

DO ALL AMPLIFIERS SOUND THE SAME?

*David L. Clark attempts to find an answer to one of hi-fi's most hotly debated questions.
A Report by Ian G. Masters*

FEW things can set hi-fi enthusiasts to squabbling faster than a discussion of amplifier sound. Ever since the tubes-vs.-transistors controversies of the early 1960's, the nature of audible differences between power amplifiers—or even the existence of such differences at all—has been a hot topic, and one that is nowhere close to being resolved even yet.

On the surface, it seems logical that an amplifier costing ten times more than another should sound better. Not ten times better, perhaps, but there should be some improvement detectable to the ears. Otherwise, what justification could there be for very high-priced units and exotic circuit designs?

One very vocal faction holds that such logic can easily be borne out simply by listening—that important differences *do* exist and that they are readily audible. The vocabulary used by members of this group in describing the nature of the sounds they hear has a tendency to be somewhat . . . um . . . poetic, which tends to put off those who are more conversant with engineering terminology—as most of the difference-deniers are.

The skeptics believe that many reasons exist to choose one amplifier over another, but that they have nothing whatever to do with the particular sound characteristics of the amplifiers. Rather, buyers make such choices on the basis of reliability, visual appeal, brand recognition, ease of operation, and a host of other factors that have nothing whatever to do with



technical performance. In their view, any sonic differences that exist would be revealed in the normal battery of measurements performed on any piece of audio equipment: frequency response, distortion, signal-to-noise ratio, and so forth. Such tests rarely show anything but the most minute variations from one unit to another, so the skeptics hold that audible differences are extremely unlikely. Even the believers grant that differences are extremely subtle but insist that they do exist and can be heard, particularly over an extended listening period.

Over the years, there have been a number of attempts to identify the distinguishing audible characteristics of amplifiers and to explain them. In most cases, listeners have been unable to hear differences consistently enough to proceed with the second part of the project, for if the differences are not identified, they are very hard to quantify and to explain. To some, this has been the basis of the argument that amplifiers sound alike; to others it has simply pointed to the inadequacies of the testing procedures. So the debate continues.

And yet, STEREO REVIEW's editors felt that there must be *some* test that would answer the question one way or the other. They concluded that a carefully controlled series of listening tests using a large sample of listeners and a group of amplifiers with as many technological differences as possible should be able to elicit reliable information at least as to the kind of differences there might be. To set up such a test, the

magazine approached David Clark of DLC Designs, who in the past year has designed and conducted similar listening tests for CD players and hi-fi VCR's.

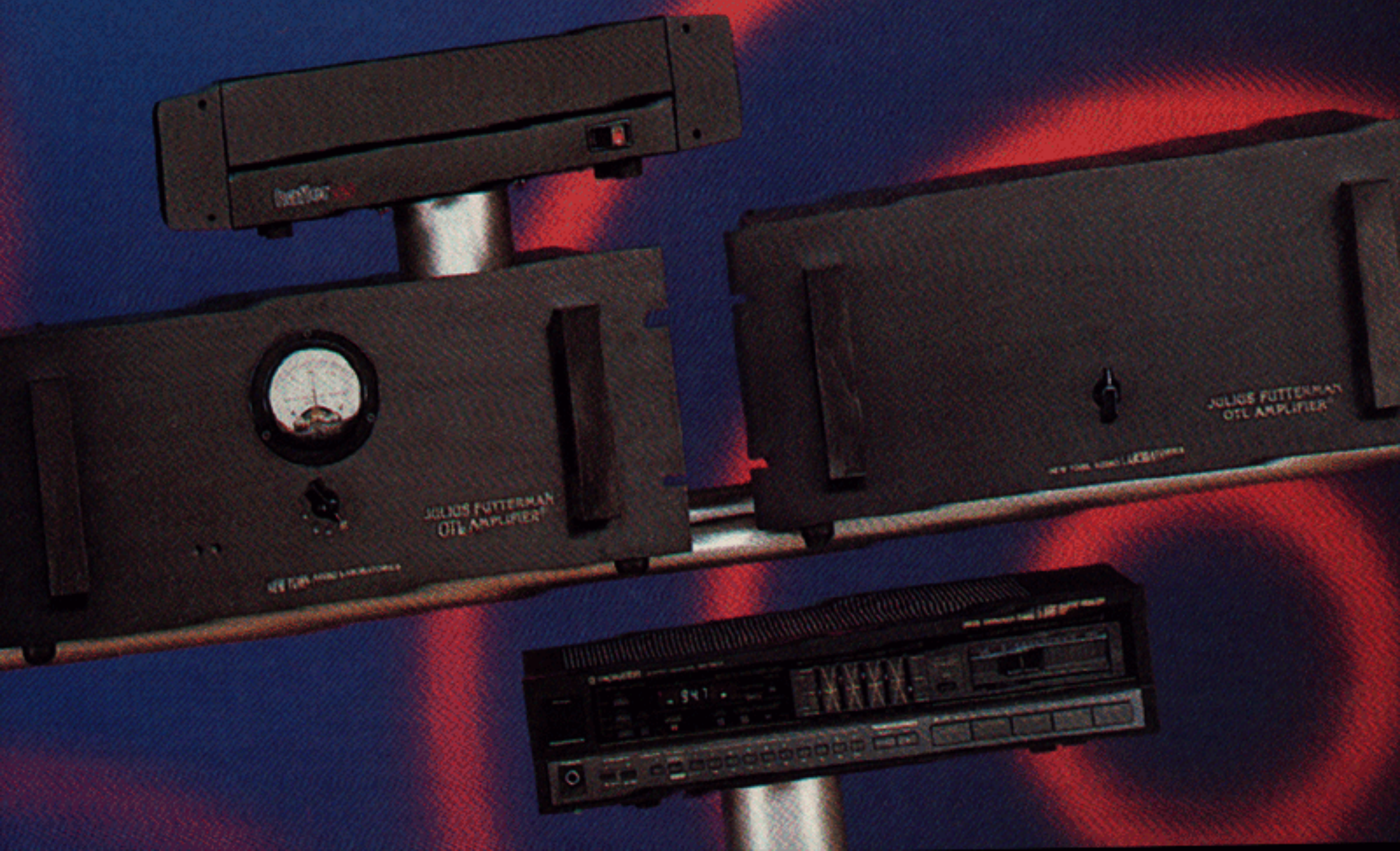
Clark's task was to set up a series of tests that would not only satisfy his own technical standards, and those of the magazine, but that would be conducted in such a way as to meet most of the potential criticisms of the believers. As far as possible, the aim was to forestall claims that the test procedures were not adequate to reveal amplifier differences.

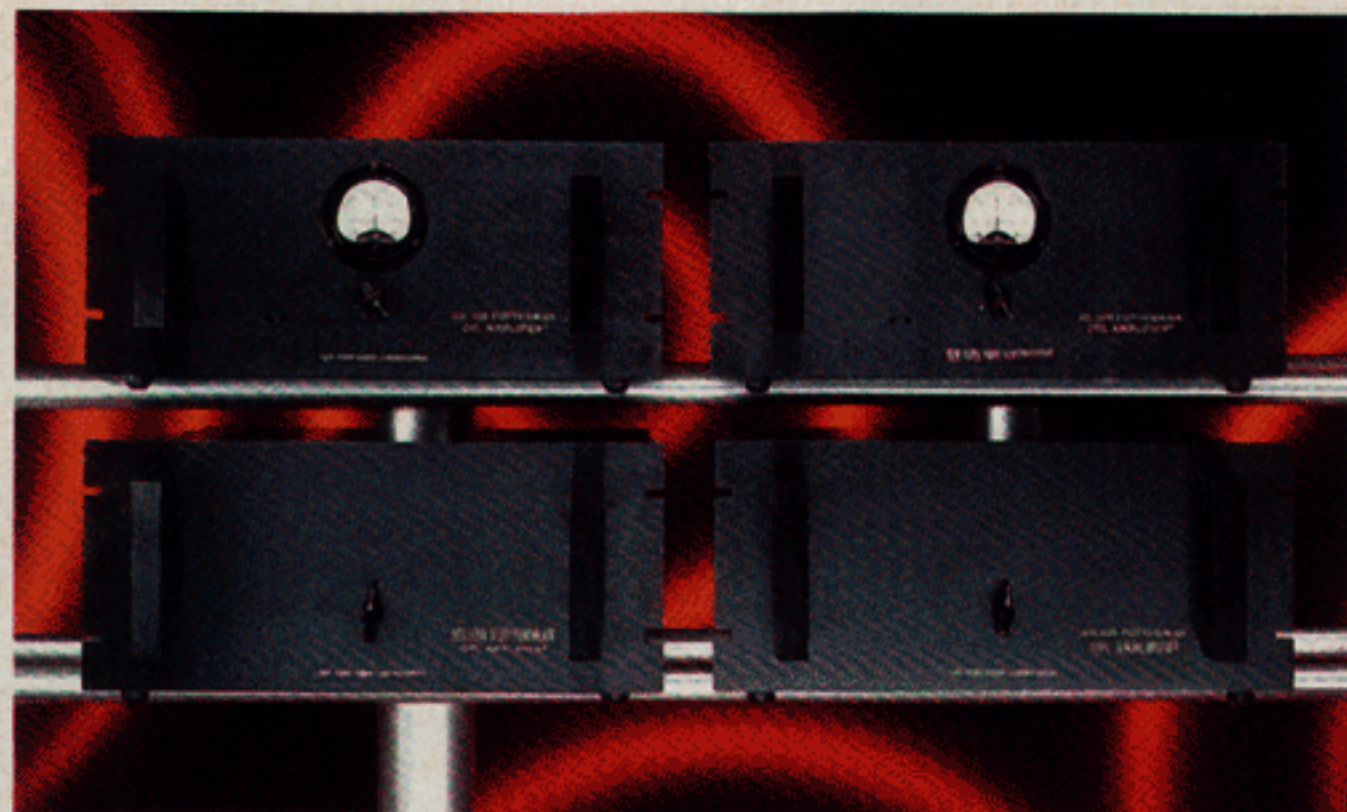
The first consideration was to set up a system in which the other components would be perceived as appropriate for the task. Every piece of equipment in such a setup would have to be beyond reproach in the eyes of the high-end audiophile community. That was clearly impossible, but a close approach was made.

For source material, it was decided to make both compact discs and analog records available. For the former, a Meridian MCD Pro player was used. For the latter, a Sota Star turntable with its vacuum hold-down system was set up, fitted with an Eminent Technology straight-line arm and a Van den Hul MC-10 moving-coil cartridge. Both sources were fed into an Audio Research SP-11 tube preamplifier using high-end interconnect cable.

The speakers used were Magnepan MG-111a's, connected to the subject amplifiers with a very heavy-duty specialty speaker cable. The tests took place in the dedicated listening room that had been used for Clark's earlier tests for the magazine.

PHOTOS BY ROBERT LORENZ





From New York Audio Labs, two \$6,000 Julius Futterman OTL-1 80-watt mono amplifiers with their separate power supplies. The signal path uses vacuum tubes only.

Equally important was the choice of amplifiers to be tested. They had to run the gamut from truly exotic to mass-market cheap, with some interesting things in between. Since the number of amplifiers that could be included in the test was limited, the probability that there would be differences within the group had to be reasonably high. For this reason, the low end was represented by a modest Pioneer receiver, the Model SX-1500, priced at \$220, while the upper end of the scale was represented by New York Audio Labs'

Julius Futterman OTL-1 tube amplifier, which weighs in at a hefty \$6,000 per channel. (The pair of Futtermans, with their separate power supplies, made a stack roughly the size of a small stove and gave off about as much heat.) In between these two extremes were one audiophile favorite, the Mark Levinson ML-11 (\$2,000), and two well-respected mid-price units, the Hafler DH-1 120 (\$320) and the NAD 2200 (\$548). The Counterpoint SA-12 (\$995) represented tube-transistor hybrids, but its untimely demise

during the early listening tests prevented its full participation. The gains of all the amplifiers were equalized by attenuators in the tape-monitor loop of the Audio Research preamplifier.

A further factor was the choice of listeners. A sample had to be assembled that was large enough for statistical validity in the results, but the group had to be small enough to allow the tests to be done in a reasonably short period of time. The total number arrived at was twenty-five, with each participating in a varying number of listening sessions, and this permitted Clark to complete the tests within a week.

The kind of listeners was important as well, and so the sample was made up both of people who professed to be able to hear differences between amplifiers, the "Believers," and of those who doubted their existence, the "Skeptics." Both factions had to be represented because it was necessary to secure their approval of the testing methods; otherwise either side could cry "foul" if the results failed to match their preconceived notions.

Two options were offered for the tests themselves. The listeners could choose to have the operator manually swap cables between the two units being listened to in any

TEST DESIGN AND EQUIPMENT

My first double-blind amplifier comparison was in 1976 when I was a listener in a test run by the Southeastern Michigan Woofer and Tweeter Marching Society—SMWTMS, pronounced "Smootums." I remember the experience vividly because I was so frustrated and amazed at not being able to hear a difference between any of the amplifiers tested.

The design of the present test, one that would make it as easy as possible to hear differences between amplifiers, therefore presented some special challenges. First, I had to keep my old skepticism about the audibility of amplifier differences from influencing the test. Second, a highly pedigreed sound system, acceptable to the most critical listeners, had to be assembled. Third was the matter of finding those listeners. The SMWTMS group provides my usual pool of experienced listeners, but most had previously participated in such tests and had become as skeptical as I. In addition, I wanted to end up with more than statistics from the tests: I wanted to record the emotional experiences of the listeners as they discov-

ered how small (if not inaudible) the differences are between gain-matched amplifiers operated below clipping.

The best solution was simply to present my plan to some audiophile believers in significant sonic differences between amplifiers and ask for their assistance. After all, they should see this as an opportunity to prove the validity of their belief to the skeptics. The cooperation I received from manufacturers, a local high-end audio salon, and other audiophiles was more than I ever hoped for. Their assistance and participation as listeners in this project demonstrated that they were secure in their belief and brave enough to risk being exposed to an uncomfortable outcome.

Harry Francis of Audio Dimensions in Royal Oak, Michigan, brought out a Sota vacuum hold-down turntable and an Eminent Technology air-bearing arm with a Van den Hul MC-10 cartridge. To complete this exotic head end, he supplied an Audio Research SP-11 tube preamplifier. After pondering the system for a while, he also suggested that it be equipped with better cables. I chose the fat, directional inter-

connects from Music Interface Technology as well as the company's 3/4-inch-diameter speaker cable, called Music Hose. After optimizing all adjustments on the turntable and arm, Francis listened for a while, but he did not have the time to go through a blind test session.

Also feeding the Audio Research preamp was a Meridian MCD Pro CD player, which was mounted on a Torlyte stand whose spiked feet pierced the carpet and rested on the concrete floor. Inserted in the tape loop of the preamp was a precision attenuator that trimmed gain to match the outputs of the amplifiers in the test within ± 0.05 dB. This attenuator—as well as the ABX Comparator relay module (when used)—was connected by short lengths of the highly acclaimed Hitachi LC-OFC cable. All connections were treated with a small amount of Tweek or Cramolin contact enhancer.

Most of the equipment was placed on a sturdy shelf unit located between two Magnepan MG-IIIa speakers. These large-panel speakers radiate very little energy to the sides, so the turntable and other components were not in a

given session if they felt that would contribute to the accuracy of their responses. It was expected that some of the Believers would prefer this method, as many high-end audiophiles are leery of instantaneous A/B testing, and this proved to be the case.

The alternative was using the ABX comparator for double-blind listening. With the ABX system, two of the amplifiers under test (designated A and B) are connected to the comparator, and listeners can switch back and forth between them using a hand-held remote control. The system includes a third selection, called X, that is the same as either A or B. By switching back and forth, the listener tries to determine which amplifier X represents. For each round of sixteen trials in each test, the comparator randomly connects X to one amplifier or the other, and the listeners note on an answer sheet which one they think it is. When the test is over, the comparator can be programmed to read out the correct answers, and then each round is scored as correct or incorrect for each listener.

The system is designed to discover differences, not preferences. To the extent that any listener can reliably match X to the correct amplifiers, it can be presumed that he is



The stereo Mark Levinson ML-11, rated at 50 watts per channel, costs \$2,000. It can deliver 25 volts of peak power at currents up to 12.5 amperes.

actually hearing a difference—with gross differences, a listener should be able to make the correct identification in every round. If there are *no* differences, the number of correct responses should be about the same as could be achieved by mere chance, 50 percent—assuming there are enough choices in the sample.

In between certainty and pure guesswork, the results are subject to statistical analysis. If the number of correct choices is statistically significant, it can be concluded that a real difference was being heard; if not,

then the choices were random, at least in the particular test being studied.

The test sessions themselves involved anywhere from one to eight listeners at a time, and ABX switching and selection among the available LP's and CD's was performed by the listeners. Throughout all the tests the equipment could be seen at the front of the room, although there were no hints as to which amplifier was playing at any one time.

At the beginning of each session,

strong direct sound field. The huge Futterman OTL-1 amplifier was placed directly on the floor, as was the Torlyte CD player stand.

Critical to hearing differences in audio equipment is the choice of speakers and listening room. Besides sounding exceptionally good over a wide range of listener positions, the Magnepan speakers have fairly low efficiency and a low impedance. Both of these factors conspire to make an amplifier work very hard, possibly exposing a weakness. The load the Magnepans present is not highly reactive, but it is typical of the low-efficiency, highly damped speakers often preferred by audiophiles.

The listening room was the same 18 x 25 x 10-foot dedicated facility used in previous double-blind test for STEREO REVIEW. It is designed to have an even reverberation time, damped room modes, and controlled diffusion of reflections.

The program material was highly varied, though all the music used acoustic instruments. Both LP's and CD's were supplied, and some listeners also brought their own. At each session, the particular test recordings used were selected by the listeners. Following are some of the more popular items: Reference Recordings' "Dafos"

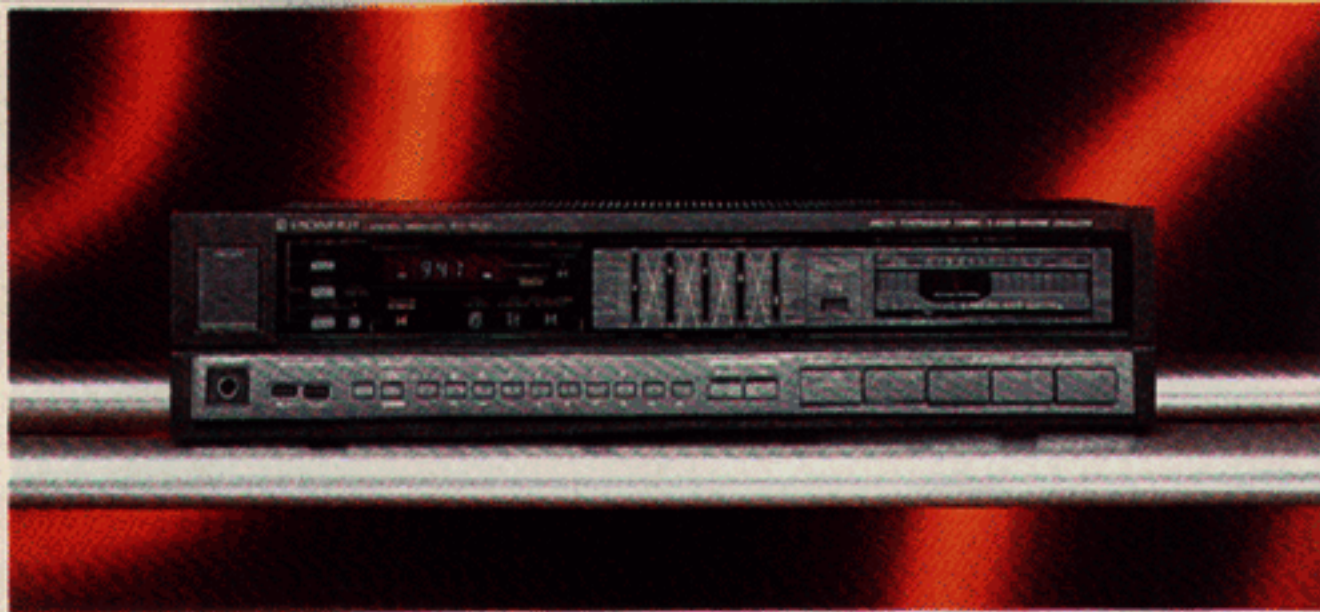
(LP and CD), an ethnic percussion album, and Capriccio espagnole (LP); Sheffield's "Track Record" (LP and CD), "West of Oz" by Amanda McBroom (LP), "I've Got the Music in Me" by Thelma Houston (CD), and "The King James Version" by Harry James (LP and CD); Joan Baez's "Diamonds and Rust" (Nautilus LP); Opus 3's "Test Record I: Depth of Image" (LP and CD); Andrew Lloyd Webber's Requiem (CD); Gershwin's Rhapsody in Blue on Telarc (CD); and the Digital Music CD's by Warren Bernhardt, "Trio '83," and Jay Leonhardt, "Salamander Pie."

A major feature of these listening-test sessions was their openness. All the equipment could be seen and inspected. At listener request, all the amplifiers could be auditioned with or without the ABX system prior to the blind testing. Listeners were given as much time as they needed to get used to the audio system, to select revealing program material, and to note apparent differences between the various amplifiers. Almost all listeners (even the skeptics) thought they could hear differences at this point. They wrote down their sonic observations and selected the pair of amps that seemed to differ most to compare in the following blind test.

The listeners even decided which kind of blind testing they would use: manual swapping of the cables feeding the chosen amplifiers (in this case hidden behind a screen) or ABX switching, where the relay system would allow a more rapid changeover. Listeners new to the ABX system had already been trained in its operation at a separate setup while they waited their turn in the listening room. Most listeners opted for the convenience of the ABX relay control, feeling that the extra contacts in the system would not degrade the signal. Nine people, however, chose to augment their ABX tests with blind cable-swap tests.

After completion of the blind (cable-swap) or double-blind (ABX) testing, the listeners were given their scores and a follow-up form asking questions about their experience. Thus, the often painful experience of being certain of audible differences but being confronted with a random score sheet was documented. High scores can prove differences were audible, but random scores can never prove that all amplifiers sound alike. Only the listeners' comments (see box on page 84) can express their disappointment at being wrong when they were sure they were right.

David L. Clark



Pioneer's SX-1500 receiver, rated at 45 watts per channel, is priced at \$219.95. With a 1-kHz test pulse, it produced a peak current output of 12.5 amperes.



The "high-current, high-voltage" NAD 2200, at \$548, is rated for 100 watts per channel with a dynamic headroom of 6 dB. It uses fully solid-state circuits.



Rated at 62 watts per channel, the solid-state DH-120 from the David Hafler Co. is priced at \$320. It is also available in kit form for \$260.

every listener was given a form that asked whether or not the test conditions were adequate to prove whether differences between the amplifiers were audible. After a preliminary round of listening, which lasted about an hour, all but three subjects signed these sheets. One of those who did not said conditions were not adequate, one had reservations, and one gave no answer.

After the sheets were handed in, the blind tests themselves were conducted, comparing in each case amplifiers chosen by the listeners. Tests ranged in duration from 45 minutes to 2½ hours, and some listeners took part in as many as three separate comparisons. Skeptics and Believers were never combined in

the same test, and the Believers' tests were conducted by an audiophile Believer.

After the formal tests, each listener was again asked whether or not the tests were adequate to reveal audible differences and also whether or not the tests could be considered relevant to consumers. In part this inquiry was simply for information, but in part it was also to gauge how attitudes toward the tests changed when the results were known. In a number of cases, Believers' feelings about the adequacy of the tests were modified or reversed.

One of the reasons for such changes in attitudes had to do with the first part of the test session itself.

Before the blind tests began, the listeners were allowed to hear each amplifier on its own for a reasonable period of time. The same musical selection was usually repeated for each amplifier, but this part of the test was not blind, nor did it involve any A/B comparisons.

Practically all listeners, including Skeptics, felt at this point that there were audible differences—some with satisfaction, some with amazement. Even so, it was immediately apparent that whatever differences there were were tiny, although many of the Skeptics began to feel that they could now understand what the Believers had been talking about.

After this introductory part of the session, the listeners began to find things much more difficult, even in what should have been the most clear-cut case: the Pioneer receiver vs. the Futterman behemoth. Throughout the tests, listeners rarely claimed certainty in their choices, and the whole process was one of straining to hear tiny clues that might aid in selection. (At one point, however, the decisions seemed to be coming very quickly, until a listener queried the phase of the amplifier connection. It turned out to be incorrect; when this was remedied and the test restarted, the difficulties returned.)

In all, some fifty-four tests were run, most of them requiring sixteen choices by each listener (to save time, the cable-swap tests required only five choices). A total of 772 choices were made.

Out of all those decisions, one could expect 386 correct choices through chance alone. In fact, the overall score was 388. So for this panel of listeners, overall, and this group of amplifiers, no statistically significant audible differences were detected.

But that did not necessarily rule out the possibility that particular listeners might be able to distinguish one amplifier from another reliably, nor did it necessarily show that every pair of amplifiers was equally difficult to separate. Even given these results, it was still possible—although unlikely—that some listeners might have been more adept at hearing differences than others, but that their results were offset by subjects whose scores were worse. By the same token, the figures might not necessarily reveal a situation where some pairs of amplifiers were, in fact, audibly identical, while others were not.

AMPLIFIER LISTENING TESTS

SESSION	AMPLIFIERS	MAKEUP OF PANEL (1)	TESTING METHOD (2)	LISTENING TIME (3)	NO. OF CHOICES (CORRECT/TOTAL)	PERCENT CORRECT	PROBABILITY RESULT DUE TO CHANCE (4)
1	Levinson vs. Pioneer	1 believer	ABX	Long	4/16	25	—
2	Counterpoint (5) vs. NAD	3 believers	ABX	Short	30/48	63	0.056
3	Hafler vs. Futterman	1 believer	ABX	Long	7/16	44	—
4	Hafler vs. NAD	8 skeptics	ABX	Medium	63/128	49	—
5	Futterman vs. Pioneer	8 skeptics	ABX	Short	74/128	58	0.046
6	Futterman vs. Levinson	8 skeptics	ABX	Short	63/128	49	—
7	Futterman vs. Levinson	5 believers	ABX	Long	43/76	57	0.151
8	Futterman vs. Pioneer	4 believers	ABX	Long	30/64	47	—
9	Futterman vs. Pioneer	4 believers	Cable swap	Short	10/20	50	—
10	Hafler vs. Levinson	4 believers	ABX	Medium	28/64	44	—
11	Hafler vs. Levinson	4 believers	Cable swap	Short	12/20	60	0.252
12	Futterman vs. NAD	2 skeptics	ABX	Medium	14/32	44	—
13	Futterman vs. Hafler	2 skeptics	ABX	Medium	21/32	66	0.055

COMBINED RESULTS

AMPLIFIERS	NO. OF CHOICES (CORRECT/TOTAL)	PERCENT CORRECT	PROBABILITY RESULT DUE TO CHANCE (4)
Counterpoint vs. NAD	30/48	63	0.056
Futterman vs. Hafler	28/48	58	0.156
Futterman vs. Pioneer	114/212	54	0.151
Futterman vs. Levinson	106/204	52	0.312
Hafler vs. NAD	63/128	49	—
Levinson vs. Hafler	40/84	48	—
Futterman vs. NAD	14/32	44	—
Pioneer vs. Levinson	4/16	25	—

INDIVIDUAL LISTENER DATA

LISTENER	PREDISPOSITION (1)	PREFERRED TESTING METHOD (2)	OVERALL SCORE (CORRECT/TOTAL)	PERCENT CORRECT	PROBABILITY RESULT DUE TO CHANCE (4)	NOTES
1	Believer	Cable swap	13/32	41	—	<p>Combining all results gives a total of 388 correct identifications out of 772 trials, for a success rate of 50.3 percent. The average result of random choices would be 50 percent correct.</p> <p>1. Believers believe that amplifiers sound significantly different. Skeptics are skeptical of that claim.</p> <p>2. Listeners chose between two methods of comparing the amplifiers: using the ABX switching box (which is double blind) or having the speaker cables unplugged from one amp and plugged into the other (which is single blind). At the end of the testing, they were asked which type they preferred (including "open" testing, where listeners know what they are listening to).</p> <p>3. "Short" was under one hour. "Medium" was between one and two hours. "Long" was over two hours.</p> <p>4. The probability that the results were due to chance, not to audible differences. Lower numbers indicate that the results were more likely to have been caused by audible differences. A probability figure was not calculated where the correct choices totaled 50 percent or less.</p> <p>5. The Counterpoint power amplifier blew up during listening and a replacement could not be acquired in time for further tests.</p>
2	Believer	ABX	30/48	63	0.056	
3	Believer	ABX	7/16	44	—	
4	Skeptic	ABX	23/48	48	—	
5	Skeptic	ABX	22/48	46	—	
6	Skeptic	ABX	28/48	58	0.156	
7	Skeptic	ABX	23/48	48	—	
8	Skeptic	ABX	25/48	52	0.443	
9	Skeptic	ABX	25/48	52	0.443	
10	Skeptic	ABX	27/48	56	0.235	
11	Skeptic	ABX	27/48	56	0.235	
12	Believer	ABX	10/16	63	0.227	
13	Believer	ABX	7/12	58	0.387	
14	Believer	ABX	8/16	50	—	
15	Believer	ABX	9/16	56	0.402	
16	Believer	ABX	10/21	48	—	
17	Believer	ABX	12/21	57	0.332	
18	Believer	Open	7/21	33	—	
19	Believer	Cable swap	11/21	52	0.500	
20	Believer	ABX	9/21	43	—	
21	Believer	ABX	13/21	62	0.192	
22	Believer	Cable swap	9/21	43	—	
23	Believer	ABX	8/21	38	—	
24	Skeptic	ABX	16/32	50	—	
25	Skeptic	ABX	19/32	59	—	

To be statistically significant, any one test or combination of tests in which the score was better than 50 percent correct would have to have a probability of no more than 0.05, or one chance in twenty, meaning that scores higher than 50 percent correct would still be expected to occur one time in twenty purely by chance. Therefore, in any group of eighty tests with random overall results, one could expect to see as many as four that appeared to show an ability to tell one sound from another before the randomness was compromised. In the present project, 92 tests or combinations of tests were analyzed, but the number of apparently significant results was only three.

No single listener scored above the 0.05 significance level overall, although one came close at 0.056, and more than half had less than 50 percent correct answers. Two listeners had *runs* of twelve correct out of twenty choices within their overall results, which would represent a probability of 0.038. If you consider these results as meaningful in themselves, they still account for only two of the four.

In one test, involving eight listeners, the overall score showed a probability of 0.046, which represents one response better than the 0.05 level and might be considered the third expected "significant" figure.

But when the same two amplifiers were compared in later tests, the correct answers were less than 50 percent each time, and the overall score was well below the 0.05 significance level. No other pairs of amplifiers yielded results that good, either in individual tests or in combinations of tests.

Further analysis revealed that scores obtained with the ABX system were no better or worse than those from the cable-swap tests, and the scores from short and long sessions were not appreciably different. All interpretations of these results, therefore, lead to the conclusion that correct choices were made totally by chance—there were no audible differences to be heard.

But this is very far from being a definitive answer to the amplifier-sound debate. The question of test procedures still remains, for instance. There is obviously no setup that will satisfy everybody completely, and it may be significant that in the post-test questionnaire a number of listeners changed their minds and stated that the test conditions were not adequate, or admitted to reservations about them. All of these were Believers whose beliefs had not been borne out, but they can be expected to represent a large group of audiophiles who will rush to deny the significance of this series of tests.

Nevertheless, a majority of listeners, including some of the Believers, approved of the test methods both going in and coming out, the amplifiers chosen varied widely in design and price, and the sample of listeners was diverse and large, as these things go. And the results indicated no audible differences.

So for these units, under these conditions, we believe the question has been resolved. But whether or not another group of amplifiers in a different situation would yield dramatically different results is still open to question.

This is just the beginning—few scientists would place a great deal of weight on the results of a single experiment, however extensive, and particularly not an early one. The testing techniques must, and will, be refined, and a larger body of data will be collected as more such tests are performed in the years to come. Readers, and the audio industry, will no doubt be free with their comments and advice about these procedures and findings, and STEREO REVIEW welcomes that.

But for now, the evidence would seem to suggest that distinctive amplifier sounds, if they exist at all, are so minute that they form a poor basis for choosing one amplifier over another. Certainly there are still differences between amps, but we are unlikely to hear them. □

LISTENER COMMENTS

At each stage of the tests—preliminary listening to the amplifiers without direct A/B comparisons, during the controlled blind (or double-blind) comparisons, and at the end of the tests, after receiving their scores—the members of the listening panels were asked to write down their subjective comments. Following are some samples of their reactions.

OPEN LISTENING

Futtermann: Sweetest top end (no pronounced highs), greatest depth, least metallic. . . . This amp's ability to increase the sound-stage width was amazing. . . . Violins excellent, clarinet very clear, woodwinds sounded very real. . . . Percussion crisp. . . . Great ambience retrieval. . . .

Hafler: Bass instruments are full range—a little hollow—clear but not crisp enough—voice less full. . . . Bass crisp. . . . Not clear, shrill. . . . Strident. . . . Better depth of voices, less bass, some stridency. . . . Flat sound. No depth. . . . Depth good to excellent. . . . Better than NAD and Pio-

neer—some muddiness. . . . A little more alive. . . .

Levinson: Sweeter top end. . . . Better bottom response than [Futtermann] OTL—more visceral impact. . . . Depth/sound stage excellent. . . . Good clarity on voice. . . . Strings and horns clear—quiet—percussion clear. . . . Leading edge of transient is excellent. . . . Could clearly hear ambience. . . . Lots of presence. . . . Gritty background noise. . . .

NAD: High frequencies more mellow than [Futtermann]. . . . Upper-mid edginess, stridency. . . . Percussion and bass seem dull. . . . Not as much air around instruments—not as distinct, not as enjoyable as [Futtermann]. . . . Flat sound, no real depth. . . . Fuzzy—distorted. . . . Violins not as clear as [Futtermann]. . . .

Pioneer: Less top end—blurry. . . . Crescendo attack a little shrill. . . . Harsh at times. . . . Less attack—no bottom—lacks bottom on voice—less string clarity. . . . Slight edginess. . . . Very good. . . . Constricted sound, not open, more distortion. . . . Seems distorted in sections of full amplitude. . . . Could hear some ambience. . . .

BLIND COMPARISONS

Pioneer vs. Levinson: Amps sound strikingly similar.

Futtermann vs. Hafler: Futtermann is cleaner, sweeter sounding.

Hafler vs. Levinson: I'm amazed at how close they sound. . . . I admit that I can hear very little difference.

Levinson vs. Futtermann: There were small differences, but not \$10,000 worth.

CONCLUSIONS

. . . . A lot of Futtermann owners are going to be upset after reading this.

. . . . Unfortunately, those elite [audiophiles] that do believe in degradation due to the ABX comparator are missing the most valid way to resolve the great debate.

. . . . Blind listening showed me little difference in two top-quality amps.

. . . . I prefer using the ABX switcher because the plug-unplug time limits the accuracy of my comments.

. . . . The source material, different types of amplifiers and ancillary equipment would appear to be capable of showing differences. However, I was hard pressed to tell the differences.