

THE BAS SPEAKER

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Open Forum

Waveform Artifacts in CD Playback

It appears a malfunctioning CD or laserdisc player can exhibit order-of-magnitude changes in distortion with just a few hertz change.

Recently I discovered that one channel of my Pioneer CLD 3030 laserdisc player produced a sputtering sound when playing low-level hiss. A check with the CBS test CD ("fade to noise, with dither" track which uses a 997Hz sine wave) showed audible distortion below -60dB, the distortion *rising* as the tone diminishes.

Checking with the Pierre Verany disc, which uses a 1,000Hz test tone, did not reveal any distortion at -70dB. The cleanliness of the waveform was confirmed on an oscilloscope. The Denon Audio Technical CD, which uses 1,001Hz, produced distortion at and below -60dB as well. [This disc and the companion *HFN/RR* one have bass-bumpy pink noise.—pub.]

Obviously the digital era has a few traps for the unwary.

— David Hadaway (New Hampshire)

The reasons for this phenomenon are very interesting, and worthy of explanation. The compact disc format (and the digital audio carrier on laserdisc) samples the audio signal exactly 44,100 times a second. A digitally-generated pure 1,000Hz tone goes through 10 complete cycles in 1/100 of a second, during which the A-to-D converter has taken 441 voltage samples. (Dividing 44,100 and 1,000 by their common factors yields 441 and 10.) Every 1/100 of a second, the incoming signal and the sampling clock are back in phase with each other.

As a result, only 441 unique samples are taken of a 1,000Hz pure tone, so at most 441 of the 65,536 available values for a sample (16 bits per sample yields 216 possible values) are represented. This doesn't exercise the system very well, and errors in the D-to-A conversion process may well not be revealed by such a tone—fewer than 2/3 of 1% of the 16-bit codes are used.

On the other hand, the only common factor of 1,001 and 44,100 is 7, so it takes 1/7 of a second, 6,300 samples, and 143 cycles to bring a pure 1,001Hz tone back into alignment with a 44,100Hz sampling rate. We therefore see about 10% of the possible digital codes with a 1001Hz tone. Even better is 997Hz: since 997 is a prime number, it will take one full second, or 44,100 samples (using 2/3 of the possible codes), to bring the tone and the sampling rate back to the starting point. Best of all would be a non-integer tone frequency, which could use all 65,536 sample values.

A test tone from an analog source, which will have minute inaccuracies in frequency and/or level, would also use a larger number of sample values. But the very "perfection" of digitally-generated test tones can make them less than perfect for distortion testing.

— Stephen H. Owades (Massachusetts)

A Small Correction

There was a small error in Poh Ser Hsu's *Bass Notes* list of recommended discs in the last issue of the *Speaker*. The disc containing the 3-meter Japanese drum is the Japan [not Japanese] Audio Society CD called *Impact*, CD-2, not *Impact 2*, CD-3.

— David Hadaway (New Hampshire)

M-S Microphone Clarifications

I think Carl Deneke, in covering Keith Johnson's talk (vol. 17 no. 1), slipped a little in transcribing his notes. First off, the "MX" microphone (p. 8) should probably be "M-S." The statement about matrixing in the next sentence is confused; in the M-S system, the outputs of the forward-facing cardioid and lateral figure-8 are matrixed, to produce the left and right channels. The output of the cardioid ("M" for "mid") mike is a mono signal, and the amount of "S" (side) info mixed in at the matrix governs the degree of stereo difference. In essence, this is a sum-and-difference matrix like that used in FM stereo.

This system is also, therefore, an exception to the statement that, with single-point mikes, "the important center information is off the microphone axis."

— Ivan Berger (New York)

More About Absolute Polarity

In the *Speaker's* volume 17 number 1, Clark Johnsen defended his book *The Wood Effect*, which I had reviewed in a negative manner (vol. 16 no. 5). I think there are several important points to be added to the discussion.

The first has to do with a detailed study of the audibility of various phase effects as reported by Stan Lipshitz and co-workers in the *Journal of the Audio Engineering Society* (vol. 30 no. 9). Johnsen cites a statement on page 583 of this report as evidence for the audibility of absolute polarity. He certainly is correct that absolute polarity has sometimes been (barely) audible in double-blind tests.

But Johnson failed to mention another critical point. The Summary section of the Lipshitz et al report (on page 593) says that the audibility of polarity changes in music played over loudspeakers is only "extremely subtle." This evaluation is confirmed in an exchange of comments between me and Lipshitz et al published in the *J.A.E.S.* vol. 31 no. 6, in which we all agreed that for music on loudspeakers absolute polarity is (1) not strongly audible to most people, (2) not usually audible above 500Hz (more so below), (3) possibly not as audible over loudspeakers which are comparatively free of asymmetry effects (such as second harmonic distortion). In these letters I said that all kinds of phase effects were "of negligible importance," and Lipshitz et al said at the very end, "We are basically in agreement with Dr. Shanefield."

Further evidence in support of all this is an article in the *Stereophile* (vol. 4 no. 8), in which there was no audibility of polarity during blind tests done with the use of low-distortion loudspeakers and yet there was good audibility when cheaper, asymmetrical distortion speakers were used. *Stereophile's* overall conclusion was that absolute phase is of "virtually no significance."

On the other hand, Johnsen has sent me photocopies of several rather glowing letters from readers of his book. And there was a very favorable review in the latest issue of *Speaker Builder* magazine (4/89), in which the reviewer said that absolute polarity now ranks in his mind among the most important audio considerations he has ever been made aware of. [Also a typically weird favorable one in Audio—pub.]

How should we add this up? Is it just a matter of prejudice, pro *and* con?

There is a principle in science which can be stated, "Once you see evidence of an additional factor which might really be causing the observed results, you should never ignore it in further studies. Instead, it must be carefully eliminated." In this case the "possible additional factor" could be asymmetry in the loudspeaker, or it could be delusion on the part of the investigator. Both have been mentioned in studies of this kind, and both must be eliminated in future experimental procedures or else the results might be mistakenly interpreted. The scientific investigator should report what was done about this when giving conclusions—otherwise we should all doubt the results.

For some strange reason, audio science is particularly prone to delusion. People get turned on to all sorts of new pseudo-scientific effects which become "the most important new thing in audio," but disappear like witches at dawn when subjected to double-blind testing. I have believed in several of these witches myself before doing blind testing, and it doesn't surprise me that Clark Johnsen's book has made many converts. During the 18th century, a group of educated and apparently dependable people once testified that an old lady of the town flew into church through an open window, uttered a blasphemy, and flew out again. Is the importance of absolute polarity a real glitch in present-day audio, or just a witch?

What I suggested in my exchange of letters with Johnsen is that he do some blind tests and tell us about the results. These don't have to be done with DPDT switches—just have a disinterested person unhook the wires and hook them up again with reversed polarity. The listening comparisons don't have to be done fast—do them at the leisure of the listener, without a lot of people present who might make for a tense situation, and without a lot of random number generators and digital readouts. Toss a coin about 30 times to generate some test sequences, and also to see how some truly random results would have looked for comparison with the test results. Only the disinterested person changing the wiring knows which polarity is which (and not even he or she, necessarily). Then there can be no excuses

about audible switch effects, psychological tensions, etc. (But on the other hand, there can be no excuses from people like me about "witch" effects.)

By the way, people who don't hear the effect do not need to do blind experiments, according to the way I see the logic. Only people who claim to hear something need the blindness, to be sure it's not imagination. (If *you* don't hear it, how can it be imagination? Of course, you might be somehow suppressing your normal perceptions, but a blind test wouldn't help that.)

Also, the burden of proof is only on the people who claim that some new phenomenon is important, not on us doubters. This is because (among other reasons) a new feature such as special wiring will always entail additional costs in dollars, time, and potential reliability problems.

I have done single-blind tests on absolute polarity, a long time ago and once again after reading Johnson's book. I recently tried it on some Japanese LPs, played over Magnepan MG-II speakers. The MG-II ought to have considerable second harmonic distortion, since the stator magnets are on only one side of the diaphragm, not symmetrically arranged. I heard a tiny bit of difference here and there when the polarity was changed, but I never could decide which was "more realistic" or "better." Also, I couldn't hear any consistent polarity differences between the alternate bands of Japanese records, which Johnsen says are strongly audible.

But whether I can hear such things doesn't count much toward proving the point. I'm just one person with one playback system. What it would take to prove the point either way is a series of foolproof tests, the results of which are essentially repeatable by several independent test groups. Nothing short of this should be believed.

The points that would need to be proven in unequivocal fashion are that absolute polarity is repeatedly audible and that getting it right constitutes a definite improvement.

Actually, I hope several such groups of people will do some foolproof tests and show us that absolute polarity really is important after all. And I hope I'm one of the first people to read about it and adjust my playback system, or practice listening, or whatever I have to do to take advantage of it. Then I can feel superior to the myriad audiophiles who aren't hip.

But until this happens, we should all conclude that the whole business is a tempest in a teapot.

— Dan Shanefield.(New Jersey)

January 1989 BAS Meeting

Open Forum

The January 1989 BAS meeting began with Poh Ser Hsu reporting that he achieved surprisingly good results using a pair of \$15 Radio Shack flat-shape (PZM) mikes to

tape a Ben Zander rehearsal in Brown Hall. Due to the small size of the hall, the orchestra was on the main floor, facing the long wall. The mikes were taped to the wall about 5 feet up and 10 feet apart. This gave reasonable sound while the usual quick-and-dirty setup of a Sony Walkman Pro and its stereo mikes gave terrible sound.

In industry news, Kyocera is stopping US distribution and audio manufacturing. This would include the KLH and Yashica brand names, and they are looking for a buyer for the KLH name. The general feeling was that Kyocera made good products but priced them about 50% above the competition [good OEM vendor—pub.].

Steve Owades attended the Yankee Dental Conference and found Tek Scan (made in Cambridge) interesting. This is a \$3,500 device that measures and displays as a 3D image the pressures between teeth. It uses a thin plastic film (\$5) with conductive grids screened on each side at right angles to each other. It is designed to let a dentist tell when a filling or crown is too high.

There was some discussion of the *BAS Speaker*. We are trying to do our best to get it out not too late. There are audio societies that meet at a Chinese restaurant or at an audiophile's house, but the majority of our members do not attend meetings and their sole contact is through the *Speaker*. It is also the way we attract guests. It would be helpful for members to contribute their observations and articles.

The Atlanta Audio Society has a monthly newsletter/publication. Membership is \$25/year. For more information, write to the AAS, P.O. Box 361, Marietta, GA 30061.

We have a chronic problem getting officers, editors, and meeting summary writers. Martin Polon, who has been involved with getting officers for the local AES chapter, noted that it required more of a KGB squad (with silenced 9mms) than a press gang to get people in audio to give their time.

Al Foster noted that John Atkinson (of *Stereophile*) liked Mark Fishman's (our former editor) writing style, which was described as a refreshing and new style [he means technically competent, in contrast with most other audio publications] which makes the *Speaker* outstanding.

Brad Meyer had some feedback from the Philips recording team who had been guests at a BAS meeting (vol. 15 no. 11/12). They were tremendously pleased with the report and thought that it both thorough and accurate. They photocopied it and sent it throughout the Philips plant.

In news of former *BAS Speaker* contributors, George Androvetta is now writing a column in the San Francisco area. This is another in the list of *BAS* contributors who have started with contributions to the *Speaker* and have moved on to greater fame (and fortune).

Steve Owades commented that he had been asked for a reprint of an article that first appeared in the *Speaker* because we had been cited as a reference in the *Journal of the Audio Engineering Society*.

As for the *Speaker* running late, John Allen noted that the November 1988 issue of the *AES* had the report of the Beranek tour of Symphony Hall that occurred in December of 1987; delays occur even with well regarded, serious, professionally staffed publications. In this case, there were delays getting photographs, getting the tapes transcribed, and waiting for appropriate space in the *Journal*. Also, the issue had a November cover date but arrived in mid-January 1989.

The local AES meeting generally draw 20 to 30 people, which is roughly the size of BAS meetings. The *AES Journal* generally has very few local meeting summaries, but we will be printing some summaries of Boston Section AES meetings in the *Speaker*. We hope this will continue to strengthen the close connection between the BAS and AES.

The general conclusion from all of this is that we are in about the same boat as everyone else. As always, your ideas—and help—would be appreciated.

Meeting Feature: CES Reports

The report on the Winter CES, in Las Vegas, was given jointly by Brad Meyer, Ira Leonard, and Al Foster.

A major reform was in the way attendance was calculated, because exhibitors pay based on the attendance. Last year the show traffic was light but the organizers announced the biggest year ever. This was accomplished by counting all the applications for badges. Last year if a dealer applied for 10 badges (badges were free), then all 10 counted toward the attendance no matter how many attended. This year it was hard to get a badge and you could not get more than one. The badges had a molded-in color code for exhibitor, dealer, or press (so that you could not change class) and multiple affiliations were not possible. Brad was representing both the *Boston Phoenix* and *High Fidelity* and felt his reception by some manufacturers would be different depending on which was on his badge, but he could not get both. However, his original badge identified his magazine as "High Fidelity Magazine." (They did let him replace it.) With these corrections the attendance was given as 70,000. (In recent years attendance has been given as about 100,000.) This was an apparent shortfall of 30,000 people, yet this was a bigger show than Chicago.

Speakers

This year many speakers are aimed at the video market and at small apartments as 3-piece systems. These speakers are small and the woofer is generally separate from the midrange/tweeter module. About half the speaker-design activity was in these areas.

Yamaha had a 7"x12"x9" box called the AST, which stands for Active-Servo Technology. This is a small 2-way vented speaker with amplifier and a plug-in cartridge for equalization of these specific speakers, which extends response flat to 28Hz. There is also a cartridge without equalization for use with normal loudspeakers. [Yamaha bought this technology from Audio Pro of Switzerland; it uses negative-impedance drive to im-

prove the Q of the woofer and equalization to extend the bass response.--ed.)

There is still no free lunch: this is not capable of playing louder than any other small box and has limited displacement. You can control this (or any other) small speaker either to have extended bass or to play loud but cannot do both. The speaker will run out of power and cone excursion. Yamaha also uses a small port so there is a relatively high air velocity. They claim to use an anti-resonator to control the puffing sound; this may be more advertising than functional, but Brad Meyer did not hear puffing. It is fairly high-priced at \$1,200 for the speakers and amp together. Using the Hindemith organ CD with 19Hz notes, Brad could hear flapping noises, like a speaker reaching its excursion limit at not very loud levels. KLH had a speaker some years ago, designed in part by Daniel von Recklinghausen, which had an electronic module to reduce the equalization as drive levels were increased, thereby reducing the risk of overload. This was not done in the Yamaha unit.

The Sansui SS-100 speaker (8", 2-way) at \$1,600/pair had a lovely sound. Their SW-2700 was 2 modules plus a woofer (\$370) sounded lovely but only on the tweeter axis and only down to 55Hz.

Boston Acoustics showed their SubSat Six. This is a \$650, 3-piece system using the usual 2 small cabinets for the majority of the audio range. The woofer cabinet houses two woofers. Its operating principle is extremely similar to that used by KEF in their 104/II and 107. The woofers are mounted on an internal baffle, which divides the cabinet into two: one loads the front of the woofers, the other the rear. The output is channeled into the room via two ducts, *both on the same side of the internal baffle*. The other sub-enclosure is sealed, i.e. below the port resonance, the woofers behave as an acoustic suspension system.

NI-1T (for Now Hear This), which is former AR engineer Ken Kantor's company, had a \$130 20W power amp intended to increase the sound quality of TV audio. The amp can be driven either at line level or from the TV speaker to make for easy adapting. All these speakers are magnetically shielded, using a second magnet mounted on the back of the main (driving) magnet to cancel the external field, so they can be located near a TV without distorting the displayed colors.

Pioneer had a surround-sound active "subwoofer" system. This is a vented center-channel woofer with line-level highpass outputs for the side speakers. It also has a center out for a dialog speaker.

Design Audio had the Micromonitor, their version of the same thing.

Velodyne had a \$645 combination amp and woofer that went down to 45Hz with low distortion and rolls off cleanly, called the VideoSub.

George Samuels, formerly president of Genesis, has designed a new line of loudspeakers for Ohm to sell for \$300, \$400, and \$500/pair. These are rounded boxes with the tweeter on top in a small egg-shaped enclosure attached by a 1/4-inch phone plug. They sounded nice

and had an excellent manual. The middle was better than the low end of the line. They are available locally at Lechmere and Highland.

Allison introduced a new line, the AL series. All but the smallest model use Roy Allison's tweeter. The tweeter apparently costs some \$10 each to make, which limits its application to more-expensive speakers. (In this case, spending the extra money is probably worthwhile.) This line is designed to be placed on a shelf high up against a wall, or out in the room away from boundaries (except the floor.) They will not replace his present line. In it, the CD6 (\$400/pair) has been modified to be even better sounding and easier to place.

Soundpipes, by Water Works Acoustics, had speakers mounted in a 4-inch pipe. The lower part is used as the stand. As part of their display they had water running out of the pipes of one of them. These speakers are meant for a wet environment (boats, patios) and have stainless steel and corrosion-resistant banana plug.

Apogee went to Las Vegas for the first time. It is also the first time that they used CDs. They used a Sony \$8,000 CD player with separate chassis for the transport and the A/D converters. (Philips had a similar unit for \$4,000.) They introduced the Duetta Signature. Their speakers are now available in faux finishes (i.e., hand-painted finishes that look like any of a variety of other materials such as marble). They apparently use a variety of brushes and other implements, including turkey feathers, to produce these effects.

Brad Meyer reported that a British company had 15W tube amps playing with speakers of 92dB sensitivity. They had a comparison of CD and LP sources. The recording was a duet, with a bass player playing with various other instruments and voices. With LP (but not CD) sources the effect was magical and real; on the other hand the voice tones did not seem integrated with the rest of the sound. There was a remarkable absence of surface noise. Some phono cartridges are able to do this to a remarkable degree, for example one made by Adcom and sold by Boston Acoustics a few years ago that for some reason had very low subjective noise.

In this case, this British company did not believe in *ever* cleaning their records and so they were very dirty, but the sound of the dirt was surprisingly easy to take. (Perhaps they thought that cleaning records just pushed the dirt into the groove, where it could not be removed.)

Snell used a DAT tape for source material. They had a new \$4,000/pair speaker called the Type B, looks like an upended coffin. This is a big box with the main drivers on the inside edge. The grille is thin and the speakers are mirror-imaged. There are a woofer and 2 vents on back but no tweeter. The front has a woofer, mids, and a tweeter. There are a total of 5 drive units—two 10" woofers, an 8", a 1.5" and a 0.75". The front and back woofers are asymmetrically placed so that they do not line up and the vents are also asymmetric but probably tuned to the same frequency. It does go very low and was designed to have good bass when placed out from the wall. The specification includes the ability to gener-

ate 119dB at 18Hz at 1 meter, which seems implausible. Sensitivity was rated at 92dB @2.83V @1 meter. It passed Brad's Hindemith test—it is loud, low and clean. Snell are still developing this speaker but it seemed to be a good one and worth listening to the final version.

Epicure loudspeakers are now part of Harman International. Howard Jacks (former owner of Precision Loudspeakers) is their designer. They are no longer north of Boston.

3A Acoustics had their Reference 2000 at \$20,000/pair, which use a ribbon plus 2 woofers in the base. These did not sound worth the price, but their smaller speakers, which are called the Master 5 or the Mini (\$2,000/pair), did sound better.

Brian Cheney had his VMPS Supertower 3. Clark Johnsen was there. At \$4,695/pair the Supertower 3's had a big, low end that could go quite loud, and good imaging. They have the same upward tilted mid-bass that all of his speakers have, which gives a mellow sound. This model had a harshness in the 5 to 6kHz band, which still needs some work.

Fried had the model R4 (\$1,050/pair) that was a remarkably nice speaker if listened to toed-in but colored if listened to straight on.

Snell had the latest incarnation of their model K. The sound is too thin and not warm enough but they will probably be popular.

ReVox demonstrated their Duetto. The speaker is triangular in cross-section and placed on the floor firing sideways to the audience. The soundstage was big, pleasant and room-filling but not very specific or localized and the high end was rolled off. Each speaker unit had 6 drivers in 2 chambers. There was also a subwoofer. These are available in white lacquer for ceiling mounting. They will cost \$800 to \$1,100 depending on finish. A notable part of the demonstration was Swiss chocolates.

More speaker designers are going to a general treble rolloff or elevated bottom end to compensate for CDs' relatively hot high end. There are also changes in the mid bass to upper bass balance, as CDs do not have the warmth of LPs.

Dr. Roger West's Sound Lab electrostatics now sound a little more forward and punchy. He feels that absolute polarity is important and liked Clark Johnsen's book on the Wood effect. Dr. West has added a wooden panel to the side of the speakers that improved their sound. Al Foster thought that the A1 was the finest speaker he had heard while the A3 sounded bass-heavy.

West previously had, in effect, closed off the end of the room with speakers, putting the main speakers on each side and filling the center (between the left and right panels) with the woofer panel. The panels nearly reached the ceiling. This went very low but was still not very loud.

Dolby surround systems have a center channel for dialog so, as noted, there are more 3-channel systems. This gives more, realistic dialogue because the speech seems to come from the TV image, but still allows the main

speakers to be spread widely for best musical and spatial effects. John F. Allen, who designs and installs theater sound systems, noted that the center channel was not just used for dialogue but also carried some of the music signal. Most of the sound on 35mm Dolby films is in mono. There is a little stereo especially because the steering circuits can turn down the left or right channels by 14dB.

Brad Meyer felt that with home video, the effect of the center speaker was small. For example, the Lexicon digital delay unit can send the low frequency mono information from the center channel to the sides so that a small speaker can be used for the center channel.

Allen commented that in a theater the bass was usually mono, with the left and right channels summed, and that the subwoofer output is always mono-derived. This is essentially true for 70mm film. It is hard to get bass (<100Hz) into the rear channels because of phase problems. Meyer noted that a speaker with an 80Hz cutoff was good enough.

Steve Owades stressed that a good speaker was needed for the center and that a lot of good small loudspeakers (such as the Celestion SL600's) were sold only in stereo pairs, while he needed a third speaker for a center channel. He suggested that the mini speakers should be sold as three of the small units (rather than two) plus the subwoofer if a company was serious about video.

A dealer suggested using an AR Powered Partner for the center channel. There are a number of potential problems with this application. First, the AR, whatever its merits, is not the sonic equal of the Celestion SL600s, and second, this speaker shuts off with a click if it does not receive signal for a period of time.

Meyer suggested buying 2 stereo pairs, then using three speakers in the front plus one in the back for the surround information. But Owades felt that having only a single speaker in the back would be acoustically obvious unless its level was drastically reduced. (The obvious solution to this is practiced by Dick Goldwater: just keep adding more stereo pairs. The more speakers you use, the more that some of the basic acoustic character of the listening room can be masked.)

Allen felt strongly that it was extremely important that all the speakers have the same sonic character, because there was plenty of information and dynamics coming from the surround speakers.

Meyer found that one of the major trends was putting speakers into the walls of the listening room. These wall speaker systems use the large volumes between the studs (usually on 16" centers for recent construction, but old houses can have almost *any* distance between the studs) for the cabinet volume. In some cases these speakers use the inter-wall volume directly but Wall Speaker Systems uses a normal cabinet designed to fit into the space between the studs, which gives the designer complete control of cabinet volume. In this case, the tweeter was aimable (left, right, up and down) because the treble is not omnidirectional. These speakers

cost \$2,000/pair. They are not sonically up to par in the midrange and treble but the bass is OK. They have to be built into the wall so they can be installed only during construction or major renovation. (You had better be sure that you like them.)

If the cabinet is not included, the in-wall speakers generally use a stiff surround, like car speakers, because the studs may not be airtight.

Al Foster noted a \$2,000 price might not be high because custom stereo was very expensive, very much more so than "normal" high-fidelity components, and that the price of the built-ins is more in line with this market.

Carver introduced two new speakers: the Platinum and the Silver Editions. The Platinum is 5 feet tall, while the Silver is 4 feet. The Platinum comes with sonic holography and bass enhancement for \$2,700. Carver will also release a "Cathedral Generator" like the Yamaha system. They designed the specifications, then a chip manufacturer constructed the entire logic and processing functions in a single IC chip which costs \$65. Carver has spent a lot of time over the last two years getting the speakers to sound good, but now that they are done we can expect to see a lot of new product introductions. (However, after nearly a year, the Platinum edition is still unavailable.)

Al Foster commented that at shows like this nothing ever sounds good—speakers are too thin, bright, or bass heavy—in part because he cannot relate to the environment. He can judge speakers only after hearing them in his home.

Brad Meyer was not impressed with the Sumo loudspeaker, which uses a single mylar diaphragm with a central driver. He thought that it was colored, did not have enough low end, and was not sensitive enough for its price range. They are also unable to play loud. It would have been competitive at \$1,000, but they cost \$3,000/pair. However, Peter Mitchell liked it a lot.

The AR (Acoustic Research) room was done in a western motif. All the staff were dressed as cowboys. They had real guns until security came in and confiscated them. The western design was done by the same person who did the western designs for Walt Disney. The overall effect was well done but out of place. The comments of visitors were a mix; however, it did draw a lot of people who would not have normally come.

In contrast, Foster reminded us of the live vs. recorded demonstrations of years ago, which were very well-done; AR used to demonstrate substance.

Paul Gardocki, a very high-energy person, was promoting his system, very small speakers with a little larger woofer module, selling for \$2,500 a pair.

Surround Sound

Video surround sound is beginning to become commercially important. Lexicon introduced their CP2 (\$895) which is a redesigned CPI with only 3 programs included. These are music logic, mono logic, and Dolby Pro Logic. Each of these has a single variable parameter.

The music logic varies the amount of steering. Mono logic varies the amount of mono sent to the center. The prologic varies the bass blend, which is mono bass sent to the side speakers. The CP2 will have the continuous, automatic-adjusting balance of channel amplitude and phase in the digital domain as the CPI.

Denon had an audio-visual amp with Dolby Pro Logic decoding for \$1,000 that had 14 audio inputs and included 7 composite-video inputs and 2 S-VHS inputs. The status of the amp can be displayed on the video screen.

Yamaha had a "Natural Sound Audio Video Control Amp," which had S-VHS inputs and surround sound but not Dolby Pro Logic.

JVC and Sony also had A/V amps but the general conclusion was not to buy these as yet because they lack S-VHS (S-YC) connectors, also called S-connectors or Y-C connectors.

Fosgate and Proton both had enhanced, surround-sound decoders.

In general, "control amp" is used for "preamp" on Japanese products.

Yamaha had the DSP-100U, which is derived from the DSP-1. Unlike the DSP-1, there is a single volume control for all 6 channels. This is a mono-processing enhancement device like the DSP-1.

Sony had a digital signal processor with digital reverb, and a programmable graphics equalizer. The surrounds do not use Dolby ProLogic. It will be sold only in Japan.

In general, Japanese manufactures are not using Dolby Pro Logic in their digital processors; they are treating home video and surround sound as separate markets.

Turntables & Arms

Finial showed the final consumer version of their laser turntable, which works but requires that the records be clean. However, Carillon (who owns Finial and now dbx) has withdrawn funding so the turntables will be manufactured in Japan and sell for over \$20k.

There are two main lasers and a tracking laser. The optics are very complex. The dimensions are so critical the shrinkage of the epoxy during curing is enough that they cannot tell if the assembly will work before the epoxy has cured. These should be solvable problems.

Bob Graham was (finally!) showing his tonearm. This is a unipivot design and will cost \$1,250. When first designed a number of years ago, it was intended to cost \$120.

Amplifiers

Carver sold as many Silver 7 tube amplifiers as he could make at \$10,000/pair (although he made them originally just to show how ridiculous high-end tube equipment was). He now has the Silver 71', which is a transistor version with supposedly the same sound, at \$1,000/channel. The transfer functions were designed to be identical to the Silver 7, in much the same way that the 1.0T has the same transfer function as a Conrad-

Johnson tube amp. The Silver 7T delivers 550W into 8 ohms and 900W into 4 ohms. This amp looks very much like the Silver 7; it even has a round meter on the front. Apparently Carver drew the prototype meter face, then cut it out and pasted it on, so it looks very 1950s-ish.

DATs, CD Players, and Recordable CDs

In DAT news, Nakamichi USA will officially import their model 1000 in March. This recorder will cost \$10,000 (that's ten thousand dollars, not a misprint) and will be based on two separate chassis (which will be different from the \$3,000 Sony). A single control unit can interface with two tape units. It will feature rapid tape loading and the head and drum assemblies are visible from the front. It is also the first with real-time off-tape monitoring. It has both balanced and unbalanced inputs and outputs. The consumer version has a wireless remote and the professional version a wired remote. It can record at 32kHz, 44.1kHz, and 48kHz (i.e., it will record at the CD sampling rate). Apparently, in discussions with the RIAA, the use of the copy-prohibit bit to prevent recording was not sufficient to prevent RIAA objections, so when the NAK 1000 records from a CD which has the anti-copy bit set a light goes on showing that the anti-copy bit is set, and then the R-DAT proceeds to record, ignoring the flag.

In the NAK 1000, the time code (in minutes and seconds) is on the tape as part of the audio bit stream, not in the control track on the edge, as with other machines. This method is not susceptible to tape edge creases but you have to start from the beginning of the tape to have the time code accurate. This machine cannot read the regular DAT time code because it has a double-speed fast-wind mode.

Fostex had a system that put the SMPTE time code on the tape and had an AES paper about the process and equipment. It is implemented in software so the encoding can be reset to match any new standard.

A wide variety of DATs will be available from DAT USA International. Being a small American company, they think the RIAA will not sue them. They offer a comprehensive service contract: if they cannot fix a broken DAT in the US, they will air-freight the unit to Japan for service, which will take a maximum of 2 to 3 weeks. This sparked some discussion of buying a service contract from what is essentially a small independent dealer who could go under at any time.

The RIAA's only hope is to sue a large Japanese company and tie up their entire stock in a California warehouse for 5 years as the legal battles go on. At the moment there is nothing illegal about selling or buying any DAT recorder, it is only the fear of the RIAA's lawyers that is stopping importation. RIAA is not threatening professional DAT.

DAT USA also won the all-time alienate-the-press award. They had a press conference at which they stopped press members from eating breakfast until after the briefing, which was in full view throughout.

There was also a distributor who said he sold the gray market DATs to DAT USA. He thought that the majority of the profit would come from selling service contracts.

These machines are not UL-listed but are made the same as the pro machines that sometimes are, so they should be safe for home use (except, of course, for any adverse effects on your fire-insurance coverage).

There are currently about a dozen sources of gray market DATs.

There were no recordable CD players for serious sale. However, Triad (a Korean company) was showing a system in the \$10-12,000 range, probably just to demonstrate that they could do it.

Krell (d'Agostino) had a \$9-10,000 CD player. This is a 2-chassis unit. The disk drive is in the open with a cover over it. It uses a CD ROM drive, because this is thought to be better. A separate signal processor could be used. Krell also had a 200-watt mono class A amp: large, heavy, and expensive.

Video

Barco had the best looking projection TV, a HDTV projector playing a NHK tape. The HDTV sets had much greater detail but seemed to lack snap and contrast. There is more detail but less brightness. That is, they look more like Sony Trinitrons and less like Pioneers. Part of the problem is going to be the expectations of a public which has been told that the new TVs will have movie quality; even HDTV is not going to look as good as 35mm (let alone 70mm) film in terms of color fidelity, saturation, contrast, and brightness.

Sanyo had a 3D HDTV at the previous Chicago show at 60 frames/sec that used switching glasses, but the background was blurry and out of focus. This was very distracting from the in-focus foreground, perhaps because our brain expects the moving foreground to be less clear than the static background and perhaps because as the video gets more lifelike we expect to be focusing on the part of the picture of our own (not the cameras') choosing.

Ira Leonard noted that a direct-view set may be better than a projection set in detail and focus.

No video has the dynamic range of film. For example, with film outdoors there is detail in both sunny and shaded sections; this is not true in any TV set. Color tracking is also less good with video than with film.

John Allen noted that projection HDTV will give small-TV NTSC quality on a screen four times normal size and that HDTV just cannot match film projected on a 50-foot screen.

Martin Polon, whose business is analyzing public response, commented that people (that is the mass audience) does not watch TV with great attention; they tend to treat TV as background. The public also tend to buy a new TV only every 10 years or so. This all makes it tough to call whether HDTV will be successful. An additional problem is that there are 15 exclusive and competing systems, none dominant. There may never be

agreement on a single common standard. (Remember 4-channel sound with just 3 major systems?)

Ira Leonard commented that things were even more complicated. At the Barco exhibit Pioneer 838 laser-disc players were used for the NTSC portion. A projector display used a 6.5'x12' screen in a 36' deep room which was 25' wide. The HDTV demonstration used a Sony (video) tape deck and was time-base-corrected to improve the picture quality. This amounted to \$250,000 worth of equipment.

The interesting thing was they got it from Southern Bell. The FCC has said that HDTV must be NTSC-compatible and some groups are not happy with this approach. There is also possible a system using both fiber-optic and satellite distribution so that telephone companies could distribute HDTV and gain a lucrative market.

Polon commented that the reality of this form of distribution depends on Congress. Under this scheme, broadcasters would be reduced to second-class carriers. These are end-of-the-century systems and there are still the 15 standards that have to be dealt with before Sony and the other Japanese companies can begin to make the production equipment. The European market standards are different from ours so the equipment will have to be different. This compounds the problem of getting equipment made and ready for sale.

But Mark Fishman commented that in the current HDTV field tests, Ikegami has equipment that changes line rate, field rate, and bandwidth with plug-in chips. The camera body, lens, and most electronics will be the same, so the cost may be more but multiple standards may not be an overwhelming problem.

However, 90% of TVs have picture tubes of less than 20 inches, so that at a 5-foot viewing distance the differences between normal TV and HDTV will be almost imperceptible.

The Philips IDTV system uses a scan-line doubler; this was not as good as full HDTV systems. The Philips HDTV system uses a second channel to carry the additional information. That is, it uses two 6MHz channels, one of which is a standard TV channel and one auxiliary HDTV channel. This was not as good as (but close to) the full NHK system.

Zenith has an HDTV that works in a single 6MHz channel, with a little spatter out of the band, but this is not usable by a normal TV as it is not a NTSC system.

NAD had a 13-inch color monitor for \$430 that had all the features of the good 25 inch monitors. It has several A/V inputs (including an S connector accessible from the remote), a sleep timer, a 9MHz bandwidth chassis, a subtle gray scale, and a stable power supply. It has impressive picture quality, with remote control and stereo and SAP outputs. The audio is good. It uses a 0.6mm dot size, which is a compromise with brightness, because people watch TV in lighted rooms.

Toshiba had TVs that used the Carver Sonic Hologram circuits to increase the aural width of the sound field, to make up for the closeness of TV speakers.

Color LCD TVs are beginning to appear at \$500 to \$600.

Generally, the Sony Trinitrons looked better than any of the IDTVs.

Reference Recordings has a reference video disc. Mostly made on D1 digital video recorder so the signal has not passed through any NTSC limiting, it has all kinds of tests encoded in various ways. For example, one section has both analog and digital audio carrying different information so you can test the two processes separately. A further test has CX encoding turned on and off in the middle to show how bad the CX noise reduction is, the sound being less vivid and focused when CX is used. It also has normal video tests, such as color bars, and resolution charts. It may be possible for the BAS to get a bulk order for about \$50 each (list is \$60).

Reference Recordings were using the Lexicon decoder for the audio surround sound. There was one section that has bass signals in the 10 to 100Hz band and the highs go up to 20kHz.

Ira Leonard reported that the Philips laser disc (and CD) player had the S video connector. This player also uses a comb filter in the laser player (rather than the monitor) to eliminate horizontal jitter because the filter can synch to the motor. The overall effect is to achieve cleaner color transitions. Pioneer will probably have a similar system in a year.

Shoreline Video has a player with both an S-VHS connector and a time-base corrector for \$1,299. This helps picture quality, especially with projectors and big screens. For \$3,000 they have a box with two of the time-base correctors. Other external boxes will be available for various other kinds of processing and special effects.

Miscellaneous Items

ICT digital radio was not at the show. However, Digital Radio Laboratories had a 16-channel digital radio with CD quality, which is transmitted over a single 6MHz TV channel. They use a lot of data compression and like a 2400bps modem, do not just send one bit at a time. The signal sounded OK in preliminary tests. The signal would be transmitted over a single cable channel, thereby avoiding the FCC regulations. There will also be provisions for text outputs to a TV set. The decoder could be either bought (\$180) or rented (about \$6/month). At night, users could record an entire CD for \$7, which seems high, and there is no direct digital output. They intend to use the upper (normally unused) channels of a cable system.

The Casio exhibit area was characterized as being slightly smaller than Somerville (a large city near Boston).

There were lots of hand-held computers, all designed for tiny fingers. Any company that does not have one now will by the end of this year. For example, Psion had a hand held computer with 1 meg of memory, due at the end of the year. If you don't have screwdrivers for fingers, you can transfer to DOS or Mac computers.

In small sound systems, Fisher had a boom box that sounded good.

There was a considerable media presence. CNN had 2 crews as did *USA Today*. The television program *West 57th Street* had a 7 member crew to do a spot solely on VCRs.

Sony had a nice exhibit, which was hidden away from the main area. They had their electronic still video camera, but this still was not a major exhibit.

Mitsubishi, Zenith, and RCA were all not there; Bose, as usual, did not attend. If a company is not interested in new dealers or interested in promoting new business connections, the cost of exhibiting is excessive, typically \$50,000 to \$100,000. Some displays cost much more; Nintendo was said to have spent \$2,000,000.

Jim Kogen of Shure said their share of the market was holding steady at 30% to 40% and that they were making money in cartridges. They see the future as video-with-audio becoming the market as opposed to the separate audio and separate video markets. Essentially, you will have a media room combining both audio and video.

Steve Owades commented that with their new magazine *Perfect Vision*, Harry Pearson and *The Absolute Sound* have lost their understanding of video as well as audio. They just don't seem to get technical things.

Pioneer had a marine line of loudspeakers, car speakers tailored for boats.

A lot of the car-speaker people had laser-disc players. They also had installed TV sets in the back of car seats. One installation had a radar detector that cuts off the audio if radar is detected.

VTL (which stands for Vacuum Tube Logic) had the best-looking tube amp. This was a huge 1,000-watt mono unit.

Some thoughts on Las Vegas

They push their (entertainment) shows, which try to copy the Paris shows but lack the talent. The shows are technically fine but lack art. There was a great contrast to Chicago where everybody always takes the bus. Here, you just rent a car. There were no traffic problems and there are big (free) parking lots. The notion of just getting in a car and driving (instead of walking) a few blocks seems strange at first but is a consequence of the cheap real estate.

John Allen reported that he got propositioned five times while crossing the street. It was noted that the streets are wide.

Everybody commented that one-armed bandits (i.e., slot machines) are everywhere, omnipresent from the time you get off the plane. In fact, the entire airport complex was built on the profits from slot machines.

— Carl Deneke (Massachusetts)

June 1989 BAS Meeting

Open Forum

The June 1989 meeting was called to order at 6:27 by David Moran. The first major announcement was of the death, after 40 years, of *High Fidelity*. Diamandis Communications, the parent group of *Stereo Review* and *Audio*, bought the logo and subscription lists of *High Fidelity* (and *Modern Photography*) and had shut both magazines down. This will give *Stereo Review* another 150,000 names they don't already have. (It seems odd they should want them, because when their circulation gets too large their rates rise too far for their advertisers; I am told they have shed readers intentionally before.—EBM) *High Fidelity* subscribers will get subscriptions to *Stereo Review* or an extension of any existing one.

During the meeting announcing the move to *High Fidelity's* staff, the locks in the building were all changed, making it impossible for Ranada, Riggs and company to retrieve the substantial amounts of personal stuff (equipment, CDs, copies of reports and reviews ready for publication). (This property was seized by ABC who, someone said, would probably either auction it off or make it into a giant System of the Month for *Stereo Review*.) *High Fidelity* had been losing money, but one member who follows the business reported that in the month before, people trying to buy the magazine were told it was not for sale, and that it was profitable.

Riggs has accepted a position as editor at large for *Stereo Review*. We also heard about the birth of a new magazine tentatively called *Audio/Video Reports*, to be put out bimonthly by CurtCo Publishing, the folks who bring you *Car Audio* and *Audio-Video Interiors*. According to a message from Peter Mitchell via Brad Meyer, there will be 10 test reports in each issue, half audio and half video, most or all written by David Ranada. The magazine will furnish him with a test lab in the New York area. The main subject will be equipment, not recordings; Peter will be doing a technical column about how things work, to be called either Technicalities or Shop Talk (0, while Larry Klein will do "his classic Q&A column." Bill Burton will most likely be the editor.

Members were apprised of the current *Globe* jazz festival. It's more accessible this year, including some free concerts which were announced. Tower Records meanwhile had a sale on jazz recordings.

John Allen has completed the installation of an HPS-4000 system at the General Cinema in Framingham at Shoppers' World. Output of the system is around 500 acoustic watts; they opened with *Indiana Jones*, soon to change to *Batman*. The main systems are 4-way versions of the Klipsch T-MCMs with lower and upper midranges; there are two extra woofers. This has further reduced the intermodulation (between, say, 500 and 5kHz). The surrounds are John's SR-70 design; amps are BGW, and the Dolby SR-equipped optical playback system is the best now available. This system will be the

subject of a joint meeting with the AES, ASA and SMPTE.

John urged comparison with the THX system in Chestnut Hill, confident that we would prefer his, which is substantially less expensive. THXer Holman gave a talk recently at Syracuse to the ASA, and was at CES. There are now 325 THX systems in the U.S., 400 worldwide, with rumors of a home system to come.

One trend in films is shorter hit lifespan. The week's surprise biggie was *Dead Poets Society*, which took over from *Indy III*, which had grossed \$120m in three weeks and started to fade.

Someone asked what had happened to Jim Snider, Mr. Goodbuyer. Al Foster saw him at the show and reported he is working on a book. He complained about the cost added to goods by advertising and seemed to be planning some kind of giant distribution agency to get around the problem.

Janice Gray, known to Bostonians for her announcements on WGBH and WCRB, is no longer working for WFCC on Cape Cod; the classical station is going to satellite pickup and automated programming.

Dbx is completely gone from Newton; phone calls at this writing didn't even get an intercept. Dbx price lists were handed out at CES by parent company Carillon. There were dbx and ADC booths, the latter a big one, at CES. CTI CEO Jacques Robinson was there, and the room was busy. If you have dbx products that need service or help, call Carillon in Sunnyvale, California or ask David Moran.... A new company called THAT, for principals Les Tyler, Gary Hebert and Paul Travaline, is selling VCAs out of Framingham; BAS/AES member Ginny Frisby now works for them. Other staff moved to Bose, Analog Devices, ADS, AR, and elsewhere; AKG will purchase the pro products division.

Meeting Feature: CES Reports

At this point Al Foster, Ira Leonard and Mark Fishman grouped themselves at the front of the room for the time-honored CES free for all, which as usual featured many reports on new loudspeakers.

Attendance at the show was 55,000, down from the claimed figures of 101,000 for the previous June and 62,000 for last winter. As of the January 1989 show the EIA counts only those who went to the show instead of everyone who applied by mail. A year ago, when the crowds on the floor were obviously thinner, the announcement of the usual new attendance record brought cries of outrage from exhibitors, who were being charged on the basis of patently incorrect figures—hence the new, accurate counting scheme.

Ira, reading from the company's own press release, said that Acoustic Research is frequently referred to as AR University because so many people "graduate" and start their own businesses. One reason seems to be that while AR does good research, they seldom put out satisfying products. They mean to change this situation. At

the show they had two booths, one for the Partner line and one upstairs for a new line, called Spirit.

AR intends to start building its own drivers again, and maybe electronics too, in Canton, Mass. They showed a new power amplifier that can be operated in class A mode (at 20W/ch) or class AB (200W/ch), which will sell in the \$1,000 range, and a couple of different versions of the ADSP time-domain equalizer/analyzer (both for commercial use). The new Spirit speakers have a small footprint, dual-density baffle boards, and a front panel that is decoupled from the rest of the box by a polymer insert. All have sealed woofer boxes, with a grille cover in the form of a cloth-only sock with a drawstring, like a fitted sheet. Prices begin at \$289/pair.

Apogee showed their Stage One speakers, 36" tall, for under \$2,000 a pair, claimed to achieve 107dB peaks at 4 meters with a 50W/ch amp. The Celestion 3 is that company's new small speaker for \$250/pair; reports were that it does not have great bass but Ira Leonard likes its clean, open midrange and top. (Ira, accustomed to Quads, is presumably fussy about these things.—EBM) [I found the top end to be too sizzly.—ed.] (Measured okay, not great—pub.) The Celestion's banana plugs have, as usual, a non-standard spacing, apparently not from British cussedness after all but in compliance with some European safety regulation. (These speakers were reviewed in the June '89 *Stereo Review*, if that helps you at all.) Ira bought a pair at the show, for a special show price, prompting a discussion of the ethics of the deals available to attendees. Brad Meyer (author of a BAS article some years ago called "The Sleaze Factor") pointed out that anyone who gets a better price than that available to a regular customer should say so in anything he or she writes about the product.

The Ohm Coherent Audio Monitors with their rotating tweeters have a new "sub-bass activator" circuit that rolls off below the cutoff and boosts the region just above it. Boston Acoustics has a new powered woofer with a 33Hz cutoff. The top of its range is 95Hz, with a 24dB/octave crossover, making it a good match for many small speakers. Price is \$600 including a built-in 100W amp with electronic crossover and summing network; it can be fed either from a line-level or power amp output. Both ends of the vent in the box are flared for lower distortion; there is a single 10" driver with a 44-oz magnet and ventilated pole piece.

Allison has updated the Mini 2, now called the MS-205. It's a three-piece system with new tweeters. The woofer goes down to 55Hz; of course it's in a sealed box. All three pieces cost \$499, or you can buy the woofer separately for about \$280.

David Moran was in the process of reviewing Allison's new AL-125 for *CD Review*, formerly *Digital Audio*. The intended room loading is different from preceding Allisons; the new series is meant to sit well away from both side and rear walls, the type of placement long favored by audiophiles for best imaging and detail but one which often involves some sacrifice of lower midrange/upper bass smoothness and power. It is a

\$900/pair three-way with two inversely mounted 6" woofers. Moran listened to it and thought it sounded "fabulous." Measurements with the dbx RTA-1 analyzer correlated well with what he heard; the system (placed 3' from one wall, 5' from the other) measures very well, especially in 150-600Hz range. From a few feet away, he found it within ± 1 dB from 150-700Hz; the crossovers look good, and overall response was ± 3 dB from 50-15k. (Moran has been making countless speaker measurements both in rooms and outside [2 pi]); some of the interesting things he is learning will be found in his upcoming July meeting report.)

The Duntech Sovereign didn't sound as good to Ira as at previous shows. Poh Ser Hsu and Al Foster transported CDs around looking at woofers, and they checked out the Duntechs in the Sweet-Spot room (featuring Wadia D/As and the new mania at CES, RPG diffusers). They found that the speaker's low bass is neither very low nor very loud. The sound is also very position-sensitive vertically.

The RPG diffusers (which are in my opinion vastly overused, crowding out absorptive Sonex for reasons of style and thereby producing a lot of hard, overly reverberant sound, even though specular reflections are largely eliminated—EBM, whose ears still ache from last January) supposedly produce an enlarged sweet spot, an effect Al listened for and didn't find. Al gave the Sovereigns what has become one of his two standard CES expensive-speaker reviews: appropriately wary of saying anything too dramatic one way or the other on the basis of the show's often weird listening conditions, he nevertheless thinks the speakers have good potential, but that they need a subwoofer, a defect that considering the speakers' price makes steam waft gently out of his ears. (His other standard review is that a speaker *doesn't* have good potential and needs a subwoofer.—EBM) Al and Poh Ser found that not many speakers have powerful low bass. Allison IC-20s were exceptional in being very clean with a 16Hz input; they don't radiate much sound, but you hear no distortion. One of Moran's favorite suggestions was repeated here: in such a big, loud system a single 20mm tweeter such as the Duntech has simply does not give enough "air."

In the Spectral room was another pair of Duntechs, sounding a bit better. Peter McGrath was there with his Stellavox DT-9, which he used to compare a master tape with the CD. (The Stellavox is Micha Schattner's favorite recording system.) The IRS Beta in the Spectral booth was subjected to the 16Hz torture test by Al Foster; it didn't pass.

The Thiel CS-5 has three small 8" woofers, and the front of the cabinet is made of Corian, a marble-like composite. Ira wasn't impressed with the sound, though he made some allowances for a noisy room; Peter Mitchell visited during a quieter period with a similar result. Al and Poh Ser found the Thiel had better than average low bass with some real fundamental, though the distortion was audible at fairly moderate levels; they thought the overall sound was fair. (This model was a

prototype.) Al did like the new \$5,000 Acoustat 66 speaker with electronic directional control. (It had a remarkable focus, and very airy and effortless—I felt, as best as one can judge under such circumstances, that it was the best at the show.—Ed)

Infinity's new Modulus system costs \$1,000/pair, has a separate \$300 pedestal or \$125 wall bracket. There is a subwoofer available too. Magnepan's new all-ribbon three way \$9,000 speaker, resembling the Apogee in some ways, didn't sound that good yet but reportedly will be improved. The Wilson WAAM is up to Series Six, and the price is up to \$88,000, so it wins the stratosphere award once again.

Matsushita's futuristic exhibit contained a theater featuring bizarre-looking trombone-like horns with plastic fire-hydrant subwoofers. The bigger of these woofers has 92dB sensitivity, is meant for discos, and supposedly goes down to 25Hz. The mid/tweeters are folded horn two-driver systems, and the midrange has two horns of different lengths loading the back of the same driver. Their AFP (audio flat panel) video screen has flat speaker modules with mid/tweeter columns at the edges and woofers radiating through screen. The sound from this system, according to Ira, Al and Mark, was "horrible." Their consensus about the KEF UniQ coaxial drivers (thanks to new, more powerful magnets [Neodymium—ed.], the coaxially mounted tweeters are tiny enough not to obstruct the woofer) are an interesting design idea, not yet well implemented.

Vandersteen Ilci ("i" for improved) sounded good to our panel; TAS also likes it a lot. Snell, which sports a new logo, showed the type E-III, which costs \$980/pair and sounded good; their new J-III is \$680.

Bozak's driver designs have been sold to NEAR, which stands for New England Audio Resource. Their new outdoor speakers are weatherproof like the old Bards but have a new cabinet of epoxy-covered wood and sound better than the old aluminum model.

Peter Mitchell raved about the new ATC SCM50A, especially for its heightened portrayal of ambience; Al agrees about the ambience but suspects a high-frequency peak or some other aberration is responsible.

In a welcome gesture of support for the arts, Michael Koss arranged to record the Milwaukee Symphony performing Dvorak's 6th and 8th symphonies, plus some modern works. The Paganini Trio played at the biannual Koss dinner. Koss has announced an unconditional lifetime guarantee for all headphones produced after July 1. They have a new transmitter for IR headphones that is more powerful with a better radiation pattern (something the old system needed; let's hope the transceiver system is quieter too.—EBM). The panel pointed out that IR transmitters are visible through a CCD video camera, a useful trick if you need to know how brightly they shine and where.

Harman Kardon/JBL, America's second-largest speaker company, are going factory-direct to dealers. This saves money (about 7%) but slows dealer distribution and tends to force dealers either to lose sales or to

carry large inventories. Lou Souther met a Sony rep who reported the company is changing its distribution arrangement by introducing its own salaried salespeople.

Notably absent from this show: DAT. Owades has heard secondhand reports of insufficient durability for heavy radio-station use and incomplete compatibility among machines. Deutsche Rundfunk has found the incompatibility too serious a problem to allow the format to be used in their system. The likely cause is DAT's very high data density. This observation prompted a lengthy discussion of the longevity of recording media. Computer digital media are designed by that industry for those who copy everything to a new medium (or a fresh example of the old one) every 10 years. Someone opined that 50-100 plays are all you can get from a half-inch digital tape, but David Hadaway has run some tests and found that after 100 plays the error rate goes up but the system still works. (100 plays, if you could stand it, would be tough for perfection from any of the analog tape formats—pub.)

Harry Pearson of the *Absolute Sound* is starting something called the High-End Audio Design group (HEAD) for manufacturers, because (among other reasons) CES does not properly represent them.

More speakers: Carver has two new models, a tall full-range ribbon and a short one with three 12" woofers. It "didn't sound very good at the show, as usual." Carver's ballyhooed Most Important Press Conference promised much, then delivered by introducing 19 new products, including a \$1,200 tube preamp. Carver's \$8,500 mono Silver Seven tube amplifier has received HP's highest blessing. The preamp has a useful spectral tilt control. There is an \$800 tuner/preamp with Sonic Holography and Dolby Pro Logic surround decoding. His new processor, called The Cathedral Generator, gives you five different parameters to adjust for each of several sizes of hall. The price has not been announced.

The Cathedral Generator sparked a discussion of the increasing use of electronic reverberation (i.e., multiple microphones whose output is fed to many small loudspeakers) for concert halls. The idea sounds horrible but apparently when carefully implemented works pretty well. The advantage is that a hall with a long reverb time is unsuitable for many purposes (even for classical music there is no single optimal reverb time). Also, it's cheaper, more effective and more versatile to build a hall with a shorter reverb time and lengthen it artificially than to build a very reverberant hall and introduce absorption later.

An historical note, for those who didn't hear Leo Beranek's fine talk: Symphony Hall opened to poor reviews, mostly from concerts with 90-piece European orchestras more suited to Europe's 1,400-seat halls than to Symphony's 2,600. Moran recommended Jeff Borish's concert-hall article in the final issue of *High Fidelity*.

The new thing in Japanese electronics is digital signal processing (DSP). Sony's new portable D-555 CD player has digital bass boost (up to 20dB below 80Hz), graphic EQ (± 10 dB at five center frequencies), digital surround

sound, and variable compression (an idea long overdue, especially for making tapes for the car; there are 20 discrete settings). The D-555 lists for \$450. The Sony ES series preamp (\$1,000) has digital EQ (three bands, parametric, 3 choices of Q, F_c settings at 1/3-octave intervals, accurate to 0.1dB) and a reverb generator, and Digital Dolby Surround with Pro Logic. Other manufacturers are beginning to offer similar products. (How sad that American companies have opted out of this game, too.—EBM) (Too tough to match the pricing, among other things—pub.)

The new rage in CD players is an abandonment of the high-bit wars: 1-bit 256x oversampling instead. Mondial showed an outboard D/A converter for under \$1,000 that uses this technology; features include good shielding and replaceable chips (the update game rear its ugly head again.—EBM).

The show's pet-rock award goes to the Serious Listeners (from the company of the same name, in Burlingame, California). These are little leather ear extensions costing \$25/pair and are supposed to improve the focus of the stereo image. They do make you talk a bit louder. Leather was used because it has an acoustic impedance somewhat similar to the pinna. The effect is a little like cupping your hands behind your ears. (i.e., a 2-6kHz boost—pub.)

The new Essence speakers are built in piles of cabinets of decreasing size: very expensive. Meridian, with KEF's help, has designed a \$5,500 three-way vented equalized speaker containing three 75-watt power amps and D/A converters, the latter able to accept electrical or optical digital inputs. There are also analog inputs, and a clumsy Dr. Who-style remote control. Users do find it intuitive to aim this at the speakers but the system was slow to respond to the remote, as is the CD player it goes with. (The system was well reviewed in the Sept *Stereo Review* and *CD Review*—pub.)

One smattering of CD-player news—CAL Labs' new Tercet MkIII player, \$1,295, requires the addition of a stabilizing disc on top of the one you're listening to for the player to work at all.

At the end of the meeting there was a smattering of video news as well, some of it rather interesting, but your reporter is not going to encourage this sort of thing by passing it along.

(Oh, all right; it's only a little bit.) DADC is adding capacity for 100,000 laser video discs/month in 1990 to their Terre Haute plant. Pioneer has three new LV players under \$600 list, two with digital sound; their new digital effects players (e.g., the 3070) turn the digital field-store off automatically on CAV discs. The Barco HDTV is winner and still champion in the picture-quality contest, and looked better than it did in January. Both of Sony's IDTVs, one 27" and one 43" (the latter costing a ridiculous \$40,000), look worse than good conventional sets by an overwhelming vote of local video experts. Matsushita's new flat TV has thousands of little guns; a 16" panel is 4" thick (in this technology, thickness is proportional to the square root of screen size), and was

shown in a display that kept crowds at least three feet away. One of the new 40" rear-screen LCD projectors weighs under 100 pounds, and is 16" deep; the light source can be external, solving the cooling problem. The picture is not yet as good as conventional sets, but the technology is promising.

— *E. Brad Meyer (Massachusetts)*