability for these lower-impedance loads. Under 4-ohm loads, the Pioneer unit delivered 245 watts per channel for 0.1 per cent THD, while the Technics delivered 210 watts per channel for 0.08 per cent THD, both well within spec. IM distortion at rated output (4-ohm loads) for the Technics unit was a bit higher than that for the Pioneer at its rated output, but the differences were rather insignificant in our opinion.

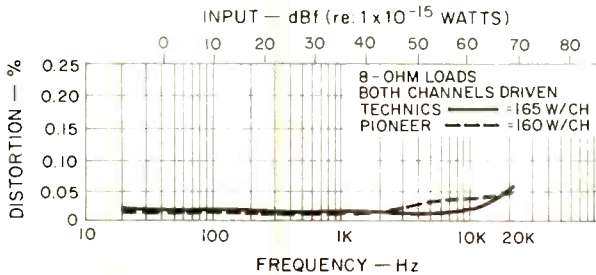


Fig. 8—THD versus frequency (note expanded scale).

Preamplifier and Tone Control Sections

Phono input sensitivity for both units were within fractions of a millivolt of each other, with 2.2 mV (for full output) measured for the Pioneer and 2.4 mV for the Technics receiver. Overload in phono (at 1 kHz) occurred with an input signal of 560 mV in the case of the Pioneer, 260 mV for the Technics, both well beyond published specifications. RIAA equalization was accurate to within 0.2 dB on both units from 30 Hz to 15 kHz, as claimed. The "A" weighted hum and noise in phono measured 78 dB for the Technics unit, 73.5 dB for the Pioneer. In high level service, hum and noise below rated output measured 85 dB for Pioneer, 92 dB for the Technics, while at minimum volume, residual hum and noise was down 98 dB below full output for the SX-1250, 95 dB for the SA-5760. Frequency response in which level inputs extended within 1 dB from 10 Hz to 53 kHz for the Pioneer unit, 10 Hz to 57 kHz for the Technics model. The microphone input on the Pioneer (Technics does not include a mike input on their model) had an input sensitivity of 5.0 mV for full output.

al graphs of these characteristics in other test reports), so that the minute differences in distortion between the two units can be read and interpreted. In like manner, Fig. 6 compares IM distortion readings at relevant power levels for both receivers and, in this instance, differences are somewhat greater, particularly at the rated power of each receiver, where the Technics unit made its published specification of 0.1 per cent, while the Pioneer unit did considerably better than claimed. Bear in mind that we are dealing with ultra-minute figures in both cases, since even at full output, rated IM is listed at 0.1 per cent for both receivers.

In an attempt to learn of any further differences between the power output section of each receiver, we next increased the power output of each until a THD reading of 0.5 per cent (well beyond clipping) was reached. Each output signal was analyzed by means of our spectrum analyzer which displays the various harmonics present in the output signal under these conditions. Figure 7A is a scope photo of the results obtained using the Technics receiver and shows even as well as odd harmonics present. Under the same test conditions, and with gain settings the same, the analysis was

Pioneer and Technics deal with the problem of tone control flexibility in different ways. The Technics unit provides two turnover frequencies for both their bass and treble controls, while Pioneer offers separate "main" and "sub" bass and treble controls. In Fig. 9 we see a plot of the range of the Technics bass and treble controls when the turnover points are set to 500 Hz and 2.5 kHz (Fig. 9A), while in the case of

the Pioneer, curves obtained using only the "main" bass and treble controls are shown in Fig. 9B. A second comparison of tone control action is shown in the scope photos of Fig. 10. In this presentation, the 250 Hz and 5 kHz turnover points were selected for the Technics model (Fig. 10A), while in the case of the Pioneer unit (Fig. 10B), the "sub" or secondary control action was plotted. It should be noted that additional tone control ranges and settings can be obtained for the Pioneer unit by combined use of the main and sub tone controls, whereas in the case of the Technics model, either low frequency turnover could be used with either high frequency turnover setting to create additional overall response range or tone control action.

Low- and high-cut filter response was plotted for both receivers, and results are shown for the Technics SA-5760 in Fig. 11A, while those for the Pioneer unit are displayed in Fig. 11B. Cut-off points and slopes are virtually identical for both receivers.

In the case of loudness control action, Technics elected to provide increasing bass compensation at progressively lower volume settings, while Pioneer opted for both bass and treble compensation as the volume control is lowered with the loudness circuitry selected. Plots showing response of these circuits from full volume (0 dB) to -50 dB are shown in the scope photos of Fig. 12A and 12B.

Using and Listening To The Receivers

When one considers the number of controls and features available at the front panels of both the Pioneer SX-1250 and the Technics SA-5760, one cannot but admire the formidable engineering talent that went into the design and layout of each of these products. The similarities in function are greater than the differences, but some differences do

exist. The multipath audible-null feature, present on the Pioneer, is a useful feature and helps to orient FM outdoor antennas for best reception. On the other hand, the tape monitor/duplicate switching arrangement on the Technics panel is easier to use and easier to understand with its clearly noted separate positions (on a rotary switch) for dubbing or monitoring. The microphone inputs on the Pioneer, not available on the Technics model, may appeal to some users, though the chief advantage (in our opinion) of having mike inputs on a central component, namely being able to mix mike with other program sources, is not possible on the SX-1250. Controls on both units are silky smooth and precise, especially those multi-detented master volume controls.

Need we mention that either receiver provides ample audio power for just about any loudspeaker system you might choose to use with it? In our listening tests you can bet that we were not able to drive either receiver into audible clipping (to do so would have left us with a pair of destroyed speakers, we suspect, since the ones we used to listen with were rated at 100 watts). While the Technics unit lacks the switchable de-emphasis feature of the Pioneer SX-1250, inexpensive onboard adaptors are available for making this transition, should you wish to add a Dolby decoder to your system in order to properly listen to any FM Dolby broadcasts in your area. Such an adaptor will just as easily plug into one of the two available tape monitor circuits of the Technics unit as into the specially labelled "adaptor" jacks included on the Pioneer SX-1250, though of course that would preclude permanent connection of two tape decks in the case of the SA-5760.

After much listening to available FM signals in our area, we could frankly detect no difference in program quality when heard using either of the two receivers, which sug-

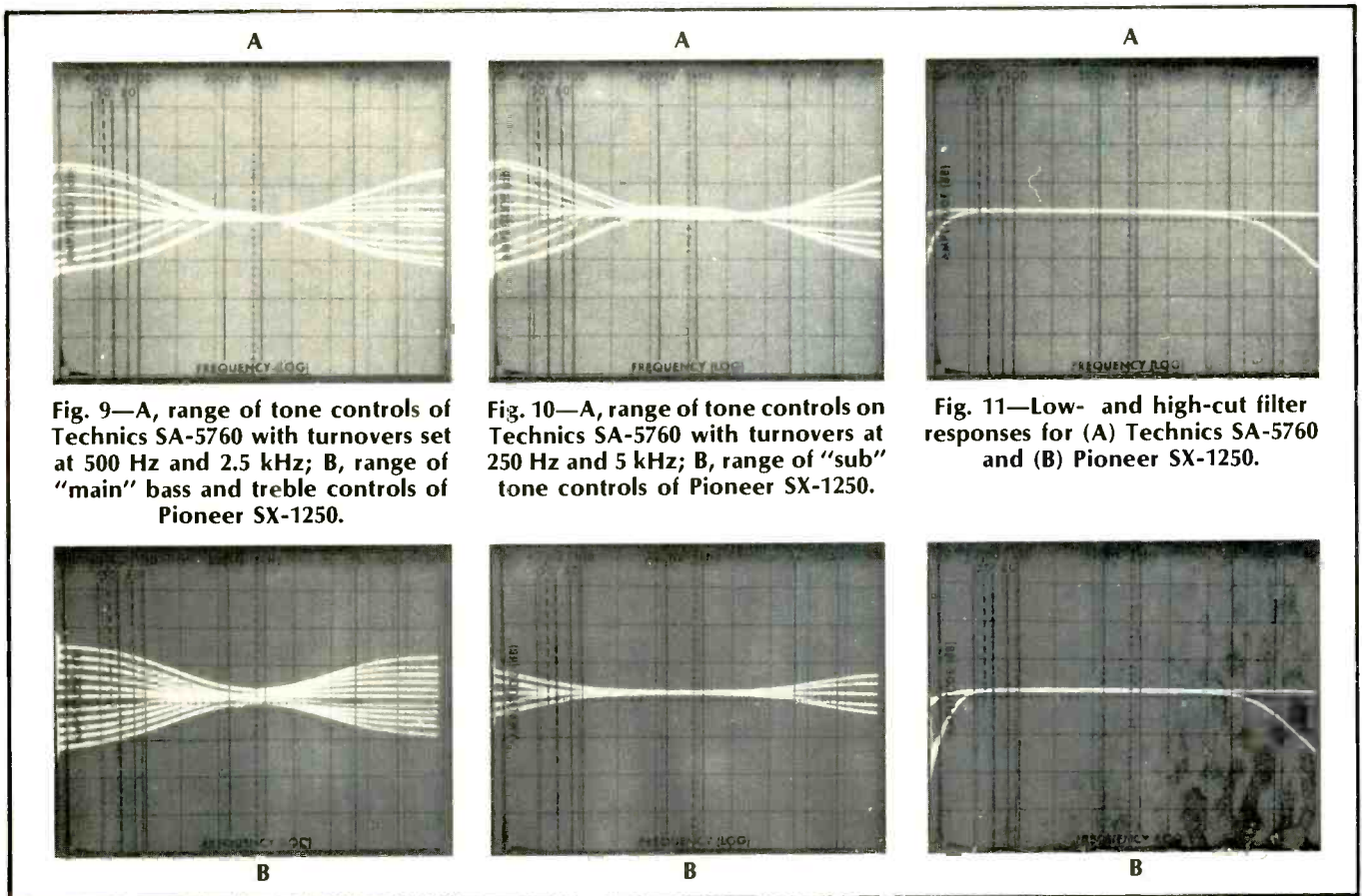


Fig. 9—A, range of tone controls of Technics SA-5760 with turnovers set at 500 Hz and 2.5 kHz; B, range of "main" bass and treble controls of Pioneer SX-1250.

Fig. 10—A, range of tone controls on Technics SA-5760 with turnovers at 250 Hz and 5 kHz; B, range of "sub" tone controls of Pioneer SX-1250.

Fig. 11—Low- and high-cut filter responses for (A) Technics SA-5760 and (B) Pioneer SX-1250.

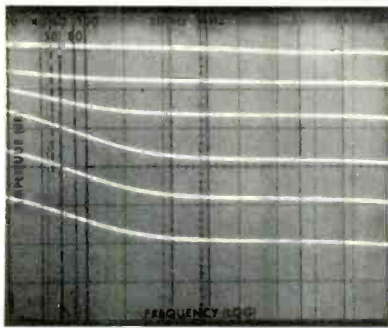
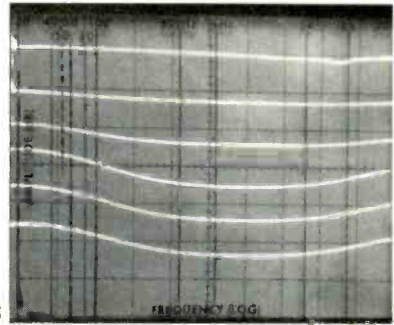


Fig. 12—Loudness control action for (A) Technics SA-5760 and (B) Pioneer SX-1250.



gests that both of them are probably being limited by existing station practices and program quality. As for phono reproduction, it was tight and uncolored in both cases, with no evidence of overload even when the most dynamically recorded discs we own were played. The phono impedance selector on the Technics unit does offer a means for changing high-end response of some cartridges to suit individual listening tastes and would also provide a proper "match" if you happen to own a CD-4 cartridge that you are using for stereo purposes.

As we suggested at the outset, our main purpose in evaluating these two high-powered receivers was to describe and measure the performance of two remarkable products which would have been impossible to produce just a few short years ago. Most readers will clearly remember when receivers broke through the "100 watt per channel" barrier (it wasn't all that long ago), and here we are with a well-

signed, excellently styled pair of receivers which, in four-ohm load operation, actually deliver more than double that amount of power per channel.

Those of our readers who judge the merits of a product strictly on "specs" can have a field day rereading the two manufacturer's published specifications as well as the figures obtained in our one-sample-of-each measurements and studies. Other, less technically concerned readers, interested in owning a high-powered receiver such as the Pioneer SX-1250 or the Technics SA-5760, would do well to audition both units in person, to evaluate their own response to control features by hands-on operation of each.

Leonard Feldman

Pioneer SX-1250

Technics SA-5760

Check 70 on Reader Service Card

Check 71 on Reader Service Card

One step nearer the reference

Model 104 aB.



Computer-based analysis has led KEF engineers to a significant advance in speaker performance – the acoustic Butterworth (aB) filter network. Now, replacing conventional filter circuitry in the renowned Model 104, it transforms performance with reduced coloration, increased stereo depth and imaging. A difference you can **hear**. An advance radical enough to justify making the new network available for replacement in existing Model 104's – see your dealer about this. Power rating is higher too – 100 watts program – with fuse protection for the tweeter. So KEF engineers have seemingly done the impossible – taken the superb 3 speaker system that reviewers already praised for its clean, uncolored 'reference' sound – **and improved it**. Model 104aB – one step nearer the reference – live sound.



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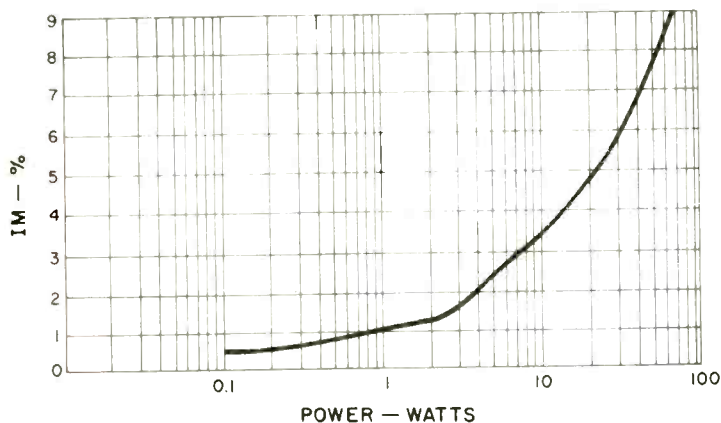


Fig. 10—IM of A4 (440 Hz) by E1 (41.2) when mixed 1:1.

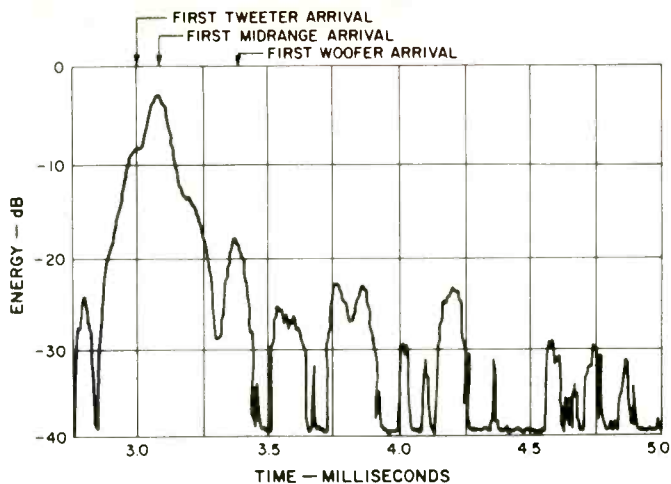


Fig. 11—Energy-time response.

my opinion the system lacks a super low bass and super top end. This speaker is rather inefficient, and when attempting to drive it at high levels, I found that I had to be careful—particularly with clean recorded material—in order to prevent lighting the clipping indicator on the Marantz 510 used to drive the system. This amp has a lot of clean horsepower, and I was afraid I might blow a voice coil trying to raise the sound level to moderate rock pressures. No apparent damage was done, though I would recommend protecting this loudspeaker with 2-amp, fast-blow fuses if high level rock is your thing.

The stereo image on orchestral music has a decent sense of lateralization of instruments, but lacked something of a sense of depth in my opinion. My impression was of an or-

chestra painted on a canvas stretched between the two systems. Female vocals appeared slightly back in the stereo image, with an apparent lack of midrange. When the sound level began to punch, the sonic impression I had was of gain compression pulling down the middle register relative level.

Piano music was definitely warm, with some lack of bite on loud passages and a slight dominance in the lower register. This sound will be pleasing to some, but it did not seem to me to be completely accurate reproduction of this difficult instrument.

Though not a star performer with rock material, the Celestion UL-10 does a creditable job on certain types of orchestral material.

Richard C. Heyser

Check No. 82 on Reader Service Card

IF YOU DON'T LIKE THE WAY YOUR SPEAKERS SOUND COVER YOUR EARS.



Nothing can improve the sound of a set of speakers better than a set of Sony ECR-500 electrostatic stereo headphones.

Because unlike most headphones, ECR-500's have an asymmetrical pentagon shaped diaphragm for wider and smoother frequency response, as well as greater bass response.

They have a push-pull driver system for higher sensitivity and less distortion.

They have a simple open-back design that lets you turn on music without shutting off the rest of the world.

But best of all, they have a price tag of only \$150.

Which might be a little more than you'd want to spend for a set of headphones. But it's a lot less than you'd have to spend for a good set of speakers.

SONY

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Check No. 36 on Reader Service Card

Harman/Kardon Rabco ST-7 Turntable

MANUFACTURER'S SPECIFICATIONS

Speeds: 33-1/3 and 45 rpm.

Adjustment: ± 5.5 per cent.

Rumble: -68 dB (DIN B).

Wow & Flutter: 0.04 per cent (NAB weighted).

Tracking Error: None.

Vertical & Lateral Friction: None.

Stylus Overhang: None.

Platter Weight: 2.4 lbs (1.1 kg).

Dimensions: 6 3/4 in. (17.1 cm) H x 16 1/2 in. (42 cm) W x 16 1/4 in. (41.3 cm) D w/dust cover.

Weight: 22.2 lbs. (10 kg).

Price: \$430.00.



74

The concept of tangential or straight line tracking for phono pickups has long appealed to engineers because of its many advantages, such as zero tracking error, lower tracking forces, and the fact that no anti-skating compensation is required. After all, records are cut this way, so it would seem a logical method for playback too. The Rabco straight-line turntable was introduced a number of years ago (the arm itself in 1968, if I'm not mistaken) and, although the design had merit, there were several minor problems. Since Harman/Kardon took over the project, it is obvious that a great deal of engineering skill and money has been invested, and the present ST-7 is a tremendous improvement over the early models.

The motor of the current model is a d.c. "Hall effect," brushless type and coupled to the turntable by a urethane belt. Another belt is connected between the turntable spindle and the tracking shaft, which drives the tonearm via an ingenious roller mechanism that automatically adjusts for variations in the groove pitch (see Fig. 1). When the tonearm is tangential to the record groove, the tracking roller is biased at an angle so that the carriage travels towards the center of the platter at approximately 0.17 in. per minute, corresponding to the average stylus velocity for cutting the groove on a record master disc. As the tonearm attempts to pivot in angle to track pitch variations, the angle of the tracking roller axis changes accordingly. This change in the tracking roller direction accelerates or decelerates the motion of the carriage to track the pitch of the groove. (Pitch, in this context, relates to the groove spacing, which is automatically increased when the master is cut to allow for heav-

ily modulated signals that would otherwise interfere with adjacent grooves.)

The tonearm has a counterweight at the rear, and the tracking force is set by a small sliding weight located at the front. Calibration markings are from 0 to 3 grams and the maximum cartridge weight is stated to be 15.5 grams with the heavy counterweight supplied. Parallel with the tonearm, and just to the right of it, is a control arm which is used to manually position the tonearm itself. A small bar on the front acts as a tonearm restraint when it is in the upper position. The cue lever which raises or lowers the arm is located at the right—almost on the edge of the unit and a dashpot mechanism slows the downward movement. The tonearm



with its control arm only begins to travel along the rotating bar when the stylus is in the record groove, and vertical friction is cancelled by a rolamite bearing with counter-rotating bands. Since there are no relative rotational forces between the pickup stylus and the arm, there are no friction problems to contend with here. At the end of a record, the photocell operates a switch which turns the motor off and causes the solenoid to lift the tonearm from the record.

Speed is electronically controlled, and at the left front there are two fine-speed controls with a strobe window. On the right is a touchbar using finger-operated contacts—a light touch is all that is necessary to select 33-1/3, 45 rpm, or to switch the motor off. A transistor sensing circuit is employed, and each function has a separate indicator light—blue for 45, green for 33-1/3, and red for off. The off mode applies to the motor only, and in order to switch off the electronics, it is necessary to use the manual switch underneath the front panel.

The turntable comes with mounting hardware for the phono cartridge, including several shims. Detailed instructions are given in the well-written manual which comes with a gauge to help obtain accurate alignment. The tonearm is adjustable in length, and after the cartridge is mounted and the arm length set, it can be balanced in the usual way with the tracking weight moved to the required position. As there is no anti-skating device, the tracking force can be set somewhat lower, a decided advantage.

For the initial tests, I used one of the new Goldring 900 SE cartridges which needs 1¼ to 1½ grams with high quality arms, but it was perfectly happy with one gram on the ST-7. The first test was for wow and flutter, and the combined weighted figure was 0.03 per cent, which was excellent. Rumble measured -63 dB using the ARLL weighting which is roughly equivalent to the -68 dB claimed with the DIN B weighting. Speed variation was ±5 per cent and was not affected by voltage line variations. Full speed was reached in less than a second—a tribute to the "Hall effect" motor and drive system.

Cable capacity is 75 pF to suit CD-4 cartridges, and the instructions suggest that extra capacitors be used to make up the manufacturer's recommended values and then connected to the proper terminals, if necessary.

Listening Tests

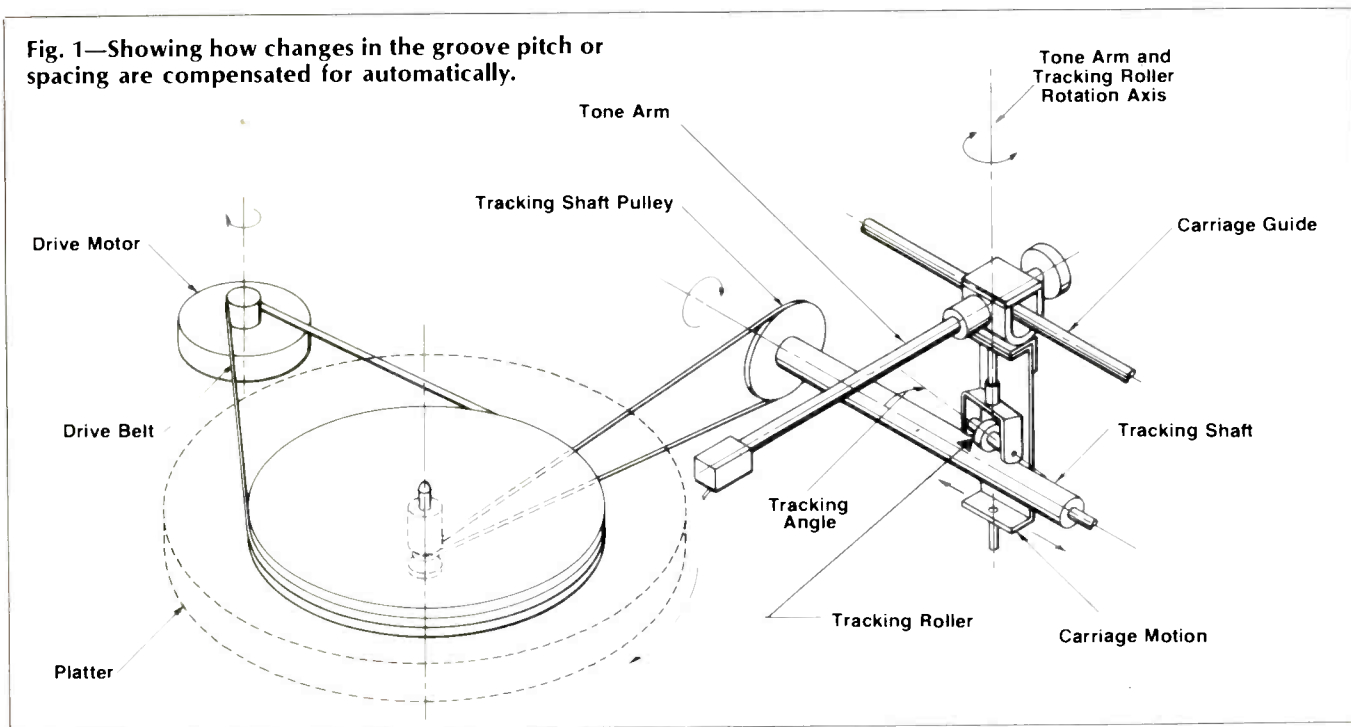
The ST-7 was connected to my audio system (Sony 2000 and Soundcraftsmen PE 2217 preamps, a Phase Linear 400 amplifier, and a two dynamic-electrostatic hybrid speaker systems) and used over a period of several weeks. In order to confirm that the theoretical reduction in distortion was audible, it would be necessary to have two absolutely identical cartridges and two identical records, but I did make some A/B comparisons using a Shure V-15 III and an ADC XLM cartridge in SME and Thorens tonearms, changing them around with the 900 SE in the ST-7. On occasion I could detect a slightly cleaner sound on the inner grooves of the record, but where ST-7 really scored was the way it played warped records. Some of these, especially CD-4 discs used in later tests (with the Shure M24H cartridge), were virtually unplayable on ordinary turntables, yet the ST-7 played them with ease.

The touchbar worked like a charm, and I must add that the unit was a real pleasure to use. Styling is very much a matter of personal preference, but most people who saw the unit were impressed by the clean lines and almost clinical appearance (I should mention that the turntable is made of satin-finished aluminum with matte-black fittings). Obviously, the ST-7 deserves a really top-quality phono cartridge for the best results, and it deserves more careful handling than some other turntables.

At \$430.00, the ST-7 is not at all cheap, but it is worthy of consideration by the most serious audiophiles and music lovers who want the best. I noted that the engineers and designers responsible for the turntable have their names inscribed on a plate underneath the unit—they can be proud of their achievement.

George W. Tillett

Check No. 83 on Reader Service Card



The column



76

How Late'll Ya Play 'Til?: The David Bromberg Band
Fantasy F-79007, two discs, stereo, \$8.98.

With this half live/half studio twofer, David Bromberg debuts on Fantasy, a far smaller label than his old home base at Columbia and, according to Bromberg, far more sensitive to his needs.

Bromberg has responded by delivering his finest recordings to date. His eclecticism has plenty of room to stretch out over the four sides. The music ranges from fiddle tunes and a couple of ragtime numbers to the Coasters' oldie *Idol with the Golden Head* and a couple cowboy songs, the traditional *Whoopie Ti Yi Yo* and Mary McCaslin's *Young Wesley*. Most of the live set is blues. There are two Robert Johnson songs, *Come On In My Kitchen*, performed solo, and an electric rocking *Sweet Home Chicago* plus David's own *Sloppy Drunk* and

his longtime showcase encore *Bullfrog Blues (Did you ever wake up...)*.

An absolutely incredible guitarist, David Bromberg has never been accused of having the world's greatest voice, though his warmth and enthusiasm more than make up the difference, and these qualities are what matter most about this new album. Steve Burgh, himself an alumnus of Bromberg's band, produced the album with David, and they have achieved a crystal clear, vibrant sound whether the song is a driver like *Danger Man* or a soft acoustic solo.

How Late'll Ya Play 'Til is the most important album for Bromberg so far. He really needed a powerhouse after the sleepy **Midnight on the Water** to debut properly on a new label. He's delivered it. Highly recommended.

M.T.

Sound: A

Performance: A

New Nation, Roderick Falconer
United Artists UA-LA651G, stereo, \$6.98.

Perhaps David Bowie didn't create the notion of selling a record on Bizarro Image, but he made it applicable to the singer/songwriter; and in his mold comes Roderick Falconer, whose cover seems to harken the fourth reich or something similar. Whether he truly believes in such marlarkey or whether it's all a ruse to sell records and fill up some space on his album cover, it's hard to tell, because his philosophies aren't spelled out in music. All you'll find on the album are songs much in the David Bowe caste (circa **Diamond Dogs**), but at this stage of the game it's rather ipso facto Cockney Rebel cum Roxy music. Matthew Fisher (ex-Procol Harumite currently producing Robin Trower's records) serves as surrogate Tony Visconti, but only on the album's cover does any soap boxing

take place. All you'll find on this well-recorded first album by Roderick Falconer (pretentious name—he looks like a gangster version of Charlie Watts) is a bunch of what McCartney might call silly love songs, perhaps a little more poetically inclined than John Denver but no less insipid. *J.T.*

Recording: B+ Performance: C-

Blackheart Man: Bunny Wailer
Island ILPS-9415, stereo, \$6.98.

Those connoisseurs of reggae might be familiar with the work of Bunny (Livingston) Wailer, who like Peter Tosh is a member of the Wailer family. The Wailers and ex-Wailers aid him on this record, his first solo outing, but Bunny himself is responsible for a great deal of the music on this album which he produced, composed, and sang on. The great thing about reggae is that one need not be an instrumental virtuoso to stand out—Bunny is primarily a percussionist (aside from his vocals)—but his vocal style is strong enough as is. Bunny Wailer's album is perhaps one of the most enjoyable reggae records released this year, along with the import of U Roy's **Natty Rebel**, the Marley single *Jah Lives*, and the Junior Mervin single.

Bunny's influences are obvious; the similarities between Marley and Bunny Wailer are noticeable but not annoying. The songs are extremely good and thoughtful, particularly the single *Rasta Man*. The arrangements stand

out as being intelligent and each track has an identity of its own. Without getting too rambly, this writer just wants to add that Bunny Wailer may be one of the most articulate artists making records today, and *Rasta Man* and *This Train* could be the two definitive reggae tracks of the year. *J.T.*

Recording: B+ Performance: A

Big Towne 2061: Paris

Capitol ST-11560, stereo, \$6.98.

Bigger Than the Both of Us: Hall & Oates

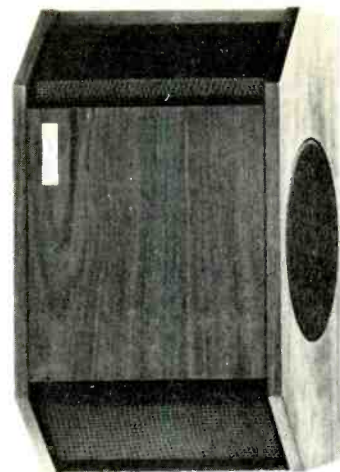
RCA APL1-1467, stereo, \$6.98.

Hard as it may seem to be totally original, it's even harder to be successful and totally imitative. Both of these acts have tried to come up with a music of their own by ripping off America's premier solo artist, Todd Rundgren, and the result is a smattering of small failures and occasional moments of musicality. But on the whole, there is nothing here to attract anything but the most marginal of audiences.

I do not condemn either general stylistic larceny or outright plagiarism—both of these have a position of esteem in the record industry (legitimized by the Rolling Stones, no doubt)—but if you steal, you should be both extremely good & extremely discreet. Paris is neither—bandleader Bob Welch has a requirement that all drummers in the band must have played with Todd, and the band itself tries to do something original with hardrock and special effects, but they don't get past their limitations. It seems strange that Welch can't see that if he'd only try to imitate himself (he had an extremely successful stint with Fleetwood Mac until they booted him out), he might meet with some success.

Hall & Oates are at least mildly talented as both songwriters and proven hitmakers, but they only manage to be interesting when they blatantly imitate Todd, at which they are extremely capable. They've both got his *Something/Anything* Philly soul technique and his more recent styles down pat, but when they're not doing that they lapse into disco-typed pap which doesn't exactly hold the listener. This is unfortunate, as their last album was extremely pleasant, evidence that they can do better. Perhaps someday they will rise to such heights again, but for now, these are Lost Americans. *J.T.*

Sound: B Performance: C+



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Rocket Cottage: Steeleye Span
Chrysalis CHR 1123, stereo, \$6.98.
Commoner's Crown: Steeleye Span
Chrysalis CHR 1071, stereo, \$6.98.

Steeleye Span has never given up its dream of putting traditional music in an imaginative, electric modern setting and reaching people. It's worked fabulously in England where they are one of their country's most beloved bands. In America they remain obscure despite a lot of groundwork and



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acclaim. The album previous to the newie **Rocket Cottage**, **All Around My Hat** (CHR 1091), was marked by a noticeably fresh orientation toward a more powerful rock sound centered around drummer Nigel Pegrum. One more step along that direction is **Rocket Cottage**. The sound, produced by Mike Batt, is layered and thick, sometimes dense, but aimed straight at the gut.

Steeleye's strongest suit has always been the claret voice of Maddy Prior, and she is properly featured, and well staged by some spooky ballads of revenge and swift justice. *Orfeo* is layered several Maddys deep. She is chilling on *The Brown Girl*, a pleasure on *The Drunkard*. Occasional off-setting vocals strengthen the album. The twin lead with Tim Hart on the audacious *Fighting for Strangers*, the wedding of a matched pair of conscription ballads, is a gem. Bassist Rick Kemp has a fine time with *The 12 Witches* which has a stunning group chorus. Lead guitarist Bob Johnson sizzles on *Sir James the Rose*. No Steeleye album is complete without a Peter Knight fiddle showcase, and the electric reel *Sligo Maid* and the acoustic *Nathan's Reel* are fine in this regard.

If **Rocket Cottage** is flawed, it is its occasional sonic dullness. The early American copies lack the lyric sheet which is an essential to an album like this. (If you have a lyricless copy, write to Chrysalis Records, 9255 Sunset Blvd., Los Angeles, CA 90069.)

Compare the sound of **Cottage** to the softer, clearer **Commoner's Crown**, only now released in America for the first time. That album's *Long Lankin* and *Little Sir Hugh* are still among Steeleye's best moments, and this has been my personal Steeleye favorite album for some time. Domestic release is welcome. With **Crown** came **Hark the Village Wait** (CHR 1120), the

album by the first Steeleye Span, plus **10 Man Mop** (CHR 1121) and the brilliant **Please to See the King** (CHR 1119) by the second Steeleye Span. Of these only **Please** has been out in America before, and that one's been out of print for years. Together they are a legacy to be proud of and highly worthy of your consideration.

Steeleye Span has always had a clear idea of what they are doing. Not too many bands do. M.T.

Rocket Cottage

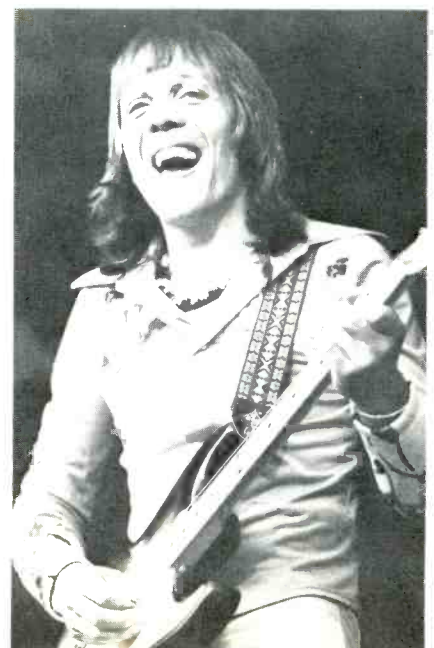
Sound: C+ Performance: B+

Commoner's Crown

Sound: B+ Performance: A-

Long Misty Days: Robin Trower Chrysalis CHR-1107, stereo, \$6.98.

Robin Trower is one of the few guitar heroes to emerge from hiding (in Procol Harum) during the Seventies, and with a string of hit albums to his credit and two fine musicians behind him, it's easy for the public to suddenly turn their back on him. It's also easy for the critics to accuse him of being an average guitar player who used the Hendrix electronic formula for turn-



ing mediocre riffing into commercially viable axework, and for using a discovery of his, singer-bass player Jim Dewar (who sounds remarkably like Paul Rodgers), to conquer the Americas. As a matter of fact, I was a bit disappointed with his records, aside from the debut album, as the subsequent albums seemed sluggish, repetitious, and bore the mark of a band which wasn't particularly interested in music but who kept on for the sake of momentum.

However, his new album is decidedly superior to the three which preceded it, and almost lives up to the standard of quality set by Trower's first solo album. Side two may trail off into the anonymous distance, but most of side one, particularly *Same Rain Falls* and *Long Misty Days*, holds up, as does the first cut of side two. Trower hasn't improved much as a guitarist during his solo career, but Jim Dewar's voice on *Sailing* and *I Can't Live Without You* displays remarkable talents. My only complaint is that Trower as a songwriter isn't nearly what he should be, and although the songs on the album are likeable, there's nothing of the calibre of *Man of the World* or even *Whiskey Train*. As a guitar hero, I can take or leave Trower—he's hardly a Page/Clapton/Beck/Hendrix—but he still makes fine records, this one better than any recent release by the aforementioned guitarists, save for Zeppelin's **Presence**. J.T.

Performance: A — Sound: A —

Long Misty Days: Robin Trower
Chrysalis CHR 1107, stereo, \$6.98.

Long Misty Days is a confident and strong rock album. It's a long, long time since the last studio Trower, **For Earth Below**, which was a bit of a let-down. **Long Misty Days** is nearly as strong as the brilliant **Bridge of Sighs**. The moody title song and a good version of the Sutherland Brothers' *Sailing*, most recently a Rod Stewart hit, lend balance to the album's core of overdrive rock & roll. *Same Rain Falls*, *S.M.O.*, and *Caledonia* sport mighty playing, at once physical and cerebral.

Robin Trower's music has no frills or silliness. It's good old-fashioned, straight-ahead stuff. Perfect, if that's your cup of tea. M.T.

Sound: A — Performance: B+

Some People Can Do What They Like:
Robert Palmer
Island ILPS 9420, stereo, \$6.98.

First off, Robert Palmer is a song stylist more than a singer or writer. His third album, **Some People Can Do**

What They Like, finds him consolidating his position. Nothing is radically different from the earlier albums. Palmer and producer Steve Smith are still right there in command and having fun; it shows.

Once again there is a killer cover of a Little Feat song, *Spanish Moon*, with backing by the Feat. In addition a new song by Feat's Billy Paine with Fran Tate, *One Last Look*, is a sizzler of an album opener. The old Bellafonte calypso number *Man Smart Woman Smarter* gets a clever rhythmic updating, and the Don Covay oldie *Have Mercy* gets a rocking treatment that won't quit. All that's on the first side.



Palmer's new originals are an extension of the soulful groove he set for himself on **Pressure Drop**, the previous album. *Keep in Touch*, *Gotta Get a Grip on You (Part II)*, and the title song all have hooks that suck you in like a vacuum cleaner. The only real distraction is *Off the Bone*, two-and-a-quarter minutes of non-infectious silliness.

The Steve Smith-Phill Brown production-engineering team, that has built all three Palmer albums, has done an exemplary job. Smith's juggling of the Little Feat members with Palmer's road band and some serious studio cats completely avoids the tempting trap of sameness without getting disjointed.

It's aptly named. Some people do get to do what they like. Robert Palmer's right there and having a good time just like he wants to. M.T.

Sound: B+ Performance: B



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Did You Miss...?

Warren Zevon: Warren Zevon
Asylum 7E-1060, stereo, \$6.98.

Warren Zevon and Jackson Browne are old friends. In concert Jackson has often slipped in a Zevon number for some time now. So when the opportunity came up, Jackson got his buddy a contract, rounded up the gang, and brought them into the studio and produced the record himself.

Realizing the very real limitations of Zevon's voice, Browne has given him what I call The Treatment which is sculptured arrangements to emphasize the song at its most attractive, with superior and considered playing. Very little gets left to chance that way. The Treatment falls apart completely if the material is weak. Fortunately, Zevon's sense of the bizarre has produced a bag of genuinely good songs.

Frank and Jesse James retells that familiar story through the unfamiliar point of view of the historical and political forces that made them outlaws. *Poor Poor Pitiful Me* borrows the great guitar riff of the Beatles' *It's All Too Much* to relate the terrible fate of a fellow who can't help attracting over-sexed women. *Carmelita*, which Murray McLauchlan once recorded, is a moving story of a dead-ended junkie. *I'll Sleep when I'm Dead* is another powerhouse rocker that peers over the edge of madness. *Mohammed's Radio*, a song of delicious ambiguity, is one Jackson has used live and the recording strongly bears that mark. It could almost be a Jackson Browne outtake.

Admittedly Zevon's album resembles a Jackson Browne album. The song structures and arrangements can't help but raise ghosts, despite how obviously thought out it all is. The sound is fine, nearly as clean as Jackson's own work.

The true stars of **Warren Zevon** are the songs themselves. Zevon's peculiar slant on life could only have come from Southern California. His album is at once direct and complex, occasionally simple and confusing. The songs will haunt you. I'll sleep when I'm dead.

M.T.

Sound: B

Performance: B-

Trick Of The Tail: Genesis
Atco SD 36-129, stereo, \$6.98.

Voyage Of The Acolyte: Steve Hackett
Chrysalis CHR 1112, stereo, \$6.98.

With the departure of vocalist Peter Gabriel, an apparently huge gap was

left in Genesis. The eventual announcement of the group drummer as new vocalist brought a collective "Huh?" from fandom. If ever disaster seemed imminent. . . .

No record will answer doubts about stage presence, but on **Trick of the Tail** Gabriel isn't missed. Collins sounds similar enough not to alter the group's sonic thrust and carries on most credibly. With the group's instrumentalists intact, the musical thrust is not damaged an iota. Actually the ensemble playing, Genesis' strongest suit, is at its most impressive on the new album.

As for material, where **The Lamb Lies Down on Broadway** felt over-extended, a considered economy is evident throughout **Trick** as the band returns from epic length ideas to songs. And the new songs are a classy bunch, too, as good as any Genesis collection yet. With **Trick of the Tail** Genesis adroitly steps back from the abyss triumphantly.

With the long layoff in search of a singer, guitarist Steve Hackett got itchy and made his own album, a handsome job from Kim Poor's cover paintings on it. Hackett's music is classically inclined, ranging from the soft medieval *Hermit* to the power-swelled Wakemanesque *Ace of Wands* and *A Tower Struck Down*. *Shadow of the Hierophant* is a beautiful, Mahler flavored suite with a lovely vocal performance by Sally Oldfield.

Hackett's guests on **Acolyte** include fellow Genesis members Mike Ruth-erford and Phil Collins for bass and drums, brother John Hackett on flute and Arp synthesizer, plus coproducer John Alcock on sundry keyboards.

The key to Hackett's album is the studied grace all through. **Voyage of the Acolyte** is a good companion to the new group effort, a bit more serious than the pungent wit of Genesis allows in the group's own context, but nonetheless highly rewarding.

Michael Tearson

Genesis

Sound: A Performance: A

Hackett

Sound: A Performance: B+

Presence: Led Zeppelin

Swan Song SS 8416, stereo, \$6.98.

I get to feel ambivalent as hell about new Led Zeppelin releases. They invariably get delayed weeks, then months, so that I increasingly anticipate the actual release so much that

when I finally hear it I feel critically constipated and unable to react at all.

Physical Graffiti, for example, was such an impossibly full album (and a double at that) that only after several months I accidentally discovered that I actually liked about ¾ of it a whole lot. And that by a so-called super-group which has never exactly inspired devotion from me.

However, there's no mistaking **Presence**. It contains some of the hardest rock ever recorded by humans, beginning with the epic-length opener, *Achilles Last Stand*. The album then is

a full-tilt guitar onslaught that never lets up until the closing epic-lengther, *Tea for One*. *Achilles* is simply glorious, like **Graffiti's Kashmir**, a long track that doesn't sound its length. Next, *For Your Love* (not the Yardbirds' oldie) starts like *Whole Lotta Love* and rocks at least as hard. The short *Royal Orleans* is closest to the craziness of the **Houses of the Holy** album.

Turning the record over, *Nobody's Fault But Mine* continues the grand Zeppelin tradition of ripping up traditional blues songs and transforming

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Also unlike the undergrounds, The Audio Critic has the professional depth (and capital) to operate its own, in-house laboratory facility, complete with spectrum analyzer, highly specialized signal generators and other sophisticated test equipment. These are used as an indispensable check on

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One year's subscription to The Audio Critic (six issues) costs \$28, first-class mail only. That's cheaper than any Wall Street advisory service of comparable scope and quality. For overseas airmail, add \$5.

Volume 1, Number 1, the January/February issue, features a giant survey of preamplifiers with pretensions to state-of-the-art. They include:

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- Epicure Model M-4
- GAS Thaedra
- Luxman C-1000
- Luxman CL-35/III (tube)
- Luxman CL-350
- Marantz 3600
- Mark Levinson JC-2 (A and D)
- Paragon Model 12 (tube)
- Quad 33
- Rappaport PRE-1
- Stax SRA-12S
- Yamaha C-1
- Yamaha C-2

All of these were tested under the same roof over the same period of time, with each unit instantly available for comparison in either the listening room or the laboratory. (Who else can make that statement?)

Shorter but equally interesting articles on speakers, tonearms and other equipment are also in the same issue.

The press run of The Audio Critic is, for the moment, still limited.

So, if you don't want to miss Volume 1, Number 1, send your \$28 subscription for the first six issues today to The Audio Critic, Box 392, Bronxville, New York 10708.

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them to their own ends, like *Custard Pie* of **Graffiti** which is *Drop Down Mama* in a flimsy disguise. *Candy Store Rock* and *Hots on for Nowhere* are a pair of typical Zep rockers, funny in an uncannily kinky way. Only the slow blues *Tea for One* fails. Without the spark of a *Dazed and Confused*, *Tea* somehow manages to sound twice its length.

In addition **Presence** features one of Hipgnosis best packaging jobs ever.

Presence breaks no new ground for Zeppelin as *Kashmir* did. What it is, is a return to blistering blues-rock for which Zep is the best there is. Those who will like **Presence**, previously liked **Led Zep 2** best.

Michael Tearson

Sound: A — Performance: B+

Firefall: Firefall

Atlantic SD 18174, stereo, \$6.98.

Firefall should be a natural. The band sports two fine singer-song-writer types, ex-Flying Burrito Rick Roberts and newcomer Larry Burnett for starters. Add the lyrical bass player from Spirit Mark Andes, ex-Byrd and Burrito drummer Michael Clarke, and Jock Bartley, who's been Linda Ronstadt's lead guitar, and you have a band with impeccable credentials.

Thus, it's all down to the material which should be no problem. Fresh off a Stephen Stills' tour, Roberts brought a fascinating new set of lyrics to Stills' *It Doesn't Matter* plus a couple fast ones in *Mexico* and *Livin' Ain't Livin'*, plus a pair of nice ballads. Burnett, with a slightly broader approach than Roberts, is alternately more C&W and R&B. His *Cinderella* is a polished gem of a song of a marriage trap snapped shut by a son. *No Way Out* has about the hottest playing on the album. Larry also supplied a pair of ballads.

Most of all Firefall is a self-contained if not fully jelled band with solid comraderie. If they can stick together, they would be a sure bet for some of the best late 70s music. Their debut is not super, but pleasant and not yet distinctive. Give them time.

Michael Tearson

Sound: B — Performance: B —

Jailbreak: Thin Lizzy

Mercury SRMI-1081, stereo, \$6.98.

With **Jailbreak**, Thin Lizzy had better finally make a dent in America. They are not likely to get a better shot. Their previous album **Fighting** had some great songs and playing but sank virtually without a trace. On **Jailbreak**

writing and performance are again superb; even the comic book art is spot on.

Phil Lynott's songs tell street stories. The influence of Bruce Springsteen is obvious both in Lynott's phrasing and phrases. Fortunately Phil continues to grow, so the music generally does not appear blatantly imitative. Time has given Thin Lizzy strength and on the new album they play for all they're worth. *Jailbreak*, the opener, is stunning for sheer power despite some dubious Clockwork Orange mayhem politics that date even beyond *Riot in Cell Block #9*. *Running Back*, *Romeo and the Lonely Girl* and *Emerald* are clever, nearly coy bits with a trickle of a smile just hidden. *Cowboy Song* is a Dublin-based hard rock view of the American TV cowboy and says a lot about heroes.

Most important, Thin Lizzy sound young and sharp. With a vitality not unlike the first Bad Company album, they grab out for what is due them. Actually not making it big fast has helped them. **Fighting** was promising. **Jailbreak** is the goods.

Michael Tearson

Sound: A — Performance: A —

The Royal Scam: Steely Dan

ABC ABCD 931, stereo, \$6.98.

Steely Dan has now totally transformed from a performing band to the nom-de-record of Walter Becker and Donald Fagen. **The Royal Scam** is a fine record beautifully produced, engineered and performed.

Becker and Fagen's sense of the bizarre and absurd is undiminished. Their flair for tricky tunes with attention riveting lyrics is at its peak. Consider *Everything You Did*, a tale of infidelity, which opens with "Where did the bastard run?" Or *Don't Take Me Alive*, the plea of the bookkeeper's son, trapped berserko on a keg of dynamite. Or *Kid Charlemagne*, the tribute to a chemist who manufactured illegal substances, possibly the legendary Owsley since the San Francisco and fame references fit. There are some best love songs, too. The strength is in the potent and enticing scenarios that Becker and Fagen construct.

Their music relies on a keen sense of the ominous that dates all the way back to *Do it Again*, their first hit. On **The Royal Scam**, Steely Dan balances adroitly between raunch and art, humor and pathos. I don't think I'll be tired of the album for quite a while.

Michael Tearson

Sound: A — Performance: A —

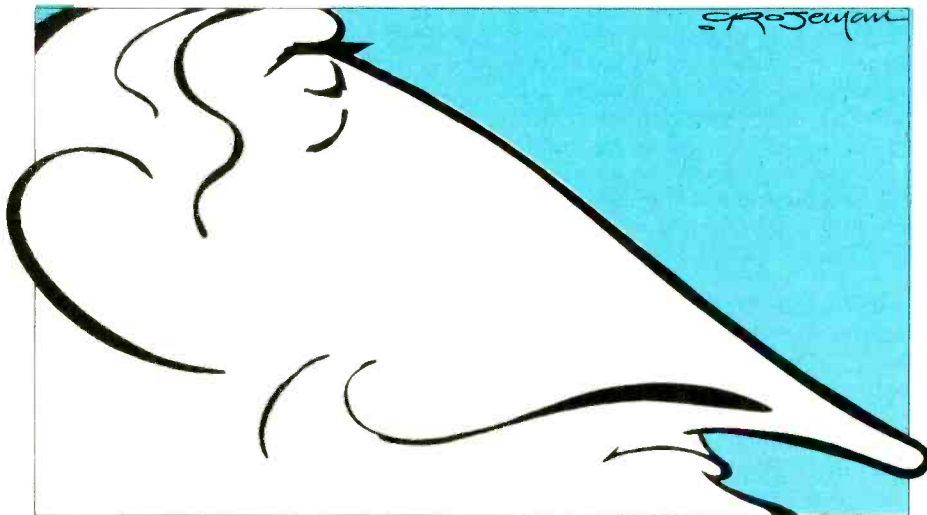
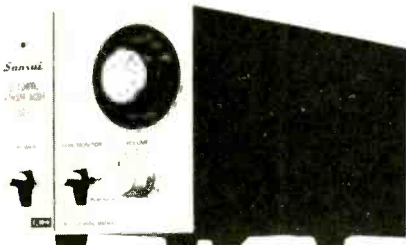
Classical reviews

Edward Tatnall Canby

If a record company is judged by its musical product, then a quadraphonic "system," even more so, ought to be judged on the same practical basis—*what is there to listen to?* Beyond the technical arguments, most home listeners ask this question first of all. In the end, for each of us, the best new system is always the one that offers us the most suitable catalogue of audible goodies.

The QS hardware people (Sansui) are not in the record business, a disadvantage they recognized early. In the classical disc area, QS snagged an important asset in Vox, a not-so-small classical label that has been active since even before the LP record. The Vox QS discs were "single inventory" long before Columbia's recent conversion of its classical from dual release. (But until a *major* corporate power came over, the smaller companies could not force this issue.) Thus, the QS discs have proliferated without the impossible burden of a double release, stereo and quadraphonic separately, and the large number of Vox QS items is proof of the importance of this policy. There are enough Vox QS records to stock any classical home library with worthwhile new music for a long time to come.

I have been exploring a group of these, as stereo and now again as played through the latest Sansui QSD-2 decode equipment (see photo) into my own four channels of playback; I am impressed and delighted beyond expectation. A lot of interesting music, Mozart, Baroque, a good many big Romantic works, Ravel, all performed competently, or better, all beautifully recorded and well served by the QS decoding. Could there be a better argument?—E.T.C.



Ravel: All the Works for Orchestra. Minnesota Orch., Scrowaczewski. St. Olaf Choir.

Vox Box QSVBX 5133, 4 discs, QS/stereo, \$10.98.

At a super-bargain price, four discs for the usual low price of three on Vox, this album is a buy of buys. The music is played with the typical American-style polish and technical perfection of detail, the recording (Marc Aubort) is clean and shiny, and the QS decode gives a startling surround ambience, yet without undue emphasis on sides and rear. Price or no, I would rate this as a real "hi-fi release" and a fine test for those curious to try QS for themselves. (Note, too, that for 95 per

cent of musical listeners, an SQ decoding will produce perfectly acceptable results—and the same for any sort of enhancement arrangement. Musically, there isn't *that* much difference.)

All the familiar works are here, *La Valse*, *Bolero* and so on, plus a lovely complete *Ma Mere L'Oye* (Mother Goose), the entire ballet score, and a number of little known short items as an extra fillip. The unspellable conductor is now a mature pro, a lot better than when he first took over at Minneapolis in the early 60s. I still find his rhythmic sensibilities a bit weak, though not disturbingly so. He misses some of the inner drive.

Tchaikovsky: Francesca da Rimini, Op. 32; Hamlet Overture, Op. 67a. Utah Symphony, Abravanel.

Vox Turnabout QTV-S 34601, QS/stereo, \$3.98.

Tchaikovsky: Complete Orchestral Music, Vol. 1 The Symphonies; No. 1 ("Winter Reveries"), No. 3 ("Polish"), No. 5. Utah Symphony, Abravanel.

Vox Box QSVBX 5129, 3 discs, QS/stereo, \$10.98.

Vox supports two labels for its singles in addition to the multiple-disc Vox Box line, as per above; Turnabout is the low-price disc, *Candide* a dollar more—but quality of recording isn't necessarily involved, nor the rerelease of oldies á la "legendary" Columbia.

Probably a matter of acclaim and contract costs, I'd guess! The Utah Symphony is extensively available on Vanguard (all the Mahler symphonies, for instance...) and shows much the same qualities here. Good European-background playing under Abravanel, no eccentricities, a variable amount of drive and intensity, not always predictable—maybe it depends on the musicians' feelings in Salt Lake City, which is a long, long way off from, say, Moscow.

The sound is predictably vast—is there any other sort in Utah?—and recorded by Marc Aubort, cleanly and at a good distance. QS gives its usual dramatic surround effect. Curious, as

in good stereo, I seem to hear it even in another room, as through a door. Very workable versions of the symphonies, including here the ultra-familiar *Fifth* and two of the early ones, more verbose and just as big as the later music. On the single disc, two of the numerous and seldom-head separate orchestral pieces make an interesting contrast. *Francesca*, an earlyish work not long after the superb early *Romeo and Juliet*, strikes me as top-grain music, full of loud tragedy, a bit thick but with notable themes. *Hamlet*, on the other hand, is a pompous and heavy-handed sequel to *Romeo*, with all the outward trappings and very little inner light. It happens with Tchaikovsky.

Magnificent Moller! Organ Power Pizza. Assorted organ artists.

Doric DO (Q) 1502, stereo/quadrasonic, \$5.98.

This QS recording isn't classical (What! Classical pizza?) and it isn't Vox, the QS classical label, but it ought to be thrown in on general principles. Such an enormous noise, like the biggest, thickest, juiciest pizza you ever got to eat. The Moller, of course, is a theatre organ in the Mighty W. category and just as fancy as far

as I can tell. It is built into and around an actual pizza joint, a big one (naturally) with rows of long deal tables and benches for seating, the organ and appurtenances (grand piano) up front and, presumably, the pizza ovens down behind. All this, where else but California, San Diego to be exact.

Need I say more? This kind of dizzy organ music definitely gets under my classical wire, along with rival Wurlitzer. Try it after too much Tchaikovsky, and be sure your pizza is decoded.

Italian Baroque Wind Concerti. (Marcello, A. Scarlatti, Stradella, Sammartini.) Southwest German Chamber Orch., Angerer.

Vox Turnabout QTV-S 34573, QS/stereo, \$3.98.

Four good solid Baroque-type concerti on this record, with solo oboe, two sizes of solo recorders and a solo trumpet—the trumpet will knock your ear out starting on side two, though its glory is dimmed by a devilish little pre-echo that gets there first. Solidly informed German performing, and who knows better?—the soloists are all excellent, but notably the recorders as played by Helmut Hucke. Amazing how much talent lurks around in places like the German

South West! The sound of all these works is vigorous and fat, but the cutting of the disc is pretty heavy (note that groove echo) and may cause you a bit of playback trouble.

Glazounov: Violin Concerto; Meditation for Violin & Orch. Ruggiero Ricci; Philharmonia Hungarica, Peters.

Glazounov: Piano Concerto No. 2. Michael Ponti; Westphalian Symphony, Recklinghausen, Landau.

Vox Turnabout QTV-S 34621, QS/stereo, \$3.98.

Two recordings on the one disc, three big pieces by the late-Romantic Russian who sounds like proto-Sibelius and didn't stop composing until well after the Soviets took over; he died incredibly in 1936. The music is, shall I say, discursive; a better term might be long winded. But it does have all the features of big Romanticism in the orchestra and the solo parts, plus some pretty darned good big Russian tunes of the old-style sort. The record features two very good European local orchestras (not that they don't get around...) and two fine soloists. Ricci, a mature violinist who in 1929 was a boy prodigy and sensation, remains an impeccable crafts-

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man with that big, rosy sound we used to hear from Kreisler and Heifetz and many more—but no longer. I could listen to Ricci play *anything*. Ponti is an international jet-tour celebrity though not so well known over here as he should be, another big pro on his own instrument. So—vintage Glazounov under the best of musical auspices. It's still pretty discursive.

Saint-Saëns: Piano Concertos No. 2, No. 5. Gabriel Tacchino; Orch. of Radio Luxembourg, De Froment.

Vox Candide QCE 31080, QS/stereo, \$4.98.

Now here is a first rate recording and a typical Vox job, at that company's best. A "local" European orchestra, but radio orchestras in Europe are often the best available. A pianist who is superbly musical, utterly fluent, in the accurate French manner, minus any tendency to pound and to show off à la Tchaikovsky Competition. He reminds me of his compatriot (French) Philippe Entremont. (Tacchino is from Cannes, near the Italian border; hence the name.) But best of all in this recording is the astonishing intensity and cooperation between the pianist and the orchestra, as coordinated by Louis De Fro-

ment on the podium. For once, Saint-Saëns sounds important, not just florid. A really memorable pair of playings.

Grieg: Works for Orchestra, Vol. 1. Utah Symphony, Abravanel. **Vox Box QSVBX 5140, 3 discs, QS quadr/stereo, \$10.98.**

Vox's vast box collections continue to appear, a unique source of "complete" everything, and mostly fine bargains. Utah has been a Vanguard orchestra; it sounds spacious and plays with style here, too. Can't list all the works, all you ever heard, and more to come. Again, the sonics via non-logic "plain" QS matrix decode (Sony 2010 "R-MTX") are really excellent.

Barenboim Conducts Elgar. English Chamber Orch. **Columbia M 33584, stereo, \$6.98.**

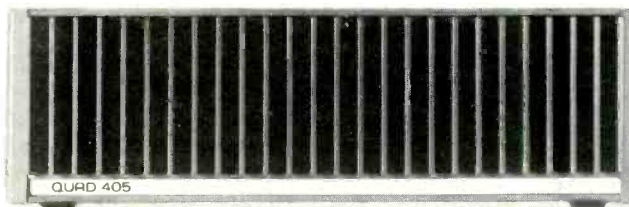
The Edwardian music of England's Elgar is beginning to come back hereabouts (it's always been around in England) as listenable material! He can be awfully corny, a la *Pomp & Circumstance*, but there are lovely melodies, suddenly interesting harmonies, now that we get into the meat. Barenboim is headstrong; the music sounds passionate but not well re-

hearsed—normal for today. Its corners and angles aren't sharp.

Liszt: Les Preludes; Two Episodes from Lenau's Faust. Westphalian Symphony, Recklinghausen, Landau. **Vox Turnabout QTV-S 34597, QS/stereo, \$3.98.**

Siegfried Landau used to be near New York—but not quite in it. He directed the Brooklyn Philharmonia, which—to a Manhattanite—is as far away as Chicago, or maybe Dallas. But Landau is good and has found his rightful place back in a more appreciative Europe. This is the best tailored and shaped big Liszt I've heard for a long, long time. Every detail is carefully shaped, the tensions are understood, and never overplayed, nor is the rather old-fashioned sound of the big Liszt climaxes taken other than seriously and professionally. Result—the music doesn't sound old-fashioned. It shouldn't. *Les Preludes* was a seminal and important work in its early Romantic time, and even a generation ago it was on every music-appreciation list of musts. The addition of two seldom heard versions of the Faust story in music is a worthwhile plus.

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Mozart: Symphonies No. 40 in G Minor, No. 41 in C "Jupiter." Mozarteum Orchestra, Salzburg, L. Hager. Vox Turnabout QTV-S 34563, QS/stereo, \$3.98.

You'd think that in this very seat of the Mozart tradition, the so-called Mozarteum in Salzburg where Mozart was born, the performance of his music would be impeccably traditional. It often is—the Mozarteum has been recording for years. And sometimes it is superb.

Sorry, not here. Must be this particular conductor. The tempi are soggy, for my ear, the mood Romantic in a mushy sort of way, the winds and woodwinds greatly played up (recording?), the strings, the very soul of the music, curiously weak and ineffective. I didn't really think the recorded sound itself was that good, either. Well, once in awhile—and, of course, I might be wrong. As Vox will surely maintain!

John Bunch Plays Kurt Weill Chiaroscuro CR 144, stereo, \$6.98.

I took this for classical. In my book, Kurt Weill is classical—he and George Gershwin, out of the 1920s. No—not Cole Porter, or Irving Berlin. They wrote tunes. W. and G. did much more. Anyhow, someone sends me this record, and it looks classical, like Badura-Skoda Plays Schubert or Rubinstein Plays Brahms. So I'll try it. Anybody who plays, or sings, Kurt Weill has my attention.

Well, it isn't classical at all. It isn't Weill. This is a jazz record. Points up the difference quite neatly.

John Bunch plays his own jazz. It is his music we hear, from beginning to end, his piano stylings, improvisations, memorized compositions (who knows which?). The only Weill we get to hear is, as in so much jazz, merely the basic tune on which each piece is elaborated. The tunes aren't even played straight out, for the most part. Woven into the jazz texture.

True, the Bunch harmonies are of the smoky, acrid sort, all bittersweet dissonance, which is not unlike the Weill harmony. So there is an affinity. But, for my ear, Bunch is too much. After awhile, it all begins to get gummy and repetitious. Not so when Weill is heard on his own!

I think I know the answer. In some sort of club, there would be a rising murmur of conversation riding above this Bunch jazz, and probably right for it, the two making a felicitous blend. After all, even Mozart wrote music for

that kind of situation and his, too, needs a hum of conversation to put it where it sounds comfortable and right. Some jazz just ISN'T classical.

Moral: NEVER try to make it so. Kill it. Let jazz live its own life, in its own surroundings.

Salon Classics for Piano Duo. Paul Hersh & David Montgomery. Orion ORS 76247, stereo, \$6.98.

Duo pianists play on two pianos. A piano duo plays on one instrument, four hands. There's a difference, decidedly, although the two sounds are first cousins, and similarly contrasted to the piano played by only 10 fingers. No matter how you use 20 fingers for piano sound, it is fascinating. I always fall for it. The piano-orchestra! Or a sort of hopped-up music box. It can be either.

This is a nicely titled record because though all the stuff is, I suppose, salon music in 19th century terms, a good deal of it measures up higher than that, and/or funnier. Take your choice. You start in, here, with a set of waltzes by of all people, Sousa—you'd hardly recognize him. Then comes a favorite old American, Arthur Foote of Boston, whom I actually met in his 80s back as a college student. An excellent local composer and his Romanticized Air, Menuet, and Gavotte are light but really lovely. Then there's an arrangement of familiar Kreisler, a mildly jazzy frolic by Ernst Bacon (this one for two pianos)—and two fireworks pieces, no other word for them. One is the Gottschalk arrangement (early 19th C. American pianist) of Rossini's Lone Ranger—podden me, *Wm. Tell Overture*—and the other is the *Variations on America* (otherwise known as *God Save the King*) by that scurrilous old wretch, Charles Ives. "America" in two keys at once! Who but Ives?

Well, I admired the smooth polish of the salon pieces, and I can see how this team can concertize all over the place with unfailing *éclat*. But I got a bit annoyed at what, to me, sounded like just a bit too much showmanship. Too smooth, too fast, when there are fast notes—the Lone Ranger goes so fast that old Silver sounds like no horse on earth, more like a Porsche in second gear. A very polished, perfectly coordinated performance that belongs, maybe, in a svelte supper club. ... Hey, what am I saying? The title, I have to remember, said *salon* music. That's exactly how it is styled, only better. Super-salon, at least, which is pretty good.

AUDIO • JANUARY 1977

Jazz & blues



Improvisations (Being Free): Milo Fine Free Jazz Ensemble

Musicians: Milo Fine, drums, piano, clarinet; Maureen Mailey, piano; John O'Brien, trumpet; Nick Radovich, drums; Curtis Wenzel, alto sax.

Selections: Solo—*Kathy's Tune*, *Quartet W*, *Duet*, *Trio*, *Quartet*.

Shih Shih Wu Ai SSWA 2, mono, \$5.50 (Milo Fine, 7700 Penn Ave. S., Apt. 2, Richfield, MN 55423).

The Milo Fine Free Jazz Ensemble was formed about two years ago, after the dissolution of Fine's previous group, Blue Freedom's New Art Transformation (heard on SSWA 1). Though the MFFJE began as a trio consisting of drummer Fine, guitarist Mark Maistrovich, and guitarist-bassist Anthony Cox, by the time of this recording (March-April 1975) it had become a floating ensemble without set personnel. By summer '75, Wenzel and (occasionally) Radovich were the only musicians on this album still with Fine.

Such a constant upheaval of personnel would be disastrous for a group bound by commercial expectations and musical conventions. This continuous changeover, however, allows Fine to improvise not only the music, but the personality of the ensemble itself, by choosing musicians he feels are sympathetic to whatever he's doing at the moment. Likewise, Fine has extended the 60s

concept of free improvisation to abolish theme statements, the last vestige of formal jazz structure retained by last decade's avant-garde. Thus, "tunes" or "compositions" are replaced by "formats"—solo, duet, etc. with different personnel for different formats. Only the two quartet tracks have the same personnel (Fine, Mailey, O'Brien, and Wenzel). The trio consists of Fine (on clarinet), Radovich, and Wenzel, while the duet is Fine (on piano) and Wenzel. Thus, each of the album's five tracks can (and does) assume a wholly distinct character, avoiding the sameness of sound inherent in many other tune-abolishing ensembles (the Music Improvisation Company on ECM 1005 comes immediately to mind).

If Fine abandons jazz formalism, his opening piano feature, *Solo—Kathy's Tune*, shows he has not lost sight of his jazz roots. In the first section, he not only attacks the keyboard and strings percussively, he uses the outer frame as a percussion instrument in a manner which betrays his experience as a drummer. The main body of the solo is divided between speedy, yet intelligent runs à la Cecil Taylor and a slower, more careful examination of melodic chord patterns. These chord patterns and the flurries arising from them, not incidentally, are straight out of blues and stride piano, a striking juxtaposition of old concepts couched in new methods.

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Quartet W sounds rather like an early ESP-Disc, as O'Brien burns over Mailey's wildly dissonant piano, while Fine rumbles his bass drum in the background. Wenzel scoops up wide chunks of musical space while twiddling around a limited tonal range, as O'Brien jabs behind him in Donald Ayler fashion. The other *Quartet* is more original in concept, opening with an amazing trio interaction by O'Brien, Wenzel, and Fine. The latter is heard on clarinet, an instrument which he only quite recently began investigating. Unbound by academically ingrained strictures on what not to do on the instrument, Fine whips out an impossibly squeaky-high fury of clarinet madness. He then switches to drums, playing quasi-military rhythms, complementing the two horns' hunt-and-peck note-spasms. Fine follows with a delightful drum solo which sounds a bit like a field recording of a princely processional from a remote corner of the globe. O'Brien has a brassy, well-developed turn until, about two-thirds of the way through, Mailey enters with a playful solo built on a couple of clever riffs bounced back and forth over more-or-less unison horns.

The Wenzel-Fine *Duet* is basically a textural examination, with Fine playing pedal-heavy piano and Wenzel chewing out a variety of animal-like timbres. At one point, Wenzel comes up with an almost humorously mellow theme which could almost be termed pastoral in another context. Near the end, Fine takes off on what sounds like a disjointed, tone-clustered mockery of an early Brubeck riff, though Wenzel's alto tone is too gruff and hollow to assume Paul Desmond's old role! The *Trio* wanders somewhat aimlessly until Radovich takes a respectable bang-and-crash solo. Then Fine flashes out a superb display of controlled, screeching clarinet harmonics, with harsh flourishes dipping down into the lower register. It's enough to turn a clarinet instructor trying to inculcate upon his students the "correct" method for performing Weber concerti into a raving, terror-crazed maniac.

The live recording is, I'm afraid, dead-sounding, distant, and grossly lacking in clarity and presence, sounding as if it were taped from the audience bootleg style. *Quartet*, however, is recorded much closer and clearer than the rest of the album. But it's the music that matters, anyway.

Tom Bingham

Sound: D+ Performance: B+

One Night Stand With Duke Ellington Joyce 1023, monaural, \$5.95.

Yet another Ellington broadcast, this one a November 25, 1957 airshot from what sounds like the Blue Note club in Chicago. The inevitable *Jam with Sam* opens the session, and though it is not one of this writer's favorite Ellington pieces, this is a particularly sizzling performance with steaming solos by trumpeters Willie Cook, Clark Terry, and the iron-lipped Cat Anderson. One must suffer through pompous pronouncements by a wordy announcer, as well as listen to two mediocre Ellington vocalists, Lurlean Hunter and Jimmy Grissom, do *Strange Feeling* and *I'm Beginning to See the Light*.

But there are rewards—a lustrous first movement from the rarely played *Perfume Suite* and two well-played movements from Duke's Shakesperian suite, *Such Sweet Thunder*. Not only are these last fine performances, but they differ in many ways from the original Columbia releases. Ellington collectors and jazz lovers should also be delighted with *Dancers in Love* which reveals that a little ragtime always lurked in Duke's soul. Another treat is a brief 16 bars by the Ellington piano on *The Soda Fountain Rag*, Duke's first composition which was written in the early 20s. **One Night Stand with Duke Ellington** is an album which connoisseurs and Ellington buffs will surely want.

John Lissner

Sound: B+ Performance: A

Sargasso Sea: John Abercrombie & Ralph Towner

ECM ECM-1-1080, stereo, \$6.98.

We'll Be Together Again: Pat Martino
Muse MR-5090, stereo, \$6.98.

Closeness: Charlie Haden

A&M/Horizon SP-710, stereo, \$6.98.

The ECM label's real contribution has been to encourage artist-oriented music not related to the funk that sells so well, but aiming instead at introspective, chamber type music, often acoustic. The new John Abercrombie/Ralph Towner duet album is a sterling example. Both are brilliant technicians who together display uncommon empathy. The album is light and moody, occasionally spacy, as on the title track and the fiery *Elbow Room*. The sound is so clear, it is hard to believe the musicians are not there in the living room. A couple years ago ECM issued a Gary Burton-Chick Corea duet album called **Crystal Si-**

lence that was sublime. **Sargasso Sea** is **Crystal Silence** for guitar.

Two other notable duet albums have also crossed my path this month. The Pat Martino Album joins his Wes Montgomery inspired electric guitar with the electric piano of Gil Goldstein. **We'll Be Together Again** is a pretty album, one Pat clearly wanted to do. His playing is melodic and joyous. The album thus has a soft, almost muted sounding album, a bit more distant than **Sargasso Sea**.

Charlie Haden's **Closeness** is the most personal album of the three. The four tracks are duets with Keith Jarrett, Paul Motian, Alice Coltrane, and Ornette Coleman, respectively. Haden is beyond accomplished, an undoubted master of acoustic bass, and has played on many important sessions, particularly with Coleman and Jarrett. *Ellen David* written for Charlie's wife and, as performed with Jarrett, is a haunting ballad. O.C. with Ornette is a happy, bopping number. *For Turiya*, with Alice Coltrane on harp, forms a surprising and engaging texture, however unlikely. Finally, *For a Free Portugal*, the duet with the brilliant percussionist Paul Motian who has often played with Haden in the Coleman and Jarrett combos, adds

field recorded Angolan music to make an effective and evocative studio collage. Haden's album also benefits from brilliantly clear recording.

The return of this kind of handmade music in the face of the popular and frantic funky stuff is a welcome balm for the ears. *Michael Tearson*
Abercrombie/Towner

Sound: A+ Performance: A

Martino

Sound: B Performance: B

Haden

Sound: A- Performance: A

Ain't Going' To Be Your Low Down Dog No More: Piano Red
Black Lion BL 311, stereo, \$6.98.

Although 65-year-old William "Piano Red" Perryman has never enjoyed the critical attention accorded his late brother Rufus ("Speckled Red") by blues and jazz historians, he's had much greater popular success. In 1951, no less than five of his RCA Victor records made the Top 10 of *Billboard's* Rhythm and Blues charts, despite being musical holdovers from the "race records" era. Red recorded for Victor until 1958, though he never again hit the Top 10.

In 1962, he hit the pop charts twice, using the name "Dr. Feelgood and the Interns" (honest!), one of those hits being a remake of his 1951 million-seller *Right String, Baby, But the Wrong Yo-Yo*. During the 70s, Piano Red has been a popular club entertainer in Atlanta, recording only occasionally.

Obviously, Red has had a lot of exposure to show-biz, and it has tainted his singing. His vocal inflections sound carefully rehearsed, as if he's trying to be nightclub-"hip" while retaining a semblance of down-home directness. When he sings blues standards which are also well-known to the larger public, such as *Everyday I Have The Blues* and *Corrine Corrina*, this paradoxically adds a distinctly personal touch to the increasingly over-familiar songs. However, at its worst, as in yet another remake of *Wrong Yo-Yo*, his mispaced showmanship causes him to flippantly throw the song away, as if he feels obliged to perform it for the thousandth time, hoping to get it over with as quickly as possible.

But for all the professional savvy-cum-artifice of his singing, his piano (which is what everyone will buy the record for anyway) seems surprisingly



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unaffected by success. Red still plays in a rollicking, back-alley style which lies somewhere between turn-of-the-century saloon-ragtime and the barrelhouse/boogie masters of the 20s and 30s. On uptempo tracks (the title song is a prime example), his steadily pumping left hand firmly accentuates every beat squarely on the beat (though on *Corrine, Corrina* he contrasts with a couple verses played in a Latinish hop). His ingratiating melodic variations display a rhythmic ease and chordal mastery that instantly communicates his joy of playing to the listener. On slow tracks such as *Please Baby, Come On Home* and *Blues, Blues, Blues*, he shifts the emphasis to vocals, accompanying them with sparse, basic chords.

He's at his best on a couple old pop songs, *I've Got My Fingers Crossed* and *It's A Sin To Tell a Lie*, which he transforms into raggy stomps, almost totally devoid of the pop-tune contrivances the composers, no doubt, thought they had built in.

Okay, so he hits a few bum notes and slightly messes up the timing on occasion. I'm not worried about it, because the enthusiastic 1974 Montreux Jazz Festival audience heard cheering throughout the record doesn't seem to mind. Piano Red is an entertainer, an "authentic" folk artist who's made a few adjustments in order to satisfy the demands of the commercial entertainment world. You may have a few misgivings about this or that aspect of his music, but you can't help but enjoy it.

The original engineers did a marvelous job of capturing every waver and groan of Red's high-pitched voice and the thickness of his heavy piano attack. But the remix engineers have unwisely chosen to favor the vocals, so that if you wish to get a clearer focus on the piano (which is, after all, the main attraction) you may find yourself blasted by the voice track.

Tom Bingham

Sound: B — Performance: B —

Now Is The Time: Dan Smith
Biograph BLP 12053, stereo, \$6.98.

Dan Smith might be considered a sort of latter day Leadbelly. Like the classic folk singer who was popularized by Alan Lomax in the 40s, the 65-year old Smith recreates the work songs, children's play/party tunes, religious material, and instrumental specialties of his rural younger years. He presents them in arrangements which modern urban folk fans will find more

entertaining than an academic field recording. But again, like Leadbelly, Smith's music is too vital, too valuable, too true to his traditions to subject it to the finicky canons of strict authenticity.

Besides Smith on harmonica and vocal, plus jews harp and bottles on one cut, the only other musician on the album is Nicky Seeger on guitar and backing vocals. However, a second harp line has been added on several cuts, while hand-claps and Seeger's responses are also overdubbed. Folk purists generally frown upon such tampering since the results are almost always artificial. But thanks to intelligent production by Arnold Caplin and Seeger's sharp sense of timing, the parts mold together very naturally.

The music is likewise natural, unaffected, and unstylized as Smith and Seeger just hop right into a tune and ride it until they feel it's time to quit. The elemental tunes and simple lyrics of the play/party and work songs are, due to their functional nature, repetitious by design.

Nevertheless, Smith's unfettered, supremely rhythmic, twisting and turning, huff-chuffing harmonica, and Seeger's dense, powerful, and surging guitar strumming are together so exciting that the listener is hardly aware of the redundancy. The title track is the only one which carries on far too long—*If You Want to Show Your Love/Now is the Time* is certainly a noble sentiment but to stretch it out for six-and-a-half minutes with few changes in the lyrics is certainly Brotherhood Overkill. However, note Seeger's loping guitar rhythm on this cut—a trick he learned from his Uncle Pete, no doubt.

However, the repetitious nature of Smith's repertoire is damaging in another respect. Several of the tracks closely resemble each other—*God Don't Like It* and *Cotton Needs Picking* are the same tune with different lyrics. Smith's harp blowing is so energetic and inspired, and Seeger's guitar accompaniment is so forceful and propulsive that the listener's interest rarely wanders, not an easy trick, believe me.

The recording manages to capture the thick-textured music without turning it into a lumpy sludge, though the guitar sound could have been a bit better defined. The surface interferes slightly at odd moments. The cover photo is by Jon Henry—how appropos.

Tom Bingham

Sound: B — Performance: A —

Tape & turntable

Bert Whyte

After a hiatus of many months, this column is back "on steam" again. I think a little status report on the program material this column deals with is in order.

Things are a bit slow on the quadrasonic disc scene. CD-4 releases have slowed to a mere trickle, but are expected to pick up by the end of the year. Columbia and Vanguard have embraced the single inventory system, so you can get SQ discs on a fairly regular, but not numerically overwhelming basis. QS recordings have picked up a little in releases from Pye in England and several European companies. If you want some top quality classical SQ recordings, check record stores like King Carol and Sam Goody in New York, both of which handle imported discs. You'll find some great stuff on the English EMI label, and on German Electrola. When I was in London this summer, Joan Coulson, the charming public relations lady of EMI, gave me some really outstanding SQ recordings.

As you no doubt know, Ampex Stereo Tapes is out of business, thus the principal source of open-reel tapes is gone. At present, the Stereotape Company in California is once again producing open-reel tapes. In their initial release, Stereotape lists more than 30 tapes of pop music programs. That may not seem very much compared to what Ampex used to issue... but it is a start, and a very auspicious start at that, for the quality of the tape processing is really excellent. All of the stereo and quadrasonic productions are Dolby-B encoded, and each tape has a Dolby level-set tone before the beginning of the music program. This last is something long overdue, as it enables one to adjust for proper tracking in decoding and ensures the maximum amount of noise reduction. To make life easy in using these tapes, if you splice in paper or plastic leader tape before and after the Dolby tone, this will act as a handy reference to cue for the tone. I

received 11 open-reel tapes from the first release and will report on them as time and space permit.

Gorilla: James Taylor.
Stereotape WSTQ2866QF, 4-chan., 7 1/2 ips, \$12.95.

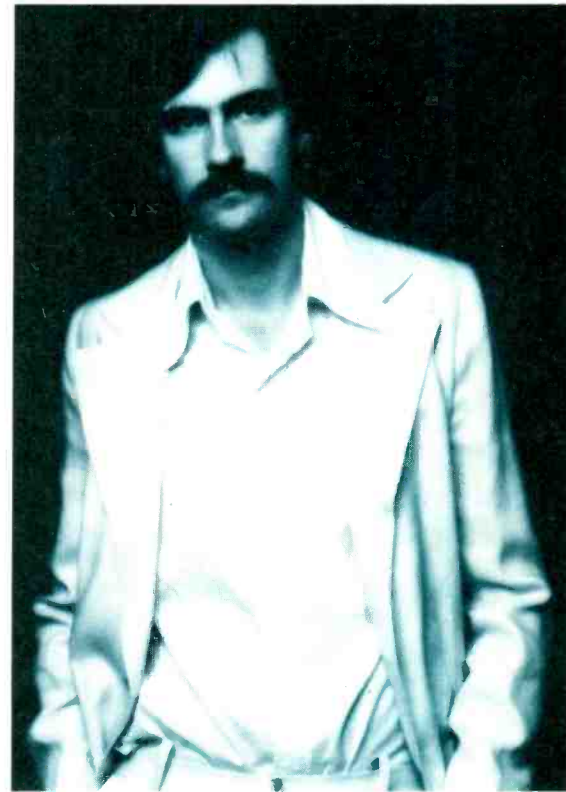
Toulouse Street: Doobie Bros.
Stereotape WSTQ2634QF, 4-chan., 7 1/2 ips, \$12.95.

Greatest Hits: Seals & Crofts.
Stereotape WST2886-A, 2-chan., 7 1/2 ips, \$9.95.

I Honestly Love You: Roger Williams.
Stereotape MCAS438-C, 2-chan., 7 1/2 ips, \$8.95.

Sweet Harmony: Maria Muldaur.
Stereotape RST2235-C, 2-chan., 7 1/2 ips, \$8.95.

I'll be the first to admit that most of this music is not my cup of tea, and I don't purport to be an expert on this sort of thing. But I know what I like, and I have an open mind (although I must confess to a violent aversion to fuzz boxes and excessive use of same). Perceptive readers will know that the quadrasonic productions have previously appeared as CD-4 recordings. I found **Gorilla** to be the best of this lot, musically quite entertaining, with clever arrangements and interesting instrumentation. Sonically, this is a winner, with bright, clean sound, wide in dynamic range, with fine definition on all the high-tinkly percussion. The quadrasonic mix fully exploits the dynamic action of the medium, while maintaining good instrumental balances. **Toulouse Street** is an excellent four-channel recording with good inter-channel dynamics... but the music was a bit too "rocky" for me, with the fuzz box all too frequently demanding attention. The Seals and Crofts tape is well recorded with vocal/instrumental balances nicely handled, good articulation of the voices, and clean overall sound. Musically, the group is very professional and some of their songs are quite interesting: it is easy to see why they are such a popular pair. The Rog-

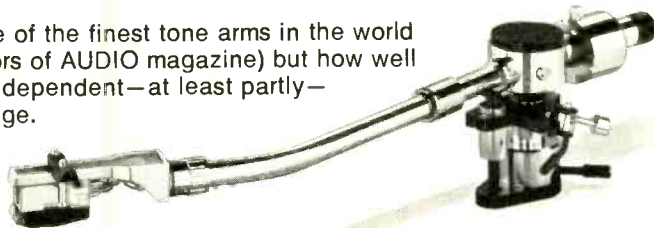


er Williams tape is typical "middle of the road" music, and it has a nice clean sound, with sharply defined piano transients. As for the Maria Muldaur tape, it too has an exemplary clean and well-balanced sound, and I am sure devotees of the lady will enjoy her performance.

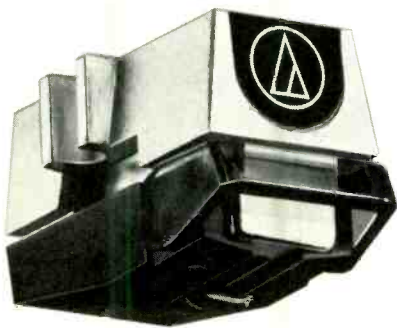
All in all, these Stereotapes are impressive in their sonic qualities. The high-speed duping doesn't seem to have caused any anomalies, and with the Dolby-B processing, tape hiss is virtually absent. All this augers well for the up-coming classical material from London Records, which I understand Stereotapes will be issuing within the next few months. You can contact this firm at Stereotape, Div. of Magtec, 8125 Lankershim Blvd., North Hollywood, Calif. 91605.

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Great Movie Thrillers: Bernard Herrmann cond. London Phil. Orch.

London SP5-44126, Dolby cassette, \$6.95.

Obsession: Bernard Herrmann cond. National Phil. Orch.

London SPC5-21160, Dolby cassette, \$6.95.

Listening to these fine movie scores makes one even more keenly aware of what a fine composer and musician Bernard Herrmann was, and how much the movie industry was musically impoverished by his untimely death. The really good practitioners of the somewhat arcane art of movie music are few in number, and Bernard Herrmann was uniquely gifted. I hasten to add that in the more general areas of music, Bernard Herrmann was highly regarded as a conductor and a highly articulate champion of much new music and the works of American composers. I still treasure a letter from Mr. Herrmann that he wrote to me when I was recording director of Everest Records, in which he suggested some interesting repertoire he wanted to record with us. Unfortunately, things went awry, and I shall always regret that I was unable to work with him.

The **Great Movie Thrillers** is really a compilation of scores composed by Herrmann for Hitchcock movies, and as such gives us *North By Northwest*, *Vertigo*, *Marnie*, *The Trouble with Harry*, and, of course, the classic *Psycho*. The same musical thread runs through all these scores... the brilliant orchestration for a large orchestra, the use of *leitmotifs*, the stunning musical effects employed to depict an explicit scene or mood in the film. Who can forget the blood-curdling shower scene in *Psycho*? The sound is very clean and wide in frequency and dynamic range throughout this cassette, but if you have a really high-quality, super-power component system, you will hear what kind of dynamics are possible on these London cassettes when you get the impact of the sudden, shocking shriek and the searing intensity of the high-pitched unison strings in the shower murder scene in *Psycho*. Believe me, this is a real tweeter-blower!

Obsession was the last movie for Bernard Herrmann. Some critics have said that his score for this film wasn't up to his usual standards. Perhaps so. It was not a *Psycho*, and it certainly doesn't rate with his masterful *Citizen Kane*. Nonetheless, it has many of his familiar elements and is still quite a cut above the usually trite movie

scores we seem to get these days. I didn't see the film, and it got generally negative reviews, but in spite of that, listening to this music does create a desire to see the film. The most distinctive part of the music is Herrmann's use of a series of massive, ultra-sonorous chords, combining the full weight of the orchestra with heavy emphasis on contrabassi and low brass, underpinned by huge organ pedal notes. Here again, on a big sound system, this is a real rouser! Processing of the cassette is up to London's best, with no audible modulation noise, and in spite of the wide dynamic range, the Dolby B tape is very quiet. If you have never sampled the music of Bernard Herrmann, these cassettes are among the best examples of his unique talents.

Pigs Eye Jass

Fidelity First Vol. 2, stereo LP, \$10.95.

Fidelity First recordings are the brainchild of a young entrepreneur, Doug Erickson, who operates Insight Records at 7726 Morgan Avenue S., Minneapolis, MN 55423. This is one of those "specialty" recordings, for which the major consideration is ultra-fidelity of sound. This is not a "direct disc" recording, but an all-out attempt to exploit the full potential of the normal tape/disc technology. In **Pigs Eye Jass**, Mr. Erickson has succeeded in producing a spectacular recording which should find wide use as a demonstration disc. "Jass" is the original spelling of jazz, and that is what is on this disc...real earthy, gut-bucket jazz, played by a hard-driving group of fine players, obviously familiar with this musical idiom. The instrumentation is banjo, clarinet, bass clarinet, cornet, drums, trombone, tuba, tenor sax, guitar, and piano, in various combinations for each selection. The group was recorded relatively close up, in a fairly intimate acoustic perspective. The balances between the instruments are excellent with no "swamping" or "shadowing" in evidence. The overall sound is absolutely pristine, wide in frequency response, with exceptionally wide dynamics. Each instrument is reproduced with startling clarity and high definition, making it easy to recognize their distinctive timbre. The sound of the bass clarinet on three of the numbers is easily the most realistic I've ever heard from a recording. Mr. Erickson makes a big point about "transient linearity" in his notes on the record jacket as a major factor in the realism

of the sound. I can believe him, for the transient response is one of the outstanding virtues of this recording. The record surfaces are near perfect, and the only flaw in the production is that in the bands between the selections, a very faint level of 60 and 120 Hz hum can be heard. However, this is completely masked during the playback of the music. Mr. Erickson will furnish technical information on how he recorded this sonic gem on request. **Pigs Eye Jass** is an object lesson

in how to make a really high quality recording.

As far as cassettes are concerned, things are in very good shape. I reported on the high quality of the London/Decca cassettes in my last two *Behind The Scenes* columns, and excellent product is coming from Philips and DGG. By the time you read this, RCA will at long last be encoding their cassettes with Dolby B noise reduction. (It is already happening with RCA in London.)

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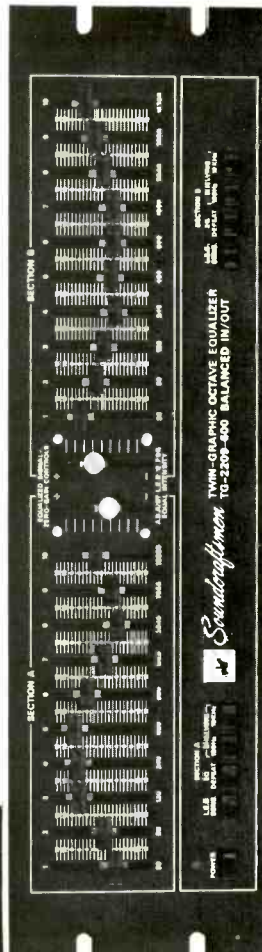
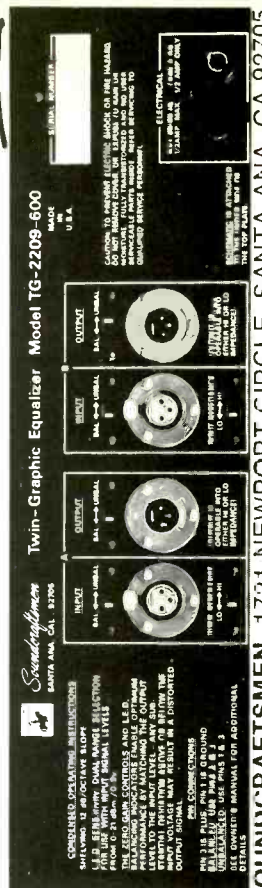
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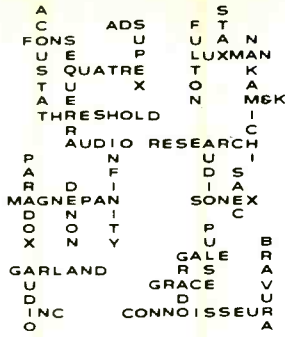
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