

# stereophile

The Original Independent Magazine for the Audio Perfectionist

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AUDIO VERITY: Presbycusis is nature's way of suggesting you  
 take up photography.

# As We See It

## The Revolution That Never Was

Not too many years ago, the high-fidelity movement was being hailed from all quarters (and many halves) as a revolution. In the sense that it took the country by storm, and made billions of dollars for many entrepreneurs during its heyday, it was indeed a revolution. But now the public has grown tired of high fidelity and is turning to other electronic diversions -- video, video games, and computer-ing. And what, as of this summer of 1982, do we have to show for the high fidelity revolution?

What we have to show is:

\* TV news broadcasts where roughly a third of the film clips sound as if the announcer was talking through a wadded wet handkerchief.

\* Amplified rock groups who seem to feel that nirvana is reached by turning the treble all the way off and the bass all the way up.

\* Public-announcement systems in drive-in restaurants and public-transportation terminals which are unable to announce anything be-

cause of 273% harmonic distortion and total lack of high end.

\* Drive-in movie theaters whose little squawk boxes would be no worse than they were twenty years ago if the owners had replaced the worn-out tubes and rubbing voice coils since then.

\* "Background-music" systems in restaurants and stores which remain resolutely foreground because of excessive volume and unbelievably cruddy high end.

\* "Blockbuster" movies broadcast during TV prime time with total volume compression, muffled high end, and more distortion than we are accustomed to hearing over a telephone.

\* Cheap phonographs which have exchanged the "rich" (muffled) high end of pre-hi-fi for the irksome screech of post-hi-fi.

\* Yet another generation of record buyers which smears fingerprints and grape jelly all over their discs, leaves them lying naked on the floor, and complains about how noisy records are.

It sometimes appears as if that so-called high-fidelity revolution

## Staff

Larry Archibald..Publisher.  
 J. Gordon Holt...Editor, Chief  
 Tester and  
 Resident Guru.  
 Mary E. Holt.....Circulation  
 Manager,  
 Assistant  
 Editor,  
 Spouse and  
 Drudge.  
 Margaret Graham..Music Editor.

Alan Edelstein,  
 Bill Sommerwerck,  
 Dick Olsher.....Contributing  
 Editors.  
 Ruth Tatter.....Layouts and  
 Mechanicals.

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came and went without leaving so much as a trace of its influence on the Great Unwashed. In fact, it HAS left some traces. It has left artifacts -- primitive electromechanical devices with a motor and a pivoted dingus and a row of little glass bottles, which arcaheologists may NEVER be able to figure out 1000 years from now. It has made available a level of sonic quality, from records and equipment, that was not available at ANY cost thirty (or even 10) years ago. It has also spawned a new breed of audiophile: one who spends thousands in pursuit of a wet-dream of perfect sound but has never heard live music.

But the only place where high fidelity has really left its mark is in the movie business. Dolby A noise reduction and magnetic soundtracks changed movie music from incidental to staggering. The public was, as usual, blissfully unaware of the reason they found films like Apocalypse Now and Star Wars so hair-raising, but the young breed of producers knew very well that it had as much to do with the awesome sound as the on-screen spectacle. In most parts of the country, and largely as a result of those two films, theater sound is so much better now than it was 20 years ago that even a Hollywood pragmatist like Louis B. Mayer would have been forced to utter the word "quality" with a straight face.

But the public has never demanded better sound, because the public is not CONSCIOUS of the quality of sound. Most people, in fact, don't seem to be conscious of the quality of anything. Scratch J. Q. Public, ask him what "quality" is, and he'll tell you it's something that won't fall apart before the warranty runs out, or is something rich people buy. Your average person is uncomfortable with the whole idea of a difference in degree. He finds it much easier

to cope with differences of KIND. Thus, high-fidelity-the-better-sound became in his mind hi-fi-the-new-thing. JQP did not buy a high-fidelity phonograph, he bought a hifi -- something he saw as being as different from a lowfi as a car was different from a horse. It was the prevalence of this simplism which caused the initial split between audiophilia and hifi: When manufacturers needed something more expensive to sell, merely better sound didn't interest JQP. It wasn't DIFFERENT in a way that he could feel, touch or smell. He wanted more FEATURES -- multicolored panel lights, pushbuttons, rocker switches, and more varieties of tone control with which to bugger up the sound.

So as far as the general public was concerned, the high-fidelity movement was probably a lost cause from the start. It was simply a fad, and went over for all of the wrong reasons -- status (All the rich people have it!), snob appeal (All the cultured people have it!) and the herd instinct (Everybody else is getting it!). But without any real understanding of what it was all about -- BETTER sound, rather than DIFFERENT sound -- it was inevitable that the mass market would lose interest when there were no more new channels to promote. To them, the sound of music on the hifi and the intelligibility of a voice on the PA system were about as related as apples and T-squares. So the news announcer is muffled, the record collection gathers scratches, and the ten-year-old steereo makes pleasant background noises for the cocktail guests. High fidelity? Who cares? We may, but the world at large just doesn't give a damn. Remember that next time you hear a rubbing voice coil in a public place. Look at the faces of the people around you. Do they hear it? What do you think?

# Recommended Components

Each component listing hereunder is followed by a series of numbers, each corresponding to one of the numbered notes on the following pages. If you are only interested in knowing what components we are currently recommending, just ignore the numbers. If you are curious enough about a component to want to know more about it, or to ascertain how it might "mesh" with your present components, take pencil and paper and jot down each of the numbered Notes pertaining to it. The result will be a capsule "Quickie" report of that component.

Components listed here are ones which we feel to be the best available in each of four quality classes, based on all of the information available to us at time of publication.

Components are selected for listing on the basis of our own tests AS WELL AS REPORTS IN OTHER MAGAZINES AND FROM USERS. The ratings are predicated entirely on performance -- i.e., accuracy of reproduction -- and are biased to an extent by our feeling that things ADDED TO reproduced sound (flutter, distortion, various forms of coloration) are of more concern to the musically-oriented listener than things subtracted from the sound, such as some deep-bass or extreme-treble range. On the other hand, components which are markedly deficient in one or more respects are down-rated to the extent that their deficiencies interfere with the full realization of the program material that is likely to be fed to them.

Some of the listed items are discontinued models (\*), retained here because their durability and performance distinguish them as "classics," and because they are sometimes available used, at substantial reductions below their

original cost. Upgrade modifications are available for many of them.

Component classes are as follows:

**Class A:** Best attainable sound, without any practical considerations; "state of the art."

**Class B:** The next best thing to the very best sound reproduction, with cost definitely a factor.

**Class C:** Somewhat lower-fi sound but far more musically-natural than average home component high fidelity.

**Class D:** Satisfying musical sound but significantly lower fidelity than the best available. Below this level, system colorations start to become so great that selection must rely more upon personal taste than considerations of accuracy.

The order in which components are listed within each class has NOTHING WHATSOEVER to do with relative quality.

Components which are considered to be near the bottom of one class and the top of the lower class are listed in both classes.

The Recommended Components listing has been completely revised and updated since it last appeared.

### Turntables

- (A) Linn-Sondek LP-12 (9, 10, 18, 190, 198)  
Oracle (Canada) (9, 10, 18, 190, 198)
- (B) Denon 2500 (15, 16)
- (D) Acoustic Research AR-X or XA\* (9, 10, 17, 195)

### Tone Arms

- (A) Linn Ittok LV-II (198, 190)  
SME 3009-III (8, 136, 189, 192)
- (B) Mayware Formula 4 (8, 136, 195)  
Grace 707 (15, 195)

### Cartridges

- (A) Technics EPC-205-Mk3 (1, 4, 80, 127, 165, 166, 188, 189, 195.)
- (B) Shure V-15-IVG (1, 4, 6, 7, 80, 156)
- (C) Shure V-15-IIIG (1, 4, 6, 7, 80)
- (D) Shure M-95EJ (1, 5, 6, 80, 195)

### Preamps

- (A) Berning TF-10 (78, 80, 86, 88, 136, 142, 157, 165, 166, 181, 189, 192)  
Denon PRA-2000 (78, 79, 88, 118, 136, 126, 157, 189, 190)
- (C) Audionics BT-2 (75, 78, 88, 94, 136, 138, 157, 161, 181, 182)  
Hafler DH-101 (77, 86, 126, 136, 179, 186, 194)
- (D) Dynaco PAS-3X\* (80, 84, 128, 137, 138, 158, 160, 181, 184, 187)

### Amplifiers

- (A) Sony Esprit TA-N900 (88, 94, 98, 136, 138, 157, 165, 166, 181, 188, 189, 190. Does not mate with Acoustats.)
- (B) Berning EA-230 (88, 92, 95, 99, 120, 127, 157, 181)  
Infinity HCA\* (92, 95, 100, 136, 137, 138, 157, 163, 165, 166, 181, 188)
- (C) Audionics CC-2-II (95, 99, 126, 139, 156, 181, 182)  
Hafler DH-200 (80, 94, 136, 179, 186)  
NAD 3020 (89, 99, 198, 195?)
- (D) Dynaco Stereo 70\* (92, 95, 99, 137, 156, 158, 178, 180, 181, 184, 187)

### Speaker Systems

- (B) Acoustat Model Four (80, 100, 107, 108, 112, 115, 117, 121, 127, 132, 138, 165, 166, 188, 192, 195)  
Infinity RS-4.5 (100, 106, 114, 124, 126, 136, 138, 156, 180, 194)  
Quad ESL-63 (198)
- (C) Spendor BC-1 (108, 120, 128, 129, 130, 133, 139, 158, 159, 194)  
Rogers LS3/5a (99, 108, 113, 118, 120, 121, 126, 133, 139, 157, 180, 191, 193)
- (D) Bill Reed 6-02 (77, 106, 113, 120, 127, 130, 133, 139, 156, 160, 195)

### Headphones

- (A) Stax SRX-Mk II\* (108, 128, 137, 138, 146, 149, 150, 153, 155, 157, 158, 165, 166, 181, 192)
- (B) Signet TK-33 (126, 136, 146, 153, 155, 157, 180, 193)

### Miscellaneous Devices

- (A) FMI audio interconnects (189, 190)

\*Discontinued item.

- (C) (continued)
  - FMI Gold speaker cables (189, 190)
- (B) Monster (speaker) cables
  - FMI Brown speaker cables (195)
  - KLH TNS-7000 transient-noise suppressor (189, 200)
  - DBX 3-BX expander (189, 200)
  - DBX 157 tape-noise-reduction device (82)
  - DBX 224 noise-reduction device (81, 83, 200)

#### Disc-Care Products

- (A) Keith Monks record cleaner (201,202)
  - LAST (201, 204)
- (B) Nitty-Gritty record cleaner (201, 203)
- (C) Discwasher record cleaner (201)

## Notes

1. Moving-magnet type; requires no step-up.
2. Moving-coil type; requires preamp or step-up transformer.
3. Substantial sample-to-sample variability; should be individually selected.
4. Outstanding tracking ability.
5. So-so tracking ability.
6. Excellent 78-rpm stylus available from manufacturer.
7. Spherical tip; more natural at high end than elliptical.
8. Use only with lightweight high-compliance cartridges.
9. Outstanding immunity to acoustic feedback.
10. Excellent external-shock isolation.
15. Some acoustic feedback tendency at high listening levels.
16. Basic turntable only; must be mounted on suitably isolated base.
17. Integrated arm/turntable. Performance can be improved by replacing tone arm with better one.
18. Belt drive, low torque.
19. Direct drive, high torque.
20. Includes 16-2/3-rpm speed.
21. Includes 78-rpm speed.
30. High-speed (7-1/2 and 15-ips) model.
31. Separate record/play heads; can monitor from tape while recording or adjusting.
34. Available in 2-track version.
35. Unbalanced inputs. Use input transformers if hum is a problem.
36. Set-up adjustments accessible without removing cabinet.
37. Edit cueing not possible.
38. Built-in test oscillator frequency(ies).
40. Digital PCM.
41. Digital copy facility.
42. Extremely good S/N ratio.
43. No wow or flutter.
44. 10-1/2-inch reel adaptors available at extra cost.
45. Awkward to thread.
46. Does not meter output signal.
47. Instructions describe user calibration for specific recording tape.
48. Adaptor only; must be used with videotape recorder.
50. Precise editing not possible without costly auxiliary equipment.
55. Omnidirectional.
56. Cardioid.
57. Bidirectional (figure-8).
58. Selectable patterns. (See 55,56,57.)
60. Somewhat awkward to handle.
61. High output may overload some preamps.
62. Choice of AC or battery supply.
67. Low sensitivity; for local reception only.

- 68. Very highly sensitive and selective; ideal fringe-area tuner.
- 69. Audio section better than tuner section.
- 70. Tuner section better than audio section.
- 75. No auxiliary AC switching.
- 76. No tape-monitoring provision.
- 77. Available in kit form.
- 78. No tone controls.
- 79. No mono A+B channel-blend switch.
- 80. Outstanding record for dependability.
- 81. Compressor/expander noise-reduction system usable for encoding and decoding cassettes or open-reel tapes, and for decoding dbxcd discs. Expander NOT usable with unencoded or Dolby-encoded recordings.
- 82. Compressor/expander tape-noise-reduction system. Compatible with professional DBX systems.
- 84. Needs high-impedance load; use only with tube-type-amplifiers.
- 86. Flexible and effective control lineup.
- 88. Unsurpassed reproduction of inner detail and depth perspective.
- 89. Integrated preamp/amplifier.
- 90. Includes built-in power amplifier(s) specifically matched to the speakers.
- 92. Best with electrostatic tweeters or full-range systems, or others with comparable transient response.
- 94. Best with dynamic tweeters.
- 95. Fattens and loosens the low end of many dynamic woofers.
- 96. Tends to dry up the low eb50 of many dynamic woofers.
- 98. Mono power amplifier.
- 99. Low power capacity.
- 100. Very high power capacity.
- 102. Very low efficiency.
- 104. Fairly high efficiency.
- 105. Will produce very high listening levels with adequate power.

- Watch for hearing damage!
- 106. Does better with good solid-state amplifiers than with tubes.
- 107. Difficult load for many amplifiers.
- 108. Best driven by top-notch tube amplifiers.
- 109. Must be biamplified.
- 112. Best in large listening rooms.
- 113. Ideal for small listening rooms.
- 114. May be biamplified for higher output levels, tighter bass, and better control of driver balance.
- 115. Unusually critical of room placement.
- 117. Beamy high end; narrow listening area.
- 118. Unusually spacious sound.
- 120. Superb stereo imaging.
- 121. Very large apparent sound source.
- 124. Some audible discontinuities between drivers.
- 126. Slightly distant perspective ("Row-M"); somewhat laid-back.
- 127. Neutral perspective ("Row-H").
- 128. Rather forward perspective ("Row-A").
- 129. Very "gutsy," authoritarian sound. (Think how Zarathustra might have spoken.)
- 130. Some vowel-like colorations.
- 132. Tendency toward bass heaviness.
- 133. Some upper-bass drumminess.
- 134. Somewhat loose low end; requires high-powered, high-damping-factor driving amplifier.
- 135. Lean, dry low end in average-sized rooms.
- 136. Extremely tight, well-defined bass.
- 137. Rich, fat low end.
- 138. Very deep bass range.
- 139. Noticeably limited bass range.
- 142. Some phono hiss audible at high volume settings.
- 146. Must be driven by power amp-

lifier.

147. 2000 ohms impedance (Hi-Z).

148. 200-400 ohms impedance.

149. 4 to 8 ohms impedance.

150. Electrostatic; requires external polarizing supply.

151. High rejection of outside sounds.

153. Designed for minimal rejection of outside sounds.

154. Heavy weight.

155. Very lightweight.

156. Extreme highs slightly soft, sweet.

157. Airy, open high end.

158. Bright, very "alive" sound.

159. Slightly sizzly high end.

160. Slightly hard high end.

165. Extraordinary focus and "snap."

166. Unsurpassed high-end transient response.

177. Rather diffuse sound.

178. Somewhat deficient in snap and sheen.

179. Somewhat flat sound, deficient in depth and perspective.

180. Somewhat over-ripe, richer-than-life sound.

181. Liquidly transparent, lucid.

182. Slightly dark, heavy.

184. Slightly veiled.

185. Very subtly veiled.

186. Slightly dry sound.

187. Many commercial update/modifications available.

188. Despite any deficiencies, this is one of the most ACCURATE reproducers in its component category.

189. Fantastic!

190. But is it worth the money to you?

191. We don't really like this, but a lot of people whose judgment we respect do.

192. Our personal favorite, as of now.

193. We feel rather so-so about this; audition it yourself before deciding.

194. A mixed bag. We like it but you may not. Audition it.

195. Best performance for the money.

196. Failure rate not yet established.

197. Samples may vary widely. If unhappy, ask to try another.

198. We haven't tested this, but it is an overwhelming favorite of many who have.

200. Not for the purist, but a boon to the music lover.

201. Wet cleaner.

202. Semiautomatic system.

203. Manual, economy system.

204. Record-preservation treatment.

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### Publisher's Corner

Whew! Getting this magazine out once a month is a lot of work even when you don't do any writing. I had many profound observations to make about the publishing trade, power of the press, etc., but space and time are limited so I've just a few points to make here.

First, no more requests for Volume IV, Numbers 11 and 12, please. These are real collectors items! Since Stereophile went to ten times a year, each Volume ends with Number 10, so IV-11 and IV-12 don't exist.

Second, since V-1 didn't get out until March 26th, we're not going to take our July and August break this year; in order to publish ten issues in 1982 (all of Volume V), Stereophile will be published straight through until January 1983 when we'll start Volume VI.

Third, if you receive your subscription third class mail please don't enquire about missing issues until at least three weeks after the mailing date, which is the 25th of each month. It's common for third class to take that long. My copy takes 10 days to arrive and I live con't on pg.25



## Audionics LK-1 Turntable

Two-speed belt-drive turntable with electronic drive. Dimensions: 19-1/4 W by 17-1/4 D by 8H. Price: \$630. Manufacturer: Audionics of Oregon, 5687 S.E. International Way, Milwaukee, OR 97222

This unusual approach to turntable design shows some of the innovative thinking that used to characterize Paul Weathers' creations. For example, the metal motor board in the LK-1 rests atop three vertical posts rising from the underside of the base. On top of each post is a 2-inch length of 5/8-inch-diameter surgical hose lying on its side. These are the motorboard isolation "springs," and they combine a substantial amount of springiness with a very high degree of internal damping. Verree clever.

This is also one of the few turntable designs which has addressed itself seriously to the problem of providing a hinged dust cover which is not a liability in terms of acoustic feedback. Our sample was an early production unit, and was styled in a manner reminiscent of a WW-I combat tank, complete with peep-hole slots. Later production units have been restyled so as to look a little less sinister, but by no stretch of the imagination could this be called a handsome turntable. (They can't all be WINs or B&Os.)

The two speeds are the mandatory 33.3 and 45, switch-selectable from the top front panel. A separate vernier speed adjustment knob is provided for each speed, and an LED next to the speed selector flashes red when either speed is off, or shows a steady

green when the selected speed is right on. There is enough vernier range to allow for plenty of speed correction, but not enough to play games with; you can't get it to run at 16-2/3 or at 78, should you so desire.

The electronic drive and its power supply are contained within the base, but the power transformer is at the end of the 6-foot cord, and plugs directly into the wall socket, thus keeping its AC magnetic field well away from the phono unit. The motor is a small synchronous type which drives the platter by a light belt. The platter is a solid casting of some dense, plastic-like material which cannot in any way be induced to ding or bong. The tone arm fastens to a small removeable metal panel which attaches to the motor board by means of four machine screws. Thin strips of a rubberlike material between them prevent rattles and ensure a tight acoustic coupling.

The turntable is normally supplied with a blank tone-arm panel, but pre-cut panels for most popular tone arms are available from the Audionics dealer or from the factory. We ordered an SME base for ours, and it came through improperly cut. The elongated hole was oriented front-to-back instead of in line with the platter spindle. This rotated the entire arm base so that its side-entry cables were pressing stiffly against one of the suspension-support posts, neatly killing most of the efficacy of the motor-board suspension. We assume Audionics has corrected that little problem, but just in case, we advise buyers who order the SME base to check it before taking it, and refuse it if it isn't right.

So, how does it perform? Both

speeds, when the green speed LED was lit, were right on (according to a strobe disc\*). Wow and flutter were both exceptionally low, as was hum radiation from the motor. Immunity to floorborne jouncing was minimal; airborne feedback immunity with arms other than the SME was very good although not comparable to that of, say, the WIN or the Oracle or, for that matter, even of the old cheap AR.

This is a prime example of what has developed into a new trend during the past few years: Virtually all half-decent turntables have had vanishingly low wow, flutter and rumble, and have differed from the top-line units mainly in the effectiveness of their suspension systems. The only glaring exception which comes to mind was the aforementioned AR XA, whose suspension was so far ahead of its

\* No printed-on strobe can be relied on as a test for wow. It is impossible to mass-print strobes with sufficient concentricity to prevent at least a slight back-and-forth wander. If yours oscillates thusly, it indicates nothing. Unless it is actually molded into the platter, a strobe is useful only for determining average speed accuracy.

JGH

time that it is only recently that some perfectionists have rediscovered the unit as a highly satisfactory platform for high-quality lightweight modern tone arms.



The LK-1 is quite a bit better than most of its pricewise competition, but is not a hands-down field conquerer. If you don't have problems with runaway feedback or the muddying that comes with borderline cases of it, this is a good choice. Otherwise, we'd advise holding out until you can afford to buy one of the super-tables (for around \$1000).

JGH

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## Sequerra Model 7 Speaker System

Among the smallest mini-speakers having any pretensions to fidelity, these span the audio range down to around 100 Hz, below which the manufacturer recommends using an add-on woofer (preferably his own). The 7's will put out substantially more signal without strain than will the Rogers LS3/5a's (which are easily bot-tomed out if fed more than a modicum of low end), but their

power-handling ability isn't in the same league as that of the somewhat-larger M&K Satellite 1 speakers, which can generate awe-some levels when driven full-range.

The Sequerra 7s are not fused, but they do have a couple of LEDs behind the perforated metal grille: a red one which indicates the onset of overload (not usually audible when the light goes on momentarily), and a green one which doesn't seem to tell you anything other than that you are listening at a level below overload. The

reds often went on at levels just above 92 dB, which is loud but not as much so as Sequerra's literature would seem to claim for the 7s.

These image superbly, although not quite as amazingly as the M&K Satellites. And while they reproduce depth and the acoustical environment very well, they don't do those things really stupendously either.

Over-all, they tend towards a rather lean, light quality which favors small ensemble reproduction over large-scale symphonic and operatic works. Their middle range is somewhat reticent and laid-back -- a characteristic we observe in most of the current crop of audiophile-oriented speakers -- and there is more than a trace of hollowness: a

not-too-subtle "aw" flavor. Their strongest point is their middle-range detail, which is comparable (but not quite equal) to the best we have heard from any speaker system. Their high end, on essentially flat program material, is a shade on the "hot" side, but extreme highs sound a little soft, as though the top goes out to, perhaps, 20 kHz and not much farther.

These, in short, will not be everyone's cuppa tea. Some enthusiastic reviews in other "undergrounders" have given the impression that these might have wider listener appeal than we think they'll have. Definitely worth an audition, but decide for yourself before buying. JGH

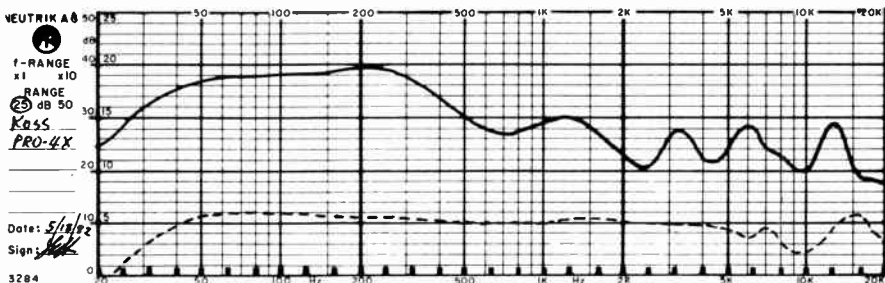
## Koss PRO-4x Headphones

The X model-designation for these must stand for Xcrable; they are positively awful.

They are hollow-sounding and turgidly bass-heavy, with a pronounced "ih" coloration (rhyming with "if"), a recessed, sucked-out

middle range and a tizzy high end. In view of the severity of these aberrations, any positive qualities that these might have pale into insignificance. The list price is \$85. We suggest you compare them with, for example, Sony's \$65 DRM-5 phones.

Koss, you oughta be ashamed of yourself! JGH



*Solid upper line: Measured frequency response of the Koss PRO-4X. This is shown in comparison with (dotted lower line) the curve obtained under identical test conditions from the best-sounding headphones we have tested: The Stax SRX-I. Note that these measurements become unreliable above 5 kHz because of the effect of standing waves between the cups.*

## Hartley H-200 Speaker System

Two-way floor-standing system. Frequency response 35 to 25,000 Hz, +/-3 dB. 8 ohms impedance. Recommended minimum power 5 watts. Maximum power 100 watts unclipped. 10" long-throw woofer, 2½" air-column mid range, 1" mylar dome tweeter. Dimensions 30" H by 15 W by 15 D. \$550/pair. Hartley, 620 Island Rd., Ramsey, NJ 07446.

The proprietary operating principle of this system is unclear to me, even after reading the literature, but it would seem that what we have here is yet another sophisticated variant of the venerable bass-reflex system. The H-200 uses two drivers and has but one electrical crossover, yet the specifications list a separate mid-range source, which we must presume to be the reflex port. This kind of obfuscation does little to forward the cause of audio science, but it is our feeling that the principle behind a device is of less significance to a buyer than how the device performs. So, how does this device perform?

My first reaction to these was that they were excellent. They produce the kind of low end we have always associated with Hartley speakers: deep, very tight, and superbly detailed -- more akin to the sound of transmission lines than ducted-port reflex systems (which these are, essentially). They have a remarkably alive, almost in-the-room quality which I like and find lacking from most of the popular audiophile speakers, and their overall spectral balance is unusually neutral. In short, I was very favorably impressed, and committed the indiscretion of telling Jim Hartley how I felt about them during a phone conversation. I really know better than to go off half-cocked before a report is formalized on paper, or floppy disc, because continued listening to any speaker

invariably reveals the thorns beneath the blossoms.

All loudspeaker designs are an amalgum of compromises, and the price one must pay for not paying the price of a state-of-the-art system is that the compromises tend to be more significant. The H-200s are a prime example of that dictum. Most loudspeakers in this price range are just plain awful! They are the ones we don't bother to test, but will occasionally list in our periodic (aperiodic?) listings of Un-Recommended Components. Some others do nice things through the middle range or the high end or possibly even both, but don't do anything worth spitting at below 60 Hz. Others go lower than that but are marred by boomy upper-bass, and so on. Well sir...

You probably know that Hartley's forte has always been low end. And so it is with these. In fact, I do not know off-hand of any other \$550/pair speaker system that can touch these for bass performance! What, then, are the inevitable compromises in these?

First of all, they share with most other moderately-priced systems a certain, let us say, inconsistency of sound. The speakers are veritable chameleons. On some recordings, they sound amazingly natural. Yet on others which should be at least comparably good, they sound nasal, brash, and markedly colored through the middle range. Imaging on most program material is also a little peculiar. The speakers seem to produce several phasing lobes at middle and high frequencies, for although I could hear no horizontal frequency-response "hot spots" when one speaker only was operating, there was a pronounced "vertical-venetian-blind" effect when BOTH were operating. And it differed from the usual VVB in that this one sounded more like the pickets of a fence -- i.e., the "slats" were much farther apart. As a result, imaging tended to be quite unstable, with

apparent sources jumping from side to side as one moved one's head. In the absolutely symmetrical dead center, imaging was very good, but was degraded even by a slight turn of the head.

Frequency-response measurements revealed no treble lobes, but they did explain why the sound of the speakers varied so much from recording to recording. Their response, although unusually free from sharp peaks, consisted of a series of broad humps and dips. Most recordings, particularly the simple two-miked variety which yields the best depth and imaging, also exhibit similar response deviations as a result of the effects of room acoustics. Apparently, what was happening was that, because of the purely random distribution of these deviations from one recording to the next, some recordings were tending to compensate for the deviations in the speakers, while others were not, or were actually reinforcing the speakers' deviations.

The most noticeable coloration of the H-200 -- a somewhat bright, hard quality -- is ameliorated somewhat by using the speakers with a good solid-state amplifier having a laid-back brightness range. It could be further helped by mating it with a moving-coil cartridge, as most such cartridges tend towards precisely the opposite coloration. The only problem with such complementary matching is that the system will sound best only when reproducing from discs. Tapes and good FM transmissions, lacking the brightness suckout of the cartridge, will do less to offset the brightness of the speakers.

So, you pays yer money, etc. As is always the case when a speaker embodies compromises galore, it is impossible for us to tell you whether or not you should like these. It depends, as usual, on what you deem most important: bass, middle range, treble, imaging or whatever. If one is to apply SOTA standards to these,

there is much to criticize. Taken on their own merits, in a context of the typical shortcomings of speakers in this price class, they have a lot going for them, but most of that lot is at the low end. (The Spica speakers -- slated for review in our next issue -- are quite extraordinary from 80 Hz on up, but can't hold a candle to the H-200s below that!)

These, then, are not exactly world-beaters, but they offer low end like no competing system we know of. If you're looking for speakers in this price class, and can accept the fact that you're going to have to give up some things in exchange for others, you'll be foolish if you don't audition these before settling for something else.

JGH

## The VPI Brick

The VPI Brick is an 8-lb block of metal about 5" by 3" by 2", encased in a nicely-finished oak box for aesthetic appeal and for protecting whatever the brick is sitting on from scratches. Placing the Brick over the power transformer of a piece of electronic gear is supposed to improve the sound of your stereo system.

Before I tried it, I was definitely of two minds about it. Because people I respected had told me that it really did work, I was inclined to believe it. But in my heart I did not really believe that an inert metal block could do anything for an audiophile except cost him money.

So, does it or doesn't it? Dammit, it DOES. I used it on my slightly-modified Hafler DH-200 power amp, and there was a small but unmistakable improvement in the focus of the sound. The best analogy for what I heard is the difference between a photograph which is almost in perfect focus (and few would notice that it wasn't) and when it is in perfect, razor-sharp focus.

Currently, my own system consists of the modified Hafler DH-200,

an also-modified db Systems preamp, custom-made 5-way dynamic speakers (of which we may have more to say at a later date), and a Logic DM-101 turntable (which also warrants later discussion). The arm is a Fidelity Research FR-64fx, and the cartridge a modified Grado G1+. In dollars, this is about a \$5500 system; not SOTA by any means, but typical of what the majority of audiophiles own. (Although most of you will undoubtedly criticise my choices.)

I also tried the Brick on a much more modest system to determine whether its effect could still be heard or whether it was of value only when a system's quality was above a certain level. The more modest system consisted of a Technics SLB202 belt-drive table with an Audioref mat, a Grado GT-1+ pickup, an NAD 3020 integrated amplifier and a pair of Audiomaster LS-1 speakers. (The Audiomasters are typical British 2-way boxes utilizing Audax drivers.) The retail price of this system is about \$725. The Brick worked again! The sound was still more focussed than without the brick. And having heard the difference, I don't feel that anyone who is concerned about sound would want to be without the Brick, even on a modest system.

I found it easiest to perceive the effect of the VPI Brick by trying to follow the line of individual instruments among many. The first Sheffield Amanda McBroom is perfect for the purpose. I also found it easier to hear what the Brick was doing by removing it after a while than by adding it and trying to observe what changed. This should not be surprising; all sonic improvements are more noticeable when, after one has gotten used to them, they are taken away, than they are when first installed.

HOW does it work? There have been two, not mutually exclusive, theories advanced to explain it. The first has to do with the effect on the sound of otherwise inaudible

amounts of hum, which are radiated by the component's power transformer and picked up by its signal-carrying circuits. According to this theory, the metal Brick acts as a "sponge" to absorb much of the stray magnetic field from the power transformer. I've discussed this idea with more knowledgeable audiophiles than I, and most concur with this explanation. They add that, if this theory is right, then the Brick should have little effect on a component whose power transformer is adequately isolated from the active circuitry, or if the power transformer is toroidal (that is, doughnut-shaped, for minimal hum radiation).

The db preamp has its power supply in a separate box, so I tried placing the Brick on the preamp chassis and then on the power supply chassis. It had no noticeable effect on either, which would seem to lend support to the magnetic-field theory.

The other explanation for the Brick's effect is that it damps mechanical vibration of the chassis beneath it. JGH touched on this in his report in the last issue on the Sony Sound Base. Briefly, this theory (which Sony obviously supports) holds that the discrete components and signal conductors in an amp or preamp are made to vibrate by airborne and floorborne sound waves, and that the resulting changes in interelectrode capacitances or magnetic fields, caused by sounds which have just left the loudspeakers, modulate the signal which is currently passing through the active device, smearing the sound. If the modulations are due to magnetic fields, the effect would be greater when circuits are handling large electrical currents than when currents are small. Power amplifiers should then be more affected than preamps. I was unable to check out this theory because high-current devices also tend to have more AC radiation from their

(continued on page 30)

# Recordings

**VIVALDI:** The Four Seasons. Seiji Ozawa, Boston Symphony Orchestra. Joseph Silverstein: violin. Telarc Digital DG 10070.

This recording is elegant. The acoustical environment and the mike perspective are just perfect. Anyone considering doing a chamber orchestra recording ought to carefully listen to this one.

Telarc's goals and recording techniques are admirable. Their refusal to diddle with the sound once the mikes have been positioned leads to proper balances or, I should say, the balances which the conductor chooses. It's nice to know that at least one record company thinks its buyers know how to listen, and feels no need to spotlight the various instruments as they appear.

There is still a bit of strain in the high-end. If you have a moving-coil cartridge the high notes of the violins will bother you even more than it did me. I don't know whether Soundstream has modified their equipment, or whether there is something inherent to the digital process which multiplies the grit per instrument. Hence the four violins in this recording would not generate as much annoyance as the full array of a Symphony Orchestra. This is only conjecture.

The jacket notes deserve some mention, as they are most interesting and informative. How many of you knew that Vivaldi was at one time a Priest, but left his original calling to take up with two sisters, at least one of whom was his mistress. The notes also include Vivaldi's original sonnets which he wrote to accompany the concerti. Scrutiny of these will

lead to an enhanced enjoyment of the music as he describes the program for each season in these verses.

The performance is more than adequate, and Mr. Silverstein's violin solos are exquisite. I am however a little weary of these concerti. Vivaldi was a very prolific composer -- he wrote over 200 concerti for the violin -- and why recordings of some of the other works are not done more often is a mystery to me. My favorite performance is still that of Neville Marriner, but this interpretation comes close to it. This is definitely a Top-of-the Pile, not only for the performance but for the exemplary recording technique.

MG

**MICHAEL MURRAY:** ENCORES a la Francaise. Couperin, Dupre, Gigout, Franck, Widor, J. S. Bach, Vierne, Lemmens. Organ at Symphony Hall, Boston. Telarc Digital DG 10069.

This is another winner. Michael Murray's superior performances are or should be well known to all by this time. This recording of Encores in the French style covers a wide gamut of registration and mood, ranging from the large and full-blown sonorities of Franck's Piece Heroique and Vierne's Final from the Symphony I to the light and nimble Scherzo of Eugene Gigout, and the technically demanding Musette by Marcel Dupre.

The recording is superb too. Telarc states in the jacket notes that they positioned the microphones at mid-pipe height, placed in such a way as to capture the "appropriate balance between the direct sound of the organ and the acoustic of the hall". They have

achieved their goal. Anyone who buys this recording will not be disappointed. Very definitely a Top of the Pile listing.

MG

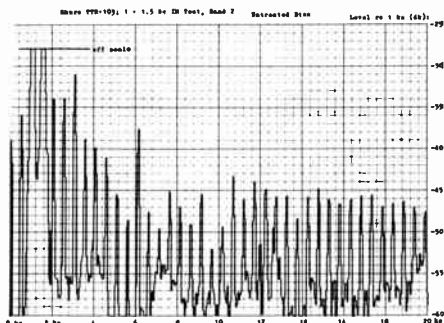
# Miscellany

## Absolutely the LAST Word

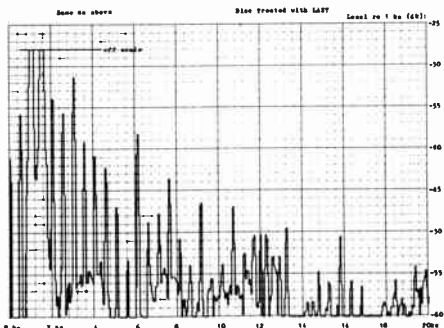
As a footnote to our lengthy report in issue 5-3 on LAST record preservative treatment, we are publishing with permission (Thank you, Peter.) some spectrum-analysis curves made by International Audio Review\*, which show that the audible benefits of LAST are most definitely measurable. See, skeptics; we audiophiles often do hear things that exist.

### Playback Distortion from Virgin Record

#### Untreated



#### Treated with LAST



**JOE MARINO** Plays 28 All-Time Greatest Hits. RealTime Digital RT-302.

M & K missed a bet when they named this disc. It should be Joe Marino Plays 28 Real-Time Hits! All joking aside, this is a delightful recording of some not very challenging but most enjoyable music.

Mr. Marino has got to be one of the greatest exponents of the cocktail lounge piano. (I refuse to call him a "saloon pianist".) Not only does he have a light touch, but he is so obviously enjoying himself as he plays. His musicality adds considerably to the pleasure of his program. The program comprises four medleys of tunes by Hoagy Carmichael, George Gershwin, Richard Rodgers, and Duke Ellington, each one more pleasing than the one before. The album is subtitled Volume I so I hope to see more.

The recording is superior. A nice, not too distant, mike perspective and the recording sounds as if it were made in a rather small, intimate room. However no information was given either about the place where the recording was made or the kind of piano which Mr. Marino plays. This too must be considered Top-of-the Pile. The question is: Is it a candidate for definitive disc? Lets have some feedback.

MG

## RECORD REVIEW



\* International Audio Review is published by Peter Moncrieff; enquiries should be addressed to IAR, 2449 Dwight Way, Berkeley, CA, 94704



## Hearing Down the Tube

I am a charter subscriber to your magazine and have read every issue to date. Given the constraints, I feel you have done an excellent job over the years. You have adhered to your original goals remarkably well and, above all, your honesty stands unquestioned.

Having said that, I am obliged to raise an awkward point. When I first subscribed to your magazine, I could hear high frequencies well out to beyond 20 kHz. But time does do its thing. I would judge JGH's age as unlikely to be much younger than mine, and can't help but wonder if he has suffered the same almost-universal loss during the course of the past 20 years. If not, he is truly one of the rare and fortunate individuals who are atypical in this regard. I confess the question crosses my mind every time you show one of your subjective listening curves extending out to very high frequencies.

Please understand that I mean no offense, and that my question is based on studies of populations of people which may not apply to JGH at all. It is even possible that he is still under 40, though I doubt it. Perhaps it would suffice to just run those subjective curves out to 15,000 Hz, if in fact that would seem more appropriate.

Robert L. Jungas, Ph D

## JGH Responds:

*How DARE you have the unmitigated audacity to question my hearing acuity! The fact that I haven't heard a thing above 5 kHz for 10 years is none of your cotton-picking business. But seriously...*

*My high end atrophied to around 14,700 about 6 years ago and has remained there ever since. This*

*is a major reason why I make sure that every component we test gets at least some exposure to younger people who can still hear bats emitting their sonar pulses.*

*And then there is another phenomenon which is generally recognized but for which no one seems to have come up with an explanation: Most people, and myself included, seem able to hear the EFFECTS of information pitched far above their objective range of hearing. For example, I can clearly hear the difference between a tweeter which is flat out to 20 kHz and one which extends out to 30 kHz before collapsing. The same is true of a preamp that goes to 25 kHz and one extending to beyond 40k.*

*I suspect that there is an as-yet-unrecognized mechanism of human hearing which responds to transient information in a manner that does not rely on the normal means for processing repetitive high-frequency information. Any better hypotheses on the subject would be welcomed. Meanwhile, what this means is that, while I can confidently draw a subjective response curve extending out to 20 kHz, I am not able to do one extending out to 100 kHz, as could a trained listener with an objective upper limit of, say, 20 kHz.*

*But with 99.999% of the musical energy we listen to occupying the range below 20 kHz, does it really make sense to agonize over the efficacy with which the range above that is reproduced anyway? Most audiophiles who make such a fuss over the ultrasonic region are deluding themselves; most of what they think is ultrasonic is actually in the range between 12 and 15 kHz. (And that "infrasonic" thud of a bass drum is actually around*

42 Hz.)

*Don't fret too much over your high-end loss. You are missing some of what's there, but very, very little of it.* JGH

### **Recommended Components**

I am seriously dismayed to read that you are considering abolishing your Recommended Components listings. It's the only section I've been looking forward to in the last several issues.

The equipment you've been reviewing far exceeds the kind of expenditure I would commit to a hobby. My Advent speakers, Hafler preamp and amp, Shure cartridge, AR turntable and Harman-Kardon cassette deck were all purchased in part because of your recommendations. And although I agree that certain components should be considered jointly, and although I appreciate the Systems recommendations, I do not believe that every component depends on every other component, and I do not buy systems, I buy individual components. I have found the RecComps list to be one of the highlights of your publication.

I am only one subscriber but, personally, I feel increasingly ignored by the Stereophile. I have never minded the delays in a quality and satisfying product, but I find less to interest me in each issue. I don't care how good the latest \$1000 cartridge is, and am inclined to feel as though I just don't belong to whatever coterie it is that you serve.

Richard Smith

*The response to our suggestion about ditching the "Recommended Components" listings was a resounding NO. We shall retain it, and are including an updated listing in this issue.*

*Actually, most readers express a desire that we retain both the*

*Component AND the System recommendations. But there was no mistake about which department is the more popular.*

*Like it or not, though, you are dead-wrong about components not depending on all other components. Every component has its usually-unique colorations -- and the moreso as the components' prices go down -- and all it takes to make a system sound really rotten is two components in the chain with similar colorations. We do however acknowledge the fact that most of us buy components, not systems, but we strongly urge those of our readers who care about musical accuracy to build towards one or another of our Recommended Systems. This may be hard to swallow when the upgrading of one component makes the system sound WORSE than it did, but your listening satisfaction will be ultimately much greater if you aim for a totally compatible system instead of merely a collection of "best buys for the money."*

*The NOTES following each Recommended Component listing should help you to avoid the more serious errors of mating that most audiophiles typically commit with 50% of their purchases. It is particularly important that loudspeakers be predicated on room size and amplifiers be predicated on speakers. Cartridges, arms and preamplifiers, too, should be considered as single unit, and we will have more detailed information about that in subsequent Recommended Components Notes.*

*Meanwhile, we will publish completely updated RecComps sections 3 times a year, with Systems recommendations once or twice a year, for the benefit of those who have learned to take our judgement on such matters seriously.*

*You may not have noticed it, but we have been reviewing far more affordable components recently than we used to. This trend will*

continue, although it behooves all of us to know what's going on in the stratosphere to give us some perspective on what we may or may not be giving up by going the less-expensive route. Most audiophiles still don't really believe in their hearts that a reproducing system can simulate a passable semblance of live musical sound, and thus tend to underestimate the potential value to them of a high-priced system. The unfortunate thing is that, even now, high cost is no assurance that a component will be any better than a cheaper one. That's why our primary function in doing equipment reports is still to report on how things sound, rather than on how they SHOULD sound in view of their marvelous specifications (and prices).  
JGH

### **An Orchestra in the Living Room**

I was indulging in one of my (of-late) favorite pasttimes this morn -- re-reading back issues of Stereophile. As I want to upgrade my disc playback system to the capabilities of my speakers (Fulton E woofers, 80 mids and modified 6 electrostatics), I was hoping to find a preamp, amp, 'table, arm and cartridge to complement the speakers. Although I know the sound I'm looking for, I see no way to make a satisfying decision from amongst the myriad choices and amidst the local "audiophiles" whose only criteria for good sound are comparisons between various components. God! I've been A-B'd into a coma.

Used equipment is okay with me, as is mail-order shopping. All I want is a LIVE SYMPHONY ORCHESTRA IN MY LIVING ROOM! Is that asking too much?

I can put the amp (or mono amps or biamps) near the speakers and make the long (ca. 30 ft.) run between the amp and preamp. Any thoughts on audio cable?

To me, it seems the tone arm, cartridge, and preamp should be mutually optimized: a unit. "Audio" (May '81, pp. 44-45) measured the SME/Shure combination you push (the tests were conducted in SME's fortress) and came up with response curves showing tipped-up bass and a rolloff above 10 kHz. Not at all what you got in your Vol. 4 No. 5 report. What gives?

I'm no electronics engineer, but why should that disqualify me from having good music in my home? I would just like to have a direct-cut disc sound like it should over my system. Given the speakers (unless there's something better for less money), could you offer any suggestions? I'd even brook a V-15-IIIG in a Gem through a Bravura if I thought it would do the job. I'm using a V-15-IIIG now in fact, being a bit too wary of the whole situation right now to change any one component.

Finally, what about the effects of the weight of some platter mats? And where do I find a Spectra mat? Should I bother? How about disc clamps (such as the Planax) as opposed to weights?

Pax vobiscum.

Paul C. Stangeland

*An orchestra in your living room?  
Surely you do jest.*

*There are few things more risky than recommending specific components to a perfect stranger. (Okay, so nobody's perfect!) It's even riskier when that person has a preconceived notion of what his system should sound like. Even if that sound is the sound of the real thing, there is always the likelihood that the most accurate front end money can buy will not elicit natural sound from a certain speaker system. For the same reason, a playback of an original master tape through the same deck that was used to cut the disc may not produce as natural a sound from a given speaker/amplifier as might*

a colored cartridge/arm/turntable combination.

Having thus neatly sidestepped any responsibility for our action, here's what we would recommend for use with your speakers. Preamp: Berning TF-10. Turntable: Oracle. Tone arm: SME 3009/III. Cartridge: Shure V-15-IVG. That's right, the much-maligned Shure. Why? Because, with electrostatic tweeters, you don't need the hyped-up high end of a moving-coil cartridge and would soon end up climbing the walls if you had one.

We have little to say about "Audio's" measurements on the SME/Shure. Test records vary from one to another, and preamps too can affect the way the low end measures. We reiterate, for the nth time (and believe us, we are as tired of repeating this as you are of reading it): We stay with the V-15-IVG because, with the Berning preamp (and the SME arm) it still makes un gimmicked discs sound more consistently like the master tapes than any other cartridge we have found to date. As far as we are concerned, that is still the best criterion for accuracy that we have. (There is no way we can compare the playback of a direct--to-disc recording with what came from the microphones.) As for test records, we use the CBS Labs STR-series discs because they make cartridges measure the way those cartridges sound to us (although the STR-100 shows a rising low end from cartridges that don't SOUND as if they have a rising low end).

As for suitable power amps, we're going to pass on that one. Without knowing the sonic characteristics of your speakers, it would be foolhardy and irresponsible for us to recommend anything. The best we can do, really, is give you a few guidelines. If you're not going to biampify, go for the highest-powered unit you can afford, preferably one with very high damping factor (to offset the

muddying effect of the passive crossover network at low frequencies). You might consider Stasis IIs or a pair of Esprit TA-N900s if price is of little concern, although the Esprit has trouble with some electrostatics. Ideally, you should biampify FMI's big systems, which also gives one the opportunity to combine tubed amps for the middle- and high-end ranges, and solid-state units for the low end -- the best of all possible worlds.

For short audio cables, our preference these days is plain, ordinary 300-ohm TV twin-lead. The low output impedance of modern preamps prevents hum pickup. For longer runs, we like the cables supplied by Acoustat and by Sony/-Esprit.

The weight of heavy platter mats changes the resonant frequency of the motor-board suspension, which may clean up the system's low end or make it worse, depending upon too many unpredictable factors to discuss. The same can be said only moreso for disc weights, some of which do more harm than good by dishing the disc downwards so the outer edge no longer contacts the mat. A really heavy mat (or weight) can cause a board suspension to bottom out, eliminating its isolation properties. There have also been reports of platter spindle bearings being ground up by the added weight of all these damping, stabilizing devices. Our feeling is that the mat and disc clamp should be no heavier than they have to be to fulfill their function, but we are not so sure what that function is. These devices CHANGE the sound, but we have heard conflicting reports about the actual improvement they bring about. Some users have claimed they make the sound worse, which may just be another way of saying that measurable improvement is not always judged to be subjective improvement. JGH

## Litzendraht

In response to your open query in issue 10, Draht is a German noun meaning wire, and litz is a German adjective meaning stranded. With the declension ending -en, litzen Draht would mean stranded wire, as does the word actually used: Litzendraht. (Germans capitalize all their nouns, not just names.)

The purpose of making wire from small strands has to do with skin effect: the tendency for higher frequencies to travel near the surface of each individual wire. This occurs because the inductance (and therefore the impedance to current) of a wire is lowest at the surface, because its surface is enclosed by less of the magnetic flux resulting from the current flow. The center of the wire is of course completely enclosed by the flux. Since less wire carries the current at high frequencies, the effective resistance of the wire is higher at high frequencies.

How much higher? I calculate that a 1-foot length of 20-gauge solid copper wire, which Audio Research may have used in the input and output circuits of their SP-6 preamp, will have a resistance of .02 ohms at 1 MHz, compared to .01 ohm at DC. This doesn't look like much of a problem in audio applications, and indeed, litz wire is most-often used where there is a need for very-high-frequency resonant circuits of great selectivity (high Q), requiring low DC resistance. It is often used in the Intermediate-Frequency amplifiers of communications receivers.

Litz wire solves this problem, where it IS a problem, for frequencies of up to 1 to 3 MHz (depending on which textbook you consult), because very small strands of wire exhibit little skin effect. The thinner the wire, the closer its surface is to its center. If each strand is individually insulated, so as not to short with the others, and woven together so all of them

are surrounded by a uniform flux, they will divide the current equally between them so that all the conducting material is effective in carrying the current.

Jack Reed

## System Noise

I would appreciate seeing a discussion in "Stereophile" about the noise of components. Not the "signal-to-noise ratio" that is mentioned in equipment reports and manufacturers specifications, but ABSOLUTE noise.

This sort of thing is usually dismissed by saying that, with a good signal-to-noise ratio, the music MASKS the noise. While the music may make it impossible to hear and identify the noise, it seems to me that the noise must be adding SOMETHING to the sound which doesn't belong there. In fact, it may have something to do with the "air" around the sound which so many audiophiles seem to admire.

As the owner of very efficient speakers (Klipschorns), I have long been plagued by preamp and power-amp noise, often undetectable on less-efficient reproducers. This has probably brought the issue of noise to a greater degree of importance in my mind than it has to other audiophiles.

I have noticed that many of the amateur and commercial modifications of existing components specify replacing certain resistors with "low-noise" types. This leads me to wonder if it is possible for anything but a cryogenic, superconducting, circuit to be completely noise-free. What exactly causes the noise referred to as "thermal noise"? I've always found it hard to understand how a passive thing like a resistor can produce a signal. Just envisioning the miniscule motions of atoms (or molecules or subatomic particles) caused by random ther-

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mal effects and Brownian motion would lead me to expect such small effects to be undetectable. Are they truly that large or is there some other thing causing the noise signals?

Will Martin

We assume that the noise you refer to is hiss rather than hum. Most system hiss is, as you surmised, a result of so-called thermal agitation.

Electron transmission through a conductor is not a perfectly smooth flow, but consists instead of a continuing exchange of electrons from the orbit of one atom to that of the one next to it. Each exchange can be thought of as a tiny collision, where one atom bumps another out of orbit and takes its place. This action is random but, when the atoms in the conductor are close together, as they are in metal, the "bumps" average out to produce what is essentially a smooth flow of electrons through the conductor.

In a resistor, the atoms carrying free electrons (the kind that are easily replaced by others) are more widely spaced, so their electron fields have less effect on one another and it is more difficult for electrons to pass from one to another. This electrical "friction" produces heat and, as the resistor's temperature rises, the motion of its atoms (which you correctly likened to Brownian motion) becomes more agitated, electron flow between adjacent ones becomes easier at one moment and harder the next, and the regularity of electron flow is interrupted in a random fashion. The result is what is called "white noise," -- hiss -- which increases in direct proportion to the resistance of and the temperature rise of the resistor.

The ABSOLUTE value of hiss in a system is no significance. Hiss is ALWAYS present in amplifying

circuits. Whether or not it has an effect on the sound depends entirely on its strength, relative to that of the signal, and the measure of this is its signal/noise ratio. That hiss CAN cause a form of signal degradation is obvious when we consider the fact that all amplifying devices have a certain amount of tendency to produce sum-and-difference byproducts between different frequencies, and hiss provides a wide spectral range of spurious frequencies against which the desired signal can intermodulate to produce these sum-and-difference products. The subjective effect of this noise pollution is a quality of dryness and edginess from a clean program and exaggerated mistracking from a slightly dirty program. The hiss also beats against the stylus-mistracking pulses.

There is no expert consensus as to how great a system's s/n ratio must be in order for the noise to have no perceptible effect whatsoever, but most authorities agree that, if the noise is not audible AT ALL in the absence of program material (with gain control and listening location both "normal"), then there is no way in which it can degrade the reproduction of sound.

Your impassioned concern about hiss is, incidentally, common to owners of Klipschorns, and is due to that speaker's extraordinarily high conversion efficiency. (CE is the percentage of electrical power a loudspeaker converts into acoustical power.) This high efficiency makes audible very small amounts of system noise which, as you observed, are not audible from other loudspeakers. It is an advantage in that you can get away with a low-powered amplifier or run a higher-powered one without ever approaching its overload point. But it is a liability both in terms of noise and the fact that many amplifiers, when operated at low output levels, produce more dis-

## CC-3 STEREO/MONO AMPLIFIER

The CC-3 basic power amplifier is a new design, in the tradition of our highly acclaimed and successful CC-2 amplifier. Improvements in circuit topology, power supply current delivery and selection of component parts, provide a new standard of performance in an affordable, medium power audiophile amplifier.

These improvements, based upon years of experience in amplifier design and manufacture, enable the CC-3 to deliver effortless sonic performance. The CC-3 works effortlessly with low impedance loudspeakers including electrostatic designs which present a complex load.

At moderate levels, the CC-3 operates in the Pure Class A mode. As in the previous CC-2 design, the CC-3 utilizes negative feedback sparingly and also incorporates a feed-forward circuit for improved dynamic performance. Slew Rate Limit of 50 volts/microsecond in the stereo mode; 100 volts/microsecond in the mono bridged mode.

The circuit design features a dual-differential current sourced input stage with an intermediate and driver stage incorporating complementary transistors with a bandwidth of 100 megahertz. The devices in the driver stage are especially designed to match the transfer characteristics of the output transistors.

The original CC-2, because of its excellent sonic performance and reliability, became a quiet favorite of professional users. There are hundreds of CC-2 amplifiers in use today in radio and television studios, discos, motion picture theaters and other professional applications. The new CC-3, with its improved heatsinking and mechanical design, offers long-term reliability to meet the needs of audiophiles and professional users alike.

## FUNCTIONS/FEATURES

Standard EIA 19" x 3 1/4" rack mount  
Generous heatsinking for thermal stability  
Fused AC Mains Input and Loudspeaker Outputs  
Front panel power switch  
True Peak Clipping Indicators  
Mono operation capability

## 275-A STEREO/MONO POWER AMPLIFIER

The 275-A amplifier is a lower cost version of the CC-3 amplifier. The 275-A is especially designed for the audiophile or professional user that may not require rack mounting capability or peak reading LED indicator circuitry.

The electrical performance specifications of the 275-A are identical to the CC-3.

## SPECIFICATIONS

Frequency Response:  
5Hz to 70kHz +0, -3dB

THD & IM Distortion:  
Less than 0.1%; typically 0.05%, from 20Hz to 20kHz, both channels driven @ 8 ohms, at 70 watts per channel, FTC method

Power Output:  
70 watts per channel @ 8 ohms; 120 watts per channel @ 4 ohms; stable into 2 ohms (forced air cooling may be required under some use conditions with low impedance loads)

225 watts @ 8 ohms, 20Hz to 20kHz, with less than 0.2% THD & IM distortion in mono bridged mode. 250 watts @ 1kHz, mono bridged @ 8 ohms. Stable into four ohm loads mono bridged

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ortion than they do at higher levels.

Try disconnecting your preamp from the power amp (AC off, of course). If this kills the noise (AC on again of course), you can solve the problem by installing (or turning down the) input-level potentiometers at the inputs of the power amp. Turn off the preamp's volume, turn down the power-amp input controls until you can no longer hear hum, and just use the preamp at a higher volume setting than before. (It won't tax it any more.) You may need to readjust one of the input level-sets so you get proper channel balance with your Balance control centered.

If unplugging the preamp doesn't kill the hiss, use a quieter power amplifier. Remember that amplifier s/n ratios are referred to full-power output, so a s/n of 70 dB for a 30-watt amplifier will be very much quieter than the same figure for a 200-watt amplifier.

JGH

### **Budget or Megabuck**

I believe that your shift in emphasis was a good one. Most audiophiles appreciate an occasional article on the megabuck approach to audio design, but the majority of us would have little left for albums if we invested heavily in unnecessarily sophisticated equipment. And the article on replacing the AR tone arm was just the right place to begin. There seems to be nothing but an expensive wasteland between the AR and the Linn.

A couple of years ago I replaced the tone arm on my AR with a Grace 707 Mk II. The installation was similar to yours (although not nearly as tidy), and the results were equally rewarding. I feel

that one tip should be passed on to your readers: The hole in the motorboard through which the new tone arm pillar emerges can be cut very neatly with a chassis punch.

Brian K. Berghstralh

### **Field Report**

One evening, my Precision Fidelity C-7A preamp quit after about 50 hours of use. Some elementary trouble-shooting disclosed that the power supply was at fault.\* In a subsequent phone conversation, PF's Jack Senecal told me that power-supply failures were common in that preamp, and that the cause was an IC voltage-regulator chip.

I was told that two modifications have been made since August of '81: The power supply has been redesigned to eliminate the regulator chip, and extensive decoupling (isolation) has been added between each tube and each channel.

Any C-7 or C-7A produced prior to that date can be modified, free. Turnaround time is pretty good: In my case it was about 2 weeks, plus shipping time. The retail price of the latest C-7A remains at \$549.

An update is also available for PF's M-7 power amplifier (now called the M-7A), consisting of both electrical and cosmetic changes.

Dick Olsher

### **Query: Where is the object of the asterisk?**

con't from pg. 8

only 60 miles from the mailing point! Of course, don't hesitate to write if you receive an issue and there are intervening issues not received. Reportedly an average loss in the Postal Service is 1%, so you won't have been singled out for unheard-of treatment.

# AKG

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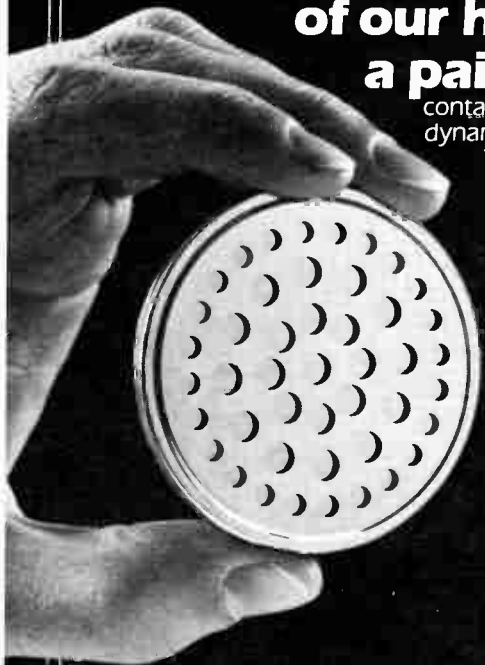
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# Comment

In recent months there has been much comment in audio circles about the relationship between Peter Aczel, editor and publisher of **The Audio Critic**, and the Fourier speaker company. Rather than step into the fray ourselves, we were lucky enough to receive permission from the Northern California Audio Society to reprint an interview with Mr. Aczel which originally appeared in the February edition of **The Audio Amplifier**, a monthly newsletter of that organization which, like Stereophile, really appears on a monthly basis. The Northern California Audio Society is an organization, like the Boston Audio Society, whose primary purpose is to satisfy the audiophile urges of their members, in the form of meetings, publications, opportunities to meet other audiophiles and manufacturers, and the like. Their newsletter and companion publication, **The Audio Moni-**

**tor**, reflect a lot of enthusiasm and their absence of axes to grind put them in the position to obtain interviews from people like Mr. Aczel who might be reluctant to talk to a rival underground magazine. Membership in the NCAS\* is available to all for the sum of \$15; the only disadvantage is the inability for non-Californians to frequently attend their meetings. Here, then, is their interview:

*Lately, there have been a lot of rumours flying about concerning **The Audio Critic**, editor/publisher Peter Aczel and his association with the Fourier Speaker Company. In an attempt to shed some light on these subjects, we contacted Mr. Aczel at his New York home for an exclusive interview. He seemed happy to have the opportunity to set the record straight.*

*Regarding **The Audio Critic**, Mr. Aczel stated emphatically that the*

\* Money can be sent or information obtained at PO Box 14156, San Francisco, CA 94114.

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## Reprints and Back Issues

We still have on hand a limited number of the softbound reprints of our first and second 12 issues. If you're curious about how and why this whole business of perfectionist audio got started (It was all our fault!), these two reprints are a not-too-compact history of the whole sordid affair.

Volume 1 contains 240 pages and covers the years 1962 to 1966, and Volume 2 has 290 pages and covers up to Spring of 1971. Both are 8-1/2 by 11 size (That's the way we were then!), and the price is \$25 each.

Also available in rapidly-dwindling quantities, for the princely sum of \$4 each, are original, unsullied copies of the following back issues (Volume and Number): 3-3, 3-4, 3-5, 3-6, 3-7, 3-9, 3-11, 3-12, 4-1, 4-5, 4-6, 4-8, 4-10, 5-1 and 5-2. Good Xerox copies of out-of-print issues can be obtained for \$5. Inquire about specific issues.

See the subscription coupon on page 18 for ordering information.



publication is not finished as had been reported. He is currently working on the next issue which will go back to the old magazine format and expects to have it out around the end of March. Subscribers to that publication may remember the change of format near the beginning of 1981 from the irregularly published magazine to the biweekly newsletter. By May of that year, only three of the newsletters had been published and **The Audio Critic** announced that they would return to the magazine format with an August issue that never materialized.

When told about the difficulty that some subscribers had experienced in obtaining the promised refund on their subscriptions, Mr. Aczel blamed the delays on the lack of good clerical help. He said that all of the requested refunds had been mailed out by now.

As to his association with the Fourier Speaker Company, Mr. Aczel said that he is very involved in the research, marketing and financial areas, although he is not president of the company. (His friend, Bruce Zayde, is president.) When asked if this did not constitute a conflict of interest, he replied that in his opinion it did not. His intention is to make a full disclosure of his involvement with the Fourier Company in the forthcoming issue of **The Audio Critic**. He feels that as long as he is above board and honest about this, his readers can either ignore it, or if they think that it makes him biased in his equipment reviews, they don't have to read his publication.

We asked Mr. Aczel about the rave review that he gave the Fourier 1 Speaker in his last magazine format issue of **The Audio Critic**, volume 2, issue 3. He stated that in that issue he

was careful not to review the speaker subjectively. While that is true, he did include the speakers in his "Reference System A" as an alternative to Quads with subwoofers in that issue and the three subsequent newsletters, implying that they were just as good. At that time, he mentioned no involvement with the Fourier Company and claims that he did not become associated with the company until later, although he was not clear as to when his involvement actually began.

We questioned him further concerning the ethical issues involved with an underground audio equipment reviewer becoming a loudspeaker manufacturer and using his publication to promote his product. Mr. Aczel's defense was merely that there is no money to be made in publishing a magazine of that type. He compared himself to an elected politician getting a public works project in his district and to a priest who had taken certain vows and then decided against being a priest somewhere down the line. Did this mean that he no longer had credibility because he changed the way he made his living? Would we deny him that living? We asked him why he planned to continue publishing **The Audio Critic** if it was so unprofitable. His reply was, "What am I going to do about all those people who have already paid money for the magazine?" It appears to have never occurred to him that he could give the money back.

The Fourier 1 Speaker, incidentally, has undergone some major revisions since its introduction in the pages of **The Audio Critic** about a year and a half ago. From reading its description in volume 3, issue 2, one gets the impression that it does just about everything but write music. We auditioned the Fourier 1 Speaker

last September, and as we reported in volume 1, issue 3 of **The Amplifier**, it exhibited a number of problems. Now it appears that both the midrange driver and tweeter of the three-way system have been replaced with new units. We asked Mr. Aczel about this and he talked at length about the speaker's evolution.

The Fourier 1 Speaker was researched and designed completely in the lab facilities of **The Audio Critic**. Originally, according to Mr. Aczel, the speaker's design had been a lab exercise rather than a commercial endeavor. In its initial version, it had sounded superb in the huge **Audio Critic** facilities. Since the speaker was not formally marketed, it was not until sometime later that reports came back about the speaker's problems. In normal size listening rooms, there were resonance and eigenmode excitation problems with the loud-

speaker. In fact, the smaller the room, the more pronounced the problems. In addition, the dispersion from the speaker's tweeter was found to be less than ideal. Since only a small number of speakers were in the field, it was decided that the speaker could be redesigned since it had not been formally released.

Originally, the dome midrange driver's response had extended very high where it was crossed over to a JVC leaf (ribbon) tweeter. The drivers that had been chosen were the best "off-the-shelf" ones that could be found at the time. When attempting to revise the speaker, it appeared that there were some superior drivers that had been developed in the meantime. For the mid-range driver, they had wanted to avoid the paper cone type, preferring instead the woven type used by B&W. Unfortunately, these were manufactured by B&W

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for use in their loudspeakers only. They finally settled on a 4½ inch paper cone driver that was treated with a plasticising vinyl material that seemed to work well. Since the response of this mid-range driver did not extend upward as far as the previous one, the ribbon tweeter would need to be crossed over at a much lower frequency - creating other problems. So a new tweeter was found as well; a 1 inch dome with superior doping was chosen - one whose predecessor had been rejected earlier.

One of the disturbing things about the speaker's revision was that Peter Aczel, who touted himself as having "Golden Ears", was unable to discern the problems that they exhibited in their original form. We must assume that he tested the loudspeaker under at least as rigorous conditions as he subjected the other

equipment that he reviewed in *The Audio Critic*.

We will leave any conclusions to be drawn about *The Audio Critic* and Peter Aczel to you.

*Publisher's Note:* Auditioning the Fourier 1 speaker, for a very brief time at Las Vegas CES, showed it to be a speaker to be reckoned with. Stereophile has requested a review sample.

(continued from page 14)

power transformer, so there was no way I could isolate one effect from the other. Perhaps the theory will be resolved ultimately; as of now, all I can report is that, for whatever reason, the Brick works. And for only \$35, I recommend it.

If you can't locate it locally, the manufacturer's address is: VPI Industries, P.O. Box 159, Ozone Park, NY 11417. AE

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# St. John's Great Hall needs acoustics

**Page A-3**

(Banner headline from The New Mexican, May 3, 1982. The item was a concert review commenting on the hall's rotten acoustics. At least it does have them.)

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