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ISSUE NO. 27
Display until arrival
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The Audio Critic

DVD-Audio:



The mountain labored and gave birth to, not exactly a mouse, but a guinea pig.

Also in this issue:

More loudspeakers, including one reviewed by arguably the best reviewer of them all (new to our pages).

The ultimate AV surround receiver, Bob Carver's unique processor and power amp, and lots more.

And, of course, our regular features, columns, letters to the Editor, CD/DVD reviews, etc.



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We're in Transition.

Our partnership with The CM Group is progressing steadily but the transfer of functions is not yet complete. Soon they will have taken over everything but the editorial side of the business, but we are not quite there yet. Hence the delay of this issue, which of course is nothing like the delays of the past. This time we can still catch up with our four-times-a-year schedule. Regrettably, transition is never as simple as it seems before it starts.

Meanwhile I am gradually removing myself as chief cook and bottle washer. My name will remain on the masthead as Editor, you will still see my byline on one or two articles in every issue, I'll still supervise the whole show, but I must stop writing and editing the entire magazine. It's too much for an old geezer and one of the reasons for the long delays of the past. The next issue will be guest-edited by Ivan Berger and Kay Blumenthal, Technical Editor and Managing Editor, respectively, of the now defunct *Audio* magazine. Don Keele will continue with his loudspeaker test reports. Others of that caliber will be coming on board as we expand. Unfortunately, they are in limited supply.

One thing is fairly certain—you will be seeing less of me and more of others. But I won't disappear. It's still my magazine and I intend to remain visible.

A handwritten signature in black ink that reads 'Peter Aczel'. The signature is fluid and cursive, with a large 'P' and 'A'.

The Audio Critic® (ISSN 0146-4701) is published quarterly for \$24 per year by Critic Publications, Inc., 1380 Masi Road, Quakertown, PA 18951-5221, in partnership with The CM Group, 74 Elsfeld Road, Toronto, Ontario M8Y 3R8, Canada. Second-class postage paid at Quakertown, PA. Postmaster: Send address changes to The Audio Critic, P.O. Box 978, Quakertown, PA 18951-0978.

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You may start your subscription with any issue, although we feel that new subscribers should have a few back issues to gain a better understanding of what *The Audio Critic* is all about. We still have Issues No. 11, 13, and 16 through 26 in stock. Issues earlier than No. 11 are now out of print, as are No. 12, No. 14, and No. 15. Specify which issues you want (at \$24 per four). Please note that we don't sell single issues by mail. You'll find those at somewhat higher cost at selected newsdealers, bookstores, and audio stores.

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BOX 978

It seems that the heavy-duty jackasses of the audio world have stopped writing us letters—at least temporarily, or have they given up altogether?—so this column cannot regale you with any "Theater of Cruelty" (to invoke Antonin Artaud) at this time. Sorry about that, but what can we do if our current letter writers like what we publish? We still welcome all letters relevant to our subject matter. Please address all editorial correspondence to the Editor, The Audio Critic, P.O. Box 978, Quakertown, PA 18951-0978.

The Audio Critic:

I was pleased to get Issue No. 26 of *The Audio Critic*. I was even more pleased to find a letter of mine from some time past used in your "Box 978" section. It is good to see that you are still venturing forth in the audio arena with statements of truth, right and justice.

While I no longer participate actively in the audio community, I still work on audio equipment in a small way and I keep in contact with many friends and former students who have worked with me over many years.

I am very much retired these days but I am very happy to see others carry forward the message of what is important in high-quality sound reproduction. My very best wishes and thoughts for your continued success . . .

Very best,
Dick Greiner
Madison, WI

Many of our readers know who Dick Greiner is, but for the information of those who don't, he is Emeritus Professor of Electrical and Computer Engineering, University of Wisconsin, and one of our heroes. For more years than anyone else I can think of he has been explaining, with relentless clarity, the facts of E.E. science. He has been the last word, the ultimate authority, the antithesis of tweako cultism, yet always in an utterly genial, gracious manner. I only hope, Dick, that there are indeed more than just a few others to "carry forward the message"—your message. I am not so sure.

—Ed.

The Audio Critic:

. . . I really loved your article "The 10 Biggest Lies in Audio." But you forgot two other lies.

The no. 11 lie, which is one of the biggest intellectual distortions in audio reasoning: the use and subjective superiority of first-order crossovers in loud-speaker systems.

The no. 12 lie: the use of full-range "weirdo" drivers for full-range operation, thus eliminating the use of the infamous component called the crossover, as stated by magazines like *Sound Practices* . . .

Best regards,
Luc Lacombe
Aksys Labs
Ile Bizard, Quebec

The advocacy of first-order crossovers isn't really a lie. It's merely a bad tradeoff—coherence against distortion and lobing. In rare cases it's actually an option, to be used with extreme caution. It's not a black and white thing. As for monolithic drivers, they aren't all bad, either, as long as the extreme bottom end is assigned to a separate subwoofer. For example, the Walsh driver used by German Physiks appears to work very well; I have heard some splendid demonstrations, although I haven't so far tested one myself. We must distinguish lies from arguable borderline cases.

—Ed.

The Audio Critic:

I was very disappointed in the recent issue, No. 26, not in the editorial

content, which was excellent as usual, but in the new type, which is much smaller than heretofore. The old type was easier to read. Tom Nousaine is now difficult to read, and the CD reviews are almost impossible. Progress?

Sincerely yours,
Lester F. Keene
Sun City Center, FL

*When we changed the typography of **The Audio Critic** to something a little more contemporary (the old look goes back to the mid-'70s), we knew that a few readers wouldn't like it. That is almost inevitable when you change anything at all. I must point out, however, that the type size of the main articles and reviews has not changed, only the typeface. (If you want to get technical about it, we changed from 10-point Times Roman with 12-point leading on two columns to 10-point Garamond with 13-point leading on three columns.) Yes, the CD reviews got squeezed a bit more than we would have liked; there were just too many of them. We're still fine-tuning the new look. Anyway, if you found the editorial content excellent, you must have managed to read it somehow.*

—Ed.

The Audio Critic:

It has never been the goal of high-fidelity recording to achieve reality. Recordists manipulate distortion to achieve realism—the illusion of reality. As recording science advances, less distortion is required. But reality

is a goal that will never be achieved.

High-fidelity playback means accuracy; that is, accurate reproduction by the equipment of whatever signal is fed into it. (Hi-fi equipment may also include facilities for distorting the signal to satisfy the taste of the listener.)

A record (tape, LP, CD, et al.) is part of the equipment chain. Therefore, it is required to be accurate. To compare the long-playing record and the compact disc, we need only to determine which is more accurate. This can be easily determined. (The question as to which "sounds better" is irrelevant.)

If the LP is an accurate playback medium, it must be able to reproduce the sound of whatever signal is fed into it. Therefore, if we dub a CD onto an LP, accurate reproduction demands that the signal coming off the LP must be indistinguishable from the CD. Similarly, if we dub an LP onto a CD, the result must sound exactly like the LP.

To test this, we begin by cutting/burning an LP and a CD from the same source, such as a master tape; let's call the LP and CD "generation one." From the generation-one LP we dub an LP (LP/LP) and a CD (LP/CD). From the generation-one CD, we dub an LP (CD/LP) and a CD (CD/CD). We then compare the sound of LP/LP and LP/CD; if we cannot tell the difference, the CD is a high-accuracy playback medium. Similarly, if we cannot tell the difference between CD/CD and CD/LP, the LP is a high-accuracy medium. If neither medium passes the test, then neither is accurate, and they are equally bad or good . . .

... I realize that the plan seems harebrained on first consideration, but I've thought it over and over, and aside from possible expense it seems quite feasible to me.

Paul A. Alter
Pittsburgh, PA

*Conceptually your scheme has merit,
but in practice it runs into complications*

that render it more or less irrelevant. You forget that the LP is an analog medium and the CD a digital one. Thus, if the original master tape is digital, all subsequent CD generations are completely lossless—Q.E.D., no test required. If, on the other hand, the original master tape is analog, A/D conversion is required to produce a CD from it, and then you won't know whether you're testing the A/D converter or the CD as a storage medium. And then, if you're cutting an LP from a CD, D/A conversion is required, and you won't know whether you're testing the D/A converter or the LP as a storage medium. And so forth and so on. Your test would be valid if the A/D and D/A converters were absolutely transparent—which they are not.

—Ed.

The Audio Critic:

Issue No. 26 of *The Audio Critic* contained a review of Revel Corporation's "Salon." I maintain that the Salon and the Waveform loudspeakers are among the best of the point-source type loudspeakers. Your review indicates that you also approve of their sound and Revel's looks.

In the Revel review, two comments deserve more of your attention: (1) comb filtering and (2) frequency-response tailoring.

It is difficult to imagine how you could have found "comb-filter squiggles all over the place." Comb filtering is generally a product of two or more closely spaced drivers reproducing the same signal but at different angles relative to the listener. More than most speakers, the Salons should be free of this anomaly because (a) they use 24-dB-per-octave crossovers, which likely contributes to your finding that the speakers have a "total absence of dynamic compression;" (b) they do not have two or more drivers reproducing the same signal except in the bass, below 125 Hz (the rear tweeter only works at

high frequencies, so its distance from the front tweeter should not have influenced your comb-filter findings); and (c) it does not employ the D'Appolito design, a driver layout that introduces comb filtering.

Your review criticized the Revel engineers for including a dip in the 3.5 to 4 kHz range. You suggested that the minor colorations you heard may have been a product of the dip, and that the Revel engineers should have talked more openly about mono-to-stereo and room/speaker "compensations."

Most intelligent speaker manufactures "fix" their speakers to avoid the Allison Dip, and they all tailor their bass response to include the interaction with the room. (Most small rooms boost the bass.) Accuracy must include the deployment of the transducer in its environment, a fact repeated often on Revel's Web site. Accuracy is defined where speakers are used, certainly not in an anechoic environment, which is not only not ideal but also terrible for listening. One may (and all do) argue about what room/speaker compensations are mandatory, but there is no argument that some anechoic findings are misused. Revel is among the few speaker manufactures that do not ignore the playback environment.

Extensive Audio Engineering Society papers on the room and loudspeaker interaction start in the 1960s. My reference is Keith R. Holland and Philip R. Newell (September 1997, AES preprint). They state that the interaction of two speakers radiating the same information causes a frequency response alteration at the listener's ears and a change of timbre.

As we know, speaker/room and stereo-speaker interactions are complex and are not completely fixable, but at some level minor frequency-response compensations can help. I have lis-

tened to the Revels, and I believe that they have it about right.

A more detailed discussion of loud-speaker interaction can be found in my article in *The Boston Audio Society Speaker*, Volume 22, Issue #2. <http://bostonaudio.home.att.net>.

Alvin Foster

Founder of the Boston Audio Society

I am willing to contemplate the possibility that the comb-filter squiggles were an artifact of my measurements (I can't repeat the measurements because the speaker is gone), but that doesn't change the basic response profile of the speaker. I agree with you that frequency-response "compensation" is sometimes necessary, or at least desirable, but I believe it should be effected by a black-box processor of some kind, not built permanently into the speaker. That's exactly how it's done in the Waveform Mach 17—you can trim the bass, midrange, and treble frequency response with the controls on the electronic crossover, while the speaker itself is anechoically flat. Permanently skewing the response of the speaker to fit all circumstances is a Procrustean bed.

—Ed.

The Audio Critic:

Now that I have read Issue No. 26, please let me know if I get this straight: I hook up a car radio to a 12 V battery, connect it to my computer, and then listen through Monsoon computer speakers at my computer desk and I get state-of-the-art audiophile sound? Now I am in audio nirvana? Do I miss something here?

Sincerely,

Ivana B.N. Audiophile
No Watts, California

P.S. I am thinking of building a new house. Do you think it a good idea to construct all interior walls and ceilings from NXT DML panels?

The jokey signature and the general tone of your letter indicate that you are not serious, but you happen to be wrong. The Blaupunkt Alaska RDM 168 car radio and the Monsoon MM-1000 multimedia speakers are perhaps not quite state-of-the-art but they are close! John Ötvös, the man behind the definitely state-of-the-art Waveform Mach 17 speakers (now unfortunately no longer available), was absolutely flabbergasted when I played the MM- 1000's for him. You have to get used to the idea that advances in technology do not always come at an exorbitant price and that new cheap technology can be superior to old high-priced technology. As for the NXT panels, if only they were strong enough for walls and ceilings. . . Maybe just for lining the walls and ceilings? I am intrigued.

—Ed.

The Audio Critic:

I read my first few copies of *The Audio Critic* last week (borrowed from a friend) and enjoyed them immensely! I did not believe everything, however; but it was great fun and very thought-provoking. Well done.

What I enjoyed most was how an editor dares to point out to his readership that the audio community is involved in a desperate battle to keep audio technologies from degenerating into a form of modern-day alchemy. It is plagued with folks who want us to believe that their senses are more acute than our own. If audio were not a fertile ground for them, many would be involved in parapsychology, fortune telling, numerology, astrology, channeling, divining, injury law, and financial planning. Whatever their pursuit, they will always bilk sufficient money from a gullible public to ensure that there will always be sizable industries founded on hokum.

Over the last 25 years, I have watched hi-fi slowly become an increasingly silly and unholy thing. It has

become a quasi-religious movement with a pantheon of gods (Levinson, Krell, Conrad-Johnson, etc.) who manufacture ephemeral devices that will lead "true believers" to a place of emotional ecstasy, a place free from the bondage of physics. Take a trip to a few high-end shops and see for yourself if they have not become a temple where audio priests hold court, a place where your common sense and credit card are sacrificed on the altar of audio enlightenment.

You are right to expose this nonsense. I wish more did. My only complaint is that, while your editorials on subjectivism are true, they are getting a little subjective themselves. Truth told with control and precision is more effective than a truth ranted or spat. Anyway, I am not writing to beat you up, just to support you and pass along this cautionary thought. (Yes, I can imagine where you want me to put my thought. . .)

. . . In closing, I would like to end this note by recruiting others to help me ban the most annoying phrase in hi-fi: ". . . it's really about the music." I think that we could all make the world a better place if we pledge to slap the next guy who utters this banality upside his head.

Sincerely,

J. J. C. Bradshaw

Edmonton, Alberta

*Thank you for your supportive words. Just two comments: (1) You "did not believe everything," but the most unbelievable information in **The Audio Critic** is usually the most important truth, untold by others. (2) That is the very reason I may occasionally overstate my case (although I don't believe I rant or spit); I want the truth to sink in, down to the slowest members of the class.*

—Ed.

DVD-Audio:

The mountain labored and gave birth to, not exactly a mouse, but a guinea pig.



"Parturient montes, nascetur ridiculus mus."

Horace meant that mountainous and prolonged preparatory processes will probably yield a puny, laughable outcome. The huge complications and endless delays that preceded the recent birth of DVD-Audio certainly suggest such a scenario, except that the end result is at this stage experimental rather than irredeemably trivial. Time will tell.

DVD-Audio is here but just barely. Players are slowly becoming available, but program material (software) is very limited. What there is may or may not be original 24-bit/96 kHz recordings; most of it is old stuff, reprocessed for the DVD-A format. If the format survives its fragile neonatal phase and becomes mainstream, an uncertain scenario at best, we may possibly have an "ultimate"

vehicle for music, perhaps even incapable of further improvement. Until then, however, the whole thing must be considered highly experimental. A few players and a few recordings do not constitute a surviving technology.

The main reason why DVD-Audio might survive is that it is basically compatible with DVD-Video, which at this point is solidly entrenched in the market. A DVD movie does not

carry a DVD-Audio soundtrack and ordinary DVD players cannot play DVD-Audio discs, but the new DVD-Audio players can all play DVD movies, of which there are already many thousands, with more coming out every month. If the DVD-Audio format sticks to the wall, fully compatible DVD-Audio/Video players will gradually replace the DVD-only players at little or no extra cost.

In fact, the very basis of the DVD-Audio technology is the enormous storage capacity of the standard DVD, 4.7 GB for a single-layer disc, permitting extremely data-rich storage of audio-only information. By contrast the standard CD stores only 650 MB (0.65 GB) of 16-bit/44.1 kHz data. A single-layer DVD-Audio disc can store 74 minutes of 24-bit/192 kHz 2-channel data without compression. For an uncompressed 6-channel recording the quantization has to be reduced to 16 bits and the sampling rate to 96 kHz; for 5 channels 20-bit/96 kHz data can be accommodated. But that's not all. A

lossless compression scheme called Meridian lossless packing (MLP) makes it possible to store 24-bit/96 kHz 6-channel data on a single layer with playback time extended beyond 74 minutes! And that's still not all. Dual-layer DVD-Audio discs (more or less theoretical—I haven't seen any, but they're in the standard) can store 8.5 GB of data, and double-sided dual-layer discs can double that for a total of 17 GB!

Now then, are these big numbers meaningful? Yes and no. It is generally agreed that 16-bit quantization is a little on the scant side, unless the 0 dB full-scale level is very accurately placed. On the other hand, 20-bit quantization is more than enough to permit some sloppiness in positioning the 0 dB level and certainly enough for the widest possible dynamic range. Nobody really needs 24 bits; it's not only overkill but unrealizable in terms of signal-to-noise ratio because the theoretical 144 dB runs into the limits of thermal noise in circuits and transducers. As for sampling rate, 44.1 kHz is again somewhat scant, not because of the bandwidth per se, which is completely sufficient, but because the Nyquist frequency of 22.05 kHz leaves a guard band of only 2 kHz on top of the 20 kHz audio passband. The anti-aliasing and reconstruction filters have to be extremely steep to fit inside that guard band, resulting in pre- and post-ringing on impulses, which some experts consider undesirable. The 4 kHz guard band provided by a sampling rate of 48 kHz (24 kHz Nyquist frequency) is an improvement from this point of view, and a 96 kHz sampling rate is already far beyond what is necessary. A sampling rate of 192 kHz is sheer insanity—who needs a bandwidth of 96 kHz? Thus, it is not unreasonable to say that the numbers inherent in the DVD-Audio standard will never have to be increased; they far exceed the requirements of any conceivable audio signal, present or future. Of course, even if the format survives, which as I said is not at all certain, very

few DVD-Audio releases will initially feature music recorded with the higher quantization and sampling-rate numbers; most of them will be reissues of older recordings converted to the DVD-Audio format.

There is also the unresolved issue of analog copy protection or "watermarking." (Digital copy protection of DVD-Audio was implemented after a Norwegian teenager cracked the DVD-Video protection code.) So far nothing has been standardized in the analog domain. Audiophiles are rightfully apprehensive about watermarking that might compromise audio quality, no matter how slightly, but at this point there is not even a hint as to future methodology. In any event, the full 24-bit/96 kHz quality of DVD-Audio is available only through the 6-channel analog outputs; the digital output of the available DVD-Audio players delivers only a 16-bit/48 kHz bitstream.

An obvious question that arises is how DVD-Audio compares with the Sony/Philips SACD. So far SACD has been visible only in its two-channel version, but let us assume that the 6-channel version will be available shortly. The two formats are definitely not compatible and both are competing for the same market. They can't both succeed; it will be something of a surprise if one of them survives. DVD-Audio has all major manufacturers other than Sony and Philips behind it, but Sony has a tradition of not giving up easily on "also ran" formats—witness Beta and the MD. DVD-Audio is just about flawless technically, but SACD actually claims to be superior because of its untrammelled straight-through simplicity without filters, although some highly credible authorities consider it flawed (see Issue No. 26). Technical superiority may not be the decisive factor, however, because consumers do not pay attention to micro-advantages in technology that they know little or nothing about. So far SACD has

been much more expertly promoted than DVD-Audio, but in the end the format in which the larger number of releases are issued regularly should prevail—if at all. DVD-Audio is likely to have the price advantage in hardware because inexpensive DVD-Audio/Video players are imminent, whereas all SACD equipment remains costly. As for a "universal" player, forget about it—too complicated, too expensive, politically too good to be true. (A discontinued Pioneer player that used to be available in Japan converted DSD to PCM and thus achieved SACD/DVD-A "compatibility"—yecch.) Maybe, just maybe, in the distant future, a digital engine able to decode any and all encoding systems is a possibility, but don't hold your breath. On balance, I put my money on DVD-Audio but very hesitantly.

My hands-on experience with DVD-Audio has been necessarily limited. The two players thus far available to us for testing are hastily finished first-generation equipment and not really representative of what can be, and probably will be, produced. The software choices so far are mediocre at best, especially in classical music. There is a **Beethoven** symphony cycle (5 discs) on **Teldec** with **Daniel Barenboim** and the **Berliner Staatskapelle** (definitely not the Berlin Philharmonic), which is hugely unexciting and not particularly well-microphoned. There is a **Johann Strauss** waltz/polka/overture program, also on **Teldec**, with **Nikolaus Harnoncourt** and the **Berlin Philharmonic** (the real McCoy this time), magnificently played and recorded but with a perversely square beat by the world-class conductor, without the slightest Viennese lilt—I think he is trying to prove a point. A **Chabrier** and **Ravel** program on **Erato**, with **Yutaka Sado** and the **Lamoureux Orchestra**, is well-recorded but only competently played, without the extra refinement needed to

maximize the effect of the highly colorful music. Of the pop recordings I sampled (there aren't too many, either), the best was the **Buena Vista Social Club** on **Nonesuch**, the famous **Ry Cooder** production featuring a slew of wonderful old-time Cuban musicians that he rescued from obscurity. The sound of this DVD-Audio disc is almost ideal—rounded, airy, and devoid of even the slightest "hot" high-

lighting—although it is processed without a center channel.

In general, the best DVD-Audio is clearly superior to the best stereo—more complete, natural, spatially plausible, just plain believable—but the question remains whether or not it is also superior to the best Dolby Digital or DTS multichannel recordings. I happen to believe that the latter are for all practical purposes transparent, de-

spite the compression algorithms. DVD-Audio, on the other hand, is not only transparent in the real world but also theoretically transparent, with margin to spare. There's nothing further to be done, technically, to clean it up. You really can't beat that, so we're back to our fundamental question—will it stick to the wall? Will it survive? The jury is still out.



DVD Audio/Video Player

Technics DVD-A10

Panasonic Consumer Electronics Company, a division of Matsushita Electric Corporation of America, One Panasonic Way, Secaucus, NJ 07094. Voice: (201) 348-7000. Fax: (201) 348-7209. Web: www.panasonic.com. Technics DVD-A10 DVD Audio/Video player, \$1 200.00. Tested sample on loan from manufacturer.

This was, to my knowledge, the very first DVD-Audio player out of the starting gate (and the last but three or four). It clearly shows some signs of haste; the main PC board has missing components (holes) where the super-seeded digital copy-protection circuitry was removed, and then a floating sub-board added with the new circuitry. Mechanically the DVD-A10 is well-built, with extra weight added by the "hybrid cast base," probably more to impress than to improve performance. The disc transport and laser tracking assembly appear to be of fairly high quality, however; on the Digital Recordings test disc the unit passed the error-correction torture tests with relatively flying colors—no clicking on

tracks 1,2, and 3; very slight clicking on track 4; stronger clicking on track 5 but still moderate. That's better than most.

The video outputs of the DVD-A10 comprise one set of component video, two S-video, and two composite video. There are only two digital audio outputs, one coaxial and one optical; the analog audio outputs are a 5.1-channel set for DVD-Audio and two pairs of stereo outputs. The front-panel controls are minimal but the remote control is very complete and versatile. There is a headphone jack and level control on the front panel, a definite convenience (missing in the Onkyo DV-S939).

When it comes to measurements, there is no DVD-Audio test disc available yet, and the one or two existing DVD-Video test discs cannot separate the video quality of the player, the decoder/processor, and the TV monitor. I therefore restricted myself to the good old 16-bit CD tests, which still reveal some of the most important performance characteristics. Frequency response is ± 0.08 dB from 10 Hz to 20 kHz. Full-scale THD + N is -90 dB across most of the audio spectrum, rising to -88 dB at 6.3 kHz. That this

Features

2-channel stereo with 24-bit/192 kHz resolution

Multichannel audio with up to 96 kHz sampling

Built-in Dolby Digital decoding

Built-in DTS decoding

DVD-Video, DVD-Audio, and CD playback

"Silence Technology"

Digital re-master processing for extended high frequencies

Separate power supplies for analog and digital circuitry

R-core transformer for the analog power supply

Technics Hybrid Cast Base for absorbing vibrations

is not entirely gain-related analog distortion is shown by the readings with -24 dB digital input, which normalize to only -92 dBFS. Thus the resolution is only 15 bits at best, with a 16-bit input. Not very impressive for a 24-bit/192 kHz player. Quantization noise is -90.5 dB and dynamic range 92 dB, both consistent with the THD + N results. Monotonicity could have more distinct stepwise definition, especially in one channel.

In actual use, I found the player's DVD-Audio reproduction through the 5.1-channel analog outputs to be without problems, except for the lack



of bass management (but all current DVD-Audio players share that shortcoming). DVD-Video reproduction is pedestrian because of the lack of pro-

gressive scanning, which is disappointing in a \$1200 unit, but the picture is not at all flawed in color or definition or any other way. In general,

the DVD-A10 is OK on all counts but not outstanding in any particular respect. That, perhaps, is the price of being the first one out.

DVD Audio/Video Player

Onkyo DV-S939

Onkyo U.S.A. Corporation, 18 Park Way, Upper Saddle River, NJ 07458. Voice: (201) 785-2600 or (800) 229-1687. Fax: (201) 785-2650. E-mail: onkyo@onkyo-usa.com. Web: www.onkyousa.com. DV-S939 DVD Audio/Video player, \$1 799.95. Tested sample on loan from manufacturer.

This is a considerably more high-end oriented DVD-Audio/Video player than the Technics. It is heavier, it features progressive scanning, and it has no headphone jack—you get the idea. The player has THX Ultra certification, which means that it has actually passed certain stringent tests. Not quite stringent enough, it seems, because the error correction is only so-so. On the Digital Recordings test disc the DV-S939 sailed through tracks 1,2, and 3 without clicks but started to click fairly insistently on track 4, followed by constant loud clicking on track 5. The Technics did a little better on these torture tests.

The build quality of the unit appears to be fairly high, with heavy-duty parts and separate transformers for the digital and analog circuitry. All outputs, audio and video, analog and digital, are double—there are two of everything. The 6-channel DVD-Audio analog outputs are duplicated by a computer-style DB-25 connector and 6 RCA-type jacks. The front-panel controls are absolutely minimal, but the remote control is quite elaborate, with 50-odd

buttons to control not only every conceivable player function but also an Onkyo receiver, if connected.

As I have said before, my measurement possibilities are limited. There is no DVD-Audio test disc available at this writing, and the one or two DVD-Video tests discs that are available provide only a general guide to video quality without being able to separate the contribution of the player, the decoder/processor, and the TV monitor. I performed the most revealing 16-bit CD tests and concluded what I could from those. Frequency response was—0.11 dB at 10 Hz and -0.05 dB at 20 kHz, with 0.00 dB flatness in between. Full-scale THD + N at frequencies below 1 kHz was -96 dB, which is superb, but climbed steadily above 1 kHz to -88 dB at 10 kHz, which is mediocre. Since a 10 kHz test signal at -20 dB (or -24 dB or any other reduced level) is not available on any test CD, I could not determine whether or not this was gain-related analog distortion. Needless to say, the 1 kHz distortion did not—and could not—improve at reduced levels. Dynamic range measured 96 dB and quantization noise -97.3 dB (but, of course, neither measurement was made with a 10 kHz tone). The monotonicity test pattern looked good.

DVD-Audio reproduction was subjectively excellent through the DV-S939's 6-channel analog outputs, but again bass management was absent, which is currently the norm in DVD-Audio. Even so, going back to stereo was

Features

- THX Ultra certified
- Plays DVD-Audio/Video discs, Video CD's, CD-R's, and CD's
- 54 MHz/10-bit video DAC
- 192 kHz/24-bit DAC's
- DB-25 and RCA 6-channel DVD-Audio outputs
- 2 gold-plated progressive component-video outputs
- 4 digital outputs for DTS, Dolby Digital, and PCM signals
- Built-in Dolby Digital decoder
- Separate transformers for digital and analog sections
- Electrically and magnetically shielded mechanism
- Heavy-duty mechanical tray door
- Full-function remote control with "learning" mode for control of other components

in each case a letdown, no question about it. I could not determine, however, whether the best Dolby Digital or DTS multichannel sound was in any way inferior to DVD-Audio. More listening experience is needed. As for DVD-Video, the progressive-scan component outputs proved to be capable of providing near-filmlike picture quality when feeding a Mitsubishi WS-55907 rear-projection TV set (review in the next issue), but with some DVDs there were digital artifacts, probably due to flaws in the disc and not the player. When everything was optimal, there were no visible scanning lines and the definition was high indeed. So, on balance, the Onkyo DV-S939 is thus far the best, or more precisely the better, DVD-Audio player to come my way. Still better units are undoubtedly around the corner.

TAC



Speakers

LOUDSPEAKER REVIEWS

By Peter Aczel, Editor, and D. B. Keele Jr.

Three Medium-Priced but Far from Mediocre Speaker Systems.

2-Way Bookshelf Speaker

F.A.A. Sound Technologies "Okwaho"

F.A.A. Sound Technologies, 149 Johnson Road, Hogansburg, NY 13655. Voice: (450) 632-2891. Fax: (450) 632-9812. Okwaho 2-way bookshelf speaker system, \$800.00 the pair. Tested samples on loan from manufacturer.

Francis King Faasou is a full-blooded Mohawk living on the Akwasne reservation at the New York/Ontario/Quebec border. That probably makes him one of a kind in the speaker business. How he became a loudspeaker manufacturer is a long story, but he ended up with Igor Levitsky of Acoustic Technology International as his designer and Swans drivers from Hi-Vi Research for his speakers—all Canadian outfits. He has assured me that he can produce the Okwaho speaker in large quantities should this review generate some interest.

The speaker itself is a smallish box, 15" high by 9" wide by 12" deep, vented in the back, with a 6" bass/midrange driver firing forward and an external pod tweeter mounted on top a la B&W. The 6-incher has a cast aluminum frame, rubber surround, paper/Kevlar cone, and phase plug. The tweeter has a soft fabric dome. Both drivers are magneti-

cally shielded. The crossover is said to be Linkwitz-Riley. The cabinet has 45° beveled front edges and is veneered in a natural wood color with a hand-rubbed finish. It's quite a handsome piece.

My MLS (quasi-anechoic) measurements yielded a rising 1-meter response on axis, a relatively rare profile in this type of speaker. The rise was very smooth but pronounced, covering 6 dB from 2.5 kHz to 11 kHz, with an additional bump of 6 dB at the tweeter resonance of 13 kHz, which was much more high-Q and couldn't really be counted as part of the steady rise. Below 2.5 kHz the response was fairly level, ± 2.5 dB. The 1-meter measurement 45° off axis, horizontally, flattened out the rise to about 3 dB, so that the response looked more like what I would have preferred on axis. Best of all was the 1-meter response 45° off axis vertically, which was dead flat (± 1.25 dB) from 5.5 kHz to 13 kHz, albeit with a huge crossover suckout a 2 kHz. The total picture was one of good power response into the room but with excessive forward radiation of high frequencies. (I am told that this has been fixed in a more recent version of the speaker.)

Bass response was unusually good for an enclosure of such small volume. The box is tuned to 39 Hz, with maximum output from the vent at 50 Hz. The nearfield low-frequency response

of the speaker, at the best summing junction of the woofer and vent that I could find, was essentially flat down to an f_3 (-3 dB point) of 42 Hz. The impedance curve fluctuated between 5.6 Ω and 27 Ω in magnitude (8 Ω nominal) and +33/-45 in phase. (Not the easiest nor a particularly difficult load for an amplifier.) I measured the nearfield distortion of the speaker at a 1-meter SPL of 95 dB, normalized to 100 Hz. That's very loud but not loud enough to drive you out of the room. Above 100 Hz the distortion remained in the 0.5% range; below 100 Hz it rose rapidly, reaching 10% at 26 Hz. An FFT of a 100 Hz tone at the same SPL showed 2nd and 3rd harmonics of approximately 0.5% (-46 dB) and 4th, 5th, 6th, and 7th harmonics 20 or more dB below that level. I would call that a good result.

The sound of the Okwaho is a matter of opinion. I found it basically smooth and open, without quite the transparency and delicacy of the best small speakers, which are almost invariably more expensive. David Rich found it too bright, and his high-frequency hearing is almost surely better than mine (he is 30-odd years younger). The measurements confirm his opinion, not mine. I am less dogmatic on the subject of loudspeakers, on the other hand. I'll just have to leave it at that.

—Peter Aczel

Floor-Standing 3-Way Speaker

Infinity "Interlude" IL40

Infinity Systems, Inc., a Harman International Company, 250 Crossways Park Drive, Woodbury, NY 11797. Voice: (800) 553-3332. Web: www.infinitysystems.com. "Interlude" IL40 floor-standing 3-way loud-speaker system, \$998.00 the pair. Tested samples on loan from manufacturer.

This is the speaker I praised, preliminarily and somewhat tentatively, in the last issue. That was based on a brief audition of a preproduction version, without any test data or protracted listening. I was sufficiently enthusiastic to want to say *something* without having to wait for a review sample. The production version reviewed here may or may not be totally identical to that early sample; we'll never know. In any event, this is the real thing, the actual test of the production speaker.

All of the new Infinity speaker systems, including this one, feature a proprietary diaphragm technology called

C.M.M.D. (Ceramic Metal Matrix Diaphragm). The diaphragm sandwiches a layer of aluminum between two layers of ceramic, achieving great rigidity and low internal resonances. This is basically what's new and different about these speakers. Harman International, Infinity's parent company, has a huge advantage over smaller manufacturers with their in-house driver manufacturing facility. At least 50% of the quality of a loud-speaker system resides in the drivers.

The outstanding characteristic of the Infinity "Interlude" IL40 is its flat response—forward, sideways, up, and down. The 1-meter MLS (quasi-anechoic) response on the axis of either the tweeter or the midrange driver (it makes absolutely no difference!) is ± 3 dB across the entire audio band, right up to 20 kHz, just as it says in the specs. What's more, 45° off the tweeter axis, horizontally, the response is even slightly

flatter (± 2.5 dB) up to 11 kHz, where it falls off. At 45° off the tweeter axis vertically (above the speaker), the response is still ± 2.25 dB up to 11 kHz, except at 3 kHz, where there's a suckout of a couple of dB more. This degree of flatness is unusual even in very high-priced loudspeakers; at \$499 per side it is unheard of. The vented box is tuned to 36 Hz, very loosely (low Q), with the maximum response from the port at 43 Hz. I could not obtain a good summed response—the woofer is in front and the vent is in the back—but I could see essentially flat output down to at least 44 Hz.

The impedance of the IL40 is somewhat peculiar, probably because of the complex and highly corrected crossover network. Magnitude above the box frequencies varies from 2.7 ohms to 7.5 ohms—it never reaches the nominal 8 ohms. At the box frequencies it's sky-high (40 ohms at 23 Hz). Phase varies over an unusually wide range, from

Manufacturer's Specifications

Type: 3-way, floor-standing, vented-box system

Drivers: 8" cone woofer, 4" cone midrange, 1" dome tweeter, all with Ceramic Metal Matrix Diaphragms

Crossover Frequencies: 600 Hz and 2.5 kHz, 24 dB/octave

Rated Frequency Response: 38 Hz to 22 kHz, ± 3 dB

Rated Sensitivity: 89 dB at 1 meter, 2.83 V rms applied

Rated Impedance: 8 ohms, nominal

Rated Power Handling: 175 watts

Dimensions: 40" (height) x 10" (width) x 11½" (depth) = 1016 mm x 254 mm x 292 mm

Weight: 41 lbs. (18.6 kg) each



-68° (at 62 Hz) to +39° (at 480 Hz)—not a particularly suitable load for a loosey-goosey amplifier. I only spot-checked the distortion with the nearfield spectrum of an 80 Hz tone at a 1-meter SPL of 102 dB (that's really loud!), and it satisfied me—second harmonic 1.4%, third harmonic 0.35%, higher harmonics totally negligible. (It could only go lower at higher frequencies, and at lower frequencies it's all vent output.) It is a very clean speaker.

In the listening tests the IL40 proved to be more neutral, balanced, and transparent than any other speaker under \$1000 the pair that I can recall. I don't know at what price point the competition begins to catch up with it because there have been too many speakers in and out of our lab in the last few years, but it could be quite a bit higher. Basically I found nothing wrong with it except perhaps a very slightly loose, boxy bass, which may even have been room interaction. Only when I switched to my reference Waveform Mach 17's was I reminded that there exists a further degree of refinement in loudspeakers. If the Interlude IL40 is at all typical of the Floyd-Toole-inspired line of Infinity and JBL speakers introduced recently, we can look forward to some very favorable reviews in coming issues.

—Peter Aczel

Floor-Standing 2½-Way Speaker

Monitor Audio Silver 9i

Monitor Audio USA, P.O. Box 1355, Buffalo, NY 14205-1355. Voice: (905) 428-2800. Fax: (905) 428-0004. E-mail: goldinfo@monitoraudio.com. Web: www.monitoraudio.com. Silver 9i floor-standing 2½-way vented-box speaker system. \$1999.00 the pair. Tested samples on loan from manufacturer.

Editor's Note: This review marks the debut of D. B. (Don) Keele Jr. in our pages. I consider Don Keele to be the best loudspeaker reviewer in the business, pre-

sent company not excepted. He is a serious scientist, not just an audio journalist. Audio magazine had to go out of business for Don to be available to us, but at least this way he remains in touch with his widespread readership. Note that the review is more detailed than our usual test reports; maybe it tells you more than you want to know about a not very different forward-firing box speaker, but that's the way Don works and there's a lot to be said for it.

Introduction

Whoa ... I went to sleep one night as a speaker reviewer for *Audio* magazine and woke up the next morning writing a review for another audio magazine, *The Audio Critic*! With the

sad demise of *Audio* magazine I am glad to continue my review contributions to this fine publication. Actually, *The Audio Critic* mirrors my personal outlook on everything audio much more than *Audio* did. My personal beliefs are firmly on the skeptical side of audio that *The Audio Critic* and Peter Aczel have avowed for many years.



The Silver 9i, manufactured by the U.K. company Monitor Audio, is rather striking-looking, particularly without its grille. The silvery metal-cone woofers with their gold center domes and the gold metal-dome tweeter, coupled with the Silver 9i's fine cabinetry, make for a rather attractive combination.



Manufacturer's Specifications

Type: 2½-way, floor-standing, vented-box system

Drivers: Two 6½" cone woofers, one 1" gold metal-dome tweeter

Crossover Frequency: 3.2 kHz

Rated Frequency Response: 30 Hz to 25 kHz, ±3 dB

Rated Sensitivity: 91 dB at 1 meter, 2.83 V rms applied

Rated Impedance: 8 ohms, nominal

Rated Power Handling: 150 watts, 350 watts peak

Dimensions: 39" (height) x 7½" (width) x 10½" (depth) = 990.6 mm x 190.5 mm x 266.7 mm

Weight: 52 lbs. (23.6 kg) each.

Available in natural cherry, black oak, and rose mahogany

The Silver 9i, the reference speaker at the top of Monitor Audio's Silver Series line, is fundamentally a two-way design with two 6¼" cone woofers and a 1" dome tweeter, all in a vertical array with the tweeter on top. As is common with other systems that utilize vertically-stacked dual woofers, vertical dispersion anomalies are reduced by operating only the top woofer up to the rated 3.2 kHz tweeter crossover. The bottom woofer is rolled off above 500 Hz. This much improves the vertical polar distribution of the system by minimizing lobing. Crossover between the woofers and tweeter is by a second-order 12-dB-per-octave network which is said to improve the power handling of the system. As is prevalent in other systems intended to appeal to the high-end crowd, the input connections allow for full biwire and biamp operation (see Peter Aczel's comments in past issues of *The Audio Critic* about the efficacy of such operation—in a word, it doesn't

work!). Large gold-plated shorting straps are provided for single-wire operation. A flared port is located just above the input connection cup in the rear of the system.

The cabinetry of the Silver 9i is first-rate and well-braced with several finishes available, including real wood veneers of natural cherry, black oak, and rose mahogany. A large, black wood plinth or base can be bolted to the bottom of the cabinet to maximize the footprint of the system and improve lateral stability. Without this, the system was prone to tipping when set up on the plush carpet of my listening room. Additional mass may be added to the system by filling the bottom with dry sand or lead shot through a circular hole in the bottom rear of the speaker. This is said to control the bass of the system by reducing "cabinet resonances and assisting in achieving a greater tonal balance."

The drivers of the Silver 9i are all manufactured by Monitor Audio. The woofers feature metal cones utilizing a composite ceramic-coated aluminum-magnesium alloy construction, which is claimed to eliminate all diaphragm breakup in the operating range of the driver. The tweeter utilizes a gold metal dome and is protected by a fine-mesh silver-colored screen. All drivers are magnetically shielded for operation near video screens.

Measurements

The frequency responses of the Silver 9i were measured combining two different techniques: (1) outside ground-plane measurements to assess low-frequency response and (2) windowed in-room tests to measure mid-to-high-frequency response. Measurements were accomplished by using the time-delay spectrometry technique as implemented by the TEF (Time Energy Frequency) analyzer (originally developed by Crown and now sold by Goldline). The microphone was placed halfway between the upper woofer and the tweeter, with the curves adjusted to a 1-meter measurement distance with 2.83 V rms applied. One-tenth octave smoothing was used in all the following curves.

The on-axis response of the Silver 9i, with grille off, is shown in Fig. 1. The curve is quite flat below 1.5 kHz and exhibits the typical vented-box bass rolloff below 60 Hz. Above 1.5 kHz, however, the response is not quite as smooth, with a broad dip between 2 and 7 kHz, a peak centered at 9 kHz, and then dropping somewhat above 13 kHz. Averaged between 250 Hz and 4 kHz, the Silver 9i's 2.83 V rms/1m sensitivity came out to 87.6 dB, some 3.4 dB below Monitor Audio's 91 dB rating. The right and left systems were matched quite close, fitting a ±1 dB window. Most error was concentrated below crossover, with one woofer slightly less sensitive than its mate.

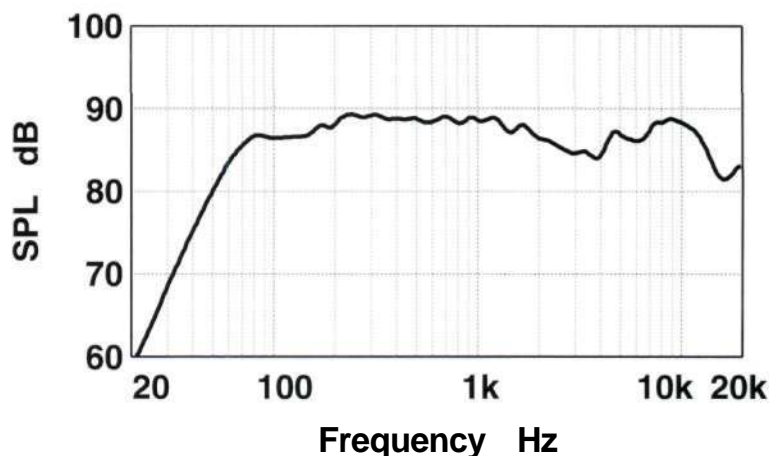


Fig. 1: One-meter, on-axis frequency response with 2.83 V rms applied.

The Silver 9i's horizontal and vertical off-axis frequency-response behavior is illustrated in Figs. 2 and 3, respectively. The 15°-increment horizontal off-axis curves in Fig. 2 are quite well-behaved, even out to $\pm 45^\circ$, where minimal high-frequency rolloff is evident. The vertical off-axis curves measured at 15° above and below axis, shown in Fig. 3, are not as smooth as the horizontal off-axis curves. At 15° above axis, a broad dip is evident between 400 Hz and 2.5 kHz, and a narrower dip centered at 4 kHz. At 15° down, a much deeper and narrower dip is evident at 3.8 kHz. The anomalies are jointly due to crossover phasing problems, the directional effects of the dual woofers, and the relatively wide spacing between the tweeter and top woofer. The asymmetrical up-down response differences indicate a significant amount of crossover lobing error. Lobing error is minimized by insuring that the tweeter and woofer are essentially inphase acoustically throughout the crossover region, and spaced close enough with respect to wavelength to minimize off-axis narrowing.

Fig. 4 shows the input impedance magnitude of the Silver 9i. Impedance minima of 6.1 ohms at 220 Hz and 4.3 ohms at 10 kHz in the tweeter's range are evident. Maxima of 17 to 18 ohms in the bass range are exhibited. A broad impedance rise through the crossover region is evident between roughly 800 Hz and 6 kHz. Below 100 Hz the bass range exhibits the characteristic two-peaks-straddling-a-dip vented-box impedance signature. The impedance dip between 40 and 50 Hz indicates the approximate box-tuning frequency. When energized with a high-level sine wave, a dip in displacement occurs at 48 Hz, the true box tuning. At this frequency, the system's output is generated primarily by the port.

The system's bass harmonic-distortion behavior is illustrated in the 3-D graph of Fig. 5. The system was ener-

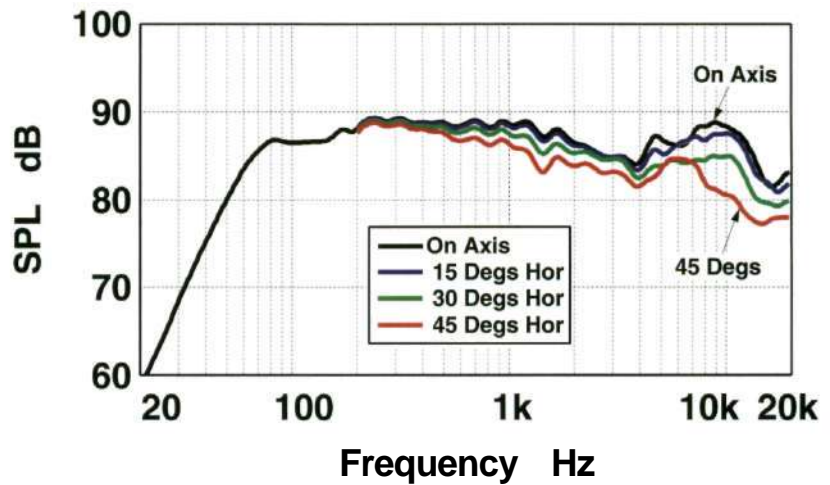


Fig. 2: Horizontal off-axis frequency responses.

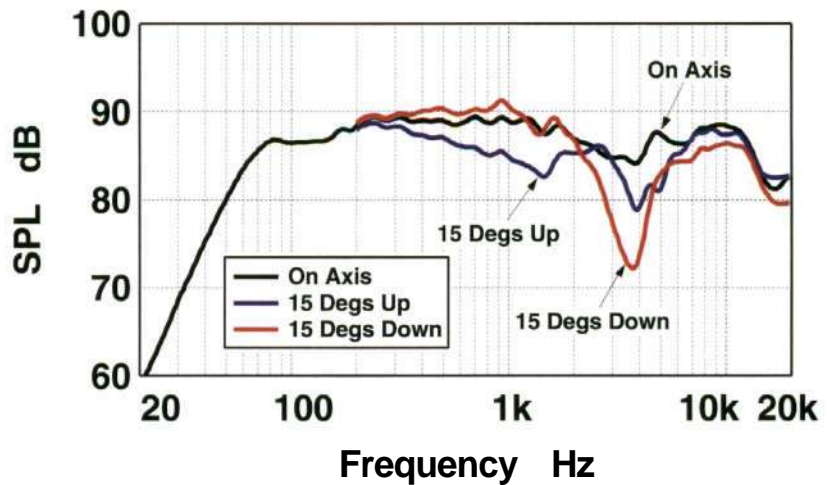


Fig. 3: Vertical off-axis frequency responses.

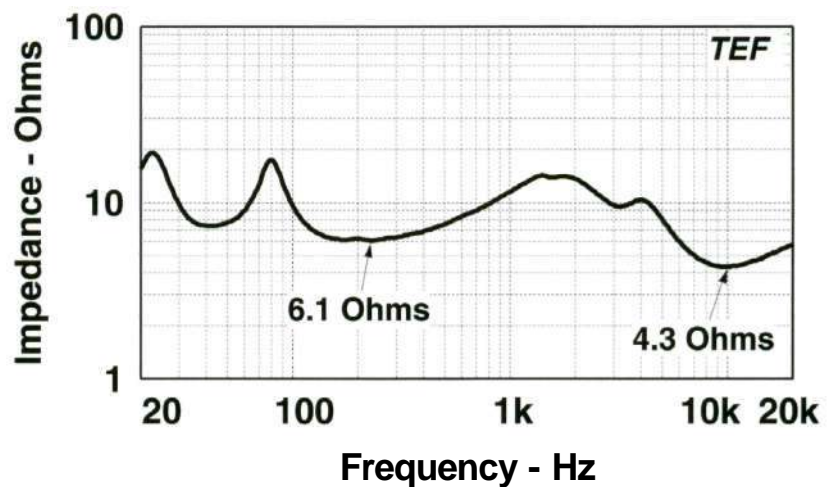


Fig. 4: Impedance magnitude.

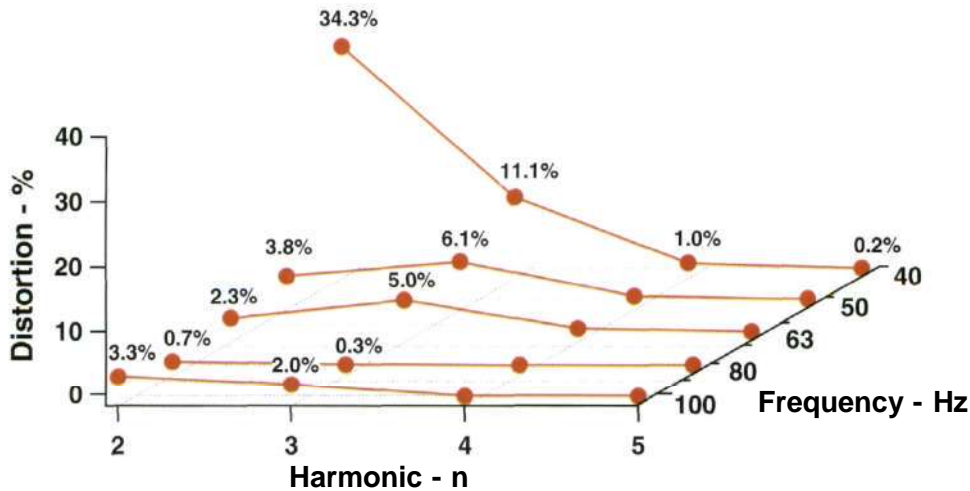


Fig. 5: Harmonic distortion at 40, 50, 63, 80, and 100 Hz at 30 watts input.

gized with 15.5 V rms (30 watts into the rated 8-ohm impedance) at all the one-third-octave center frequencies from 40 Hz (rear) to 100 Hz (front). The vertical scale indicates the distortion percentage of each of the individual harmonics, which are displayed across the front of the graph and run from the second up to the third harmonic. The rear of the graph shows the harmonics of the 40 Hz signal. The distortion is primarily low-order, with a significant 34% second and 11% third harmonic. Between 50 and 100 Hz, the distortion is significantly lower and still consists of primarily low-order harmonics. At higher frequencies above 100 Hz, the distortion was quite low at less than 0.4%. The high distortion at 40 Hz is a direct result of the system being driven hard below box resonance. Below box resonance, the vented box unloads rapidly and results in low power-handling capacity.

Use and Listening Tests

In listening tests the Silver 9i's gave a good account of themselves. Bass response was full-bodied with sufficient extension to do justice to most pop/rock and large-scale classical music. It was only on pipe organ music with loud and low pedal notes that the Silver 9i's ran out of gas, with significant intermodulation of the mids by the low frequencies. Played

at moderate to moderately loud levels the Silver 9i's were quite satisfying on most organ material.

Imaging was first-rate, with a quite solid and stable center image on mono program material such as a centered soloist. Some upper-mid and high roughness was evident when compared to my reference speakers (a pair of B&W 801 Matrix Series 3's). This was particularly apparent when listening to recorded pink noise. Some tonality was evident on the Silver 9i's, whereas the B&W's were very smooth, with minimal emphasis or de-emphasis of any part of the audio spectrum. However, the aberrations were not as noticeable on normal program material, where the Silver 9i's produced a sound that was quite similar to the B&W's in extension, balance, and overall smoothness. On normal program material, the differences in upper midrange tonality between the Silver 9i's and the B&W's were most evident when reproducing percussive sounds, such as the wood block and shakers in Latin music material.

The sensitivity of the Silver 9i's was quite close to the B&W's, requiring only 1 to 2 dB of attenuation to make them equal in playback level (B&W rates the 801 sensitivity at 87 dB, but I measured 86 dB in a review I did for *Audio* magazine several years ago). Although fairly sensitive, the Silver 9i's were nowhere near

Monitor Audio's higher rating. The Silver 9i's could play quite loud on program material that did not contain high amounts of low bass. Dynamics were quite impressive, particularly on solo piano, where the keys in loud passages were quite sharp and distinct. The rim shots of rock drum were quite satisfying when listened to at high levels.

A slight amount of high-frequency harshness and spittiness was evident on some female solo vocal material.

The Silver 9i's occasionally sounded a bit more up front, forward, and crisper as compared to the B&W's. *{That was also one of my main impressions of the speaker.—Ed.}* On male speaking voice the Silver 9i's were quite well balanced, with minimal emphasis of upper bass that often adds a barrel-chested sound to some speakers.

The vertical coverage of the Silver 9i's was checked with pink noise by listening to the speakers while seated and standing. Here the Silver 9i's exhibited some upper-midrange tonal changes when I stood up as compared to when I was sitting down. The reference B&W system handily passed this test, with essentially no change in sound when sitting or standing.

Low-frequency extension and maximum output levels were checked by playing third-octave band-limited pink noise. Here the Silver 9i's were effective only at 40 Hz and above. At lower frequencies, the speakers were only effective in generating distortion. Some port turbulence and noise were evident between 40 and 63 Hz when played at high levels.

All in all, the Monitor Audio Silver 9i's provided a good dose of high-end sound, coupled with a quite attractive and handsome visual package. At \$1999 the pair, however, serious competition to the Silver 9i would be PSB's Stratus Silver at \$1899 to \$2049 a pair.

—Don Keele

Electronics

REVIEWS OF AUDIO ELECTRONICS

By Peter Aczel, Editor
Richard T. Modafferi, Technical Consultant
David A. Rich, Ph.D., Technical Editor

FM Tuners and a Very Special Preamp

Mobile 4-Channel
FM/AM/CD Receiver

Blaupunkt Alaska RDM 168 (follow-up)

Blaupunkt-Werke GmbH, distributed in the Americas by Robert Bosch Corporation, Sales Group, 2800 South 25th Avenue, Broadview, IL 60153. Voice: (708) 865-5634. Web: www.blaupunkt.com. Alaska RDM 168 mobile 4-channel receiver with FM/AM tuner, CD player, and wireless remote control, \$369.95. Tested sample on loan from manufacturer.

Editor's Note: I had my say about this remarkable product in Issue No. 26. I finally got Rich Modafferi to measure it and use-test it. As you can see, I wasn't just whistling Dixie. Please remember that this is a complete 4-channel FM/AM car radio and CD player, but here we are only interested in its performance as a tuner (when connected to a 12 V dc power supply). It isn't even the latest model, but the FM section hasn't changed. I cannot conceal my glee over its superiority to tuners costing ten times as much. In the highly engineering-intensive world of RF, performance is of an unrelated to price because, as I have said many times before, good thinking costs no more than bad thinking—good engi-

neering costs no more than bad engineering.



After connecting the radio to the power supply and the antenna, I fiddled around with the controls. Actually, the radio's controls are well done, once one figures out which buttons to hit; it can be operated by feel with a little practice. There are tons of functions, many of which you set just one time at installation, like tone equalization, station presets, and default tuner functions (such as automatic selectivity setting).

The radio's performance as a tuner is excellent. It approaches the best "super-tuners." In fact, this radio is too good to use in a car—it should be installed in a home music system instead!

FM sensitivity and selectivity are nearly as good as my McIntosh MR-78 tuner's [which Rich Modafferi designed when he was with McIntosh and which is

unsurpassed in sensitivity and selectivity—Ed.]. The Blaupunkt can tune adjacent channels, 91.9 and 92.3 MHz, to the FM station at 92.1 in my backyard! There is no signal received from 92.1, just noise with some splatter. It can receive 89.9 MHz, fifty miles away, sandwiched between two local signals at 89.7 and 90.1, and it can also receive 91.3, seventy-five miles distant, next to a strong local signal at 91.5.

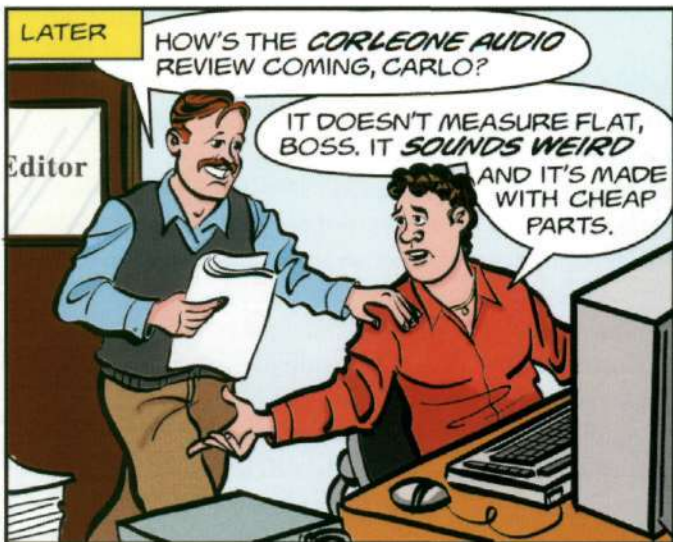
FM sensitivity for full quieting measures a good 1.2 μ V into 75 ohms. FM stereo separation is about as good as I have ever seen in any FM tuner, 48 dB at the lower frequencies, 58 dB maximum at 7 kHz, and 51 dB at 15 kHz. FM stereo frequency response is down about 1 dB at 15 kHz.

AM works as well as the FM. I obtained clear daytime reception of 710, 770, and 880 kHz from New York City, two hundred miles distant! The



THE CONSPIRACY THEORY OF AUDIO

HOW SOME AUDIOPHILES IMAGINE IT



Peter and Tom Aczel

AM station at 1430 kHz, six hundred feet away in my back yard, caused no problems. The radio did not overload or distort on 1430, and was able to receive local signals at 1250, 1290, 1330, and 1360 kHz with no cross modulation or interference. Very weak signals at 1460 and 1470 kHz were also received!

I had no schematic or service manual, so the circuit is unknown, but it surely shows some very good engineering. [We do know that the IF signal is directly digitized, and FM demodulation and stereo decoding are performed in the digital domain.—Ed] Setting up a proper test for tuner performance is tricky, as the match to antenna impedance is critical. On AM, the capacitance to ground figures into the tuning of the RF input, and I had to "fake" an antenna connection for optimum performance. On FM, one sets the antenna to function as a $(2n-1)/4$ wavelength vertical ($n = 1, 2, 3, \dots$)—my guess, and it worked—providing excellent reception. I used my $3/4$ -wavelength 75-ohm vertical antenna; also tried a $1/4$ -wavelength piece of wire.

I tried a crazy experiment. I connected the FM input to a tower-mounted stacked log-periodic antenna array, which points right at the FM station's antenna in my back yard only 138 feet away, to see if I could melt the radio's RF circuits. I couldn't! This dumb radio receives 92.3 MHz (a weak signal) *right next* to 92.1 MHz! The only other tuner which can do this is my specially tweaked McIntosh MR-78!

Reception with the tower antenna was noticeably poorer on the high end of the FM band, but this was probably an antenna-matching problem, not a fault in the radio. There was no problem with reception on the high end of the FM band when using a simulated car antenna.

I also played with the equalizer settings. They work well and are easy to

set up, once you figure out how to do it. (I had some momentary difficulties at first.) The owner's manual, which is quite dreadful overall with lots of undecipherable language, gives a surprisingly good explanation of this one thing.

In summary, buy the Blaupunkt Alaska for your home. Don't waste in a car. [Rich, you're obviously too old to relate to the megasystems in the cars of those flashy young studs.—Ed.] I know of a car radio installation in a bathroom of a home. This nut wanted a radio in the bathroom but didn't want a shock hazard, so he installed the radio in the wall near the bathtub and connected it to a car battery in the basement! A chrome loudspeaker grille sits in the wall above the radio. I can imagine this Blaupunkt peeking out of a bathroom wall, but do not install it in the shower. The owner's manual says to keep the detachable front dry.

—Richard Modafferi

Digital/Analog FM Monitor Fanfare FT-1A

Fanfare Electronics, Ltd., P.O. Box 455, Buffalo, NY 14225-0455. Voice: (716) 683-5451. Fax: (716) 683-5421. E-mail: marv@fanfare.com. Web: www.fanfare.com. FT-1A digital/analog FM monitor, \$1495.00. Tested sample on loan from manufacturer.

Inspection shows a well-made tuner. It has high-quality surface-mounted components on three glass-epoxy PC boards: (1) the main board with tuner analog circuits: RF, IF, detector, MPX, and power supply; (2) the control PC board with control but-

tons; (3) the display/microprocessor PC board. Internal wiring is neatly done. Human engineering is so well done that I was able to figure out all functions without the manual.

Station presets are easy to use—just tune in a station and push/hold the preset button until the word SET appears in the display. Selectivity function and mono/stereo mode are remembered. There is no mute function; interstation noise is unusually low, as on the old Scott vacuum-tube tuners of 1960 vintage.

The RF front end is a stock prefab unit, probably of Far Eastern origin. It uses three RF tuned circuit plus oscillator, typical of units of this type. It is sensitive but has only fair spurious rejection, also typical of RF circuitry in all tuners except the "supertuners." IHF sensitivity into 75 ohms is $0.6 \mu\text{V}$. The tuner works well with lower-gain indoor antennas but will have noise and spurious problems in strong-signal areas with a high-gain outdoor antenna. I have an FM station (92.1 MHz) only 138 feet away in my back yard. This creates a really unfair test for FM tuner RF performance, and it is no surprise that the Fanfare had trouble with it. On the other hand, it was able to receive a weak signal, 75 miles distant, at 91.3 MHz with the outside antenna, although selectivity wasn't quite enough to stop crosstalk from a local signal at 91.5 MHz.

Reception with the FT-1A on an indoor antenna (a home-made vertical) was good; some signals over 100 miles distant were received in clean stereo. Local stations, of course, caused no re-



ceptions problems; even the signal from 92.1 MHz in my back yard was not strong enough on the indoor antenna to create any problems. The tuner has only one antenna input, a 75-ohm nominal impedance female F-connector jack. There are no 300-ohm screw terminals to attach a crummy twin-lead dipole or wire antenna. Apparently the designers intended the tuner to be used with any of the good indoor antennas available today, active or passive. I have found the Magnum Dynalab 205 'Signal Sleuth' to be a good choice in an active indoor antenna amplifier to use with my homemade vertical antenna; this combination on my tweaked McIntosh MR-78 could receive some (but not all) stations nearly as well as the tower-mounted stacked log-periodic antennas.

FT-1A owners should try various indoor antennas, active or passive; there should be one that will match well with the tuner. Outdoor antennas would probably not work well in metropolitan areas where there are many powerful signals; the RF circuits of the FT-1A would have spurious responses. In remote fringe area, however, an outdoor antenna could work well. Also, the FT-1A's selectivity might prove adequate in fringe areas.

Sound quality was faultless; this tuner, like most, is better in that respect than just about any FM station. Even in a more critical test—playing recordings (LP or CD) through an FM generator (Sound Technology ST-1020A or Sencore SG80) and listening to the results on the FT-1A—no fault in sound could be heard.

In my static distortion test—tuner in stereo mode, output sampled with modulation on right channel only, 1 kHz, 90% modulation, 1000 μ V input @ 91.1 MHz—total harmonic distortion was 0.12% (-58.1 dB) with wide selectivity and 0.45% (-46.9 dB) with narrow selectivity. Stereo frequency re-

sponse was 2 dB down at 15 kHz. Static (sine wave) stereo separation with wide selectivity was 32 dB at 100 Hz, 46 dB at 1 kHz, 38 dB at 5 kHz, and 32 dB at 10 kHz.

I also have a special 10 kHz stereo IM distortion test. The tuner is fed with a stereo signal, modulated in one channel at 10 kHz, 90% modulation. A spurious 1 kHz tone appears, which is produced by the second harmonic of 10 kHz, namely 20 kHz, combining with the 19 kHz pilot tone. In the FT-1A, the spurious 1 kHz tone was -56 dB in the modulated (right) channel and -63 dB in the other (left) channel.

When I measure stereo separation with an FFT analyzer, the test signal is an impulse, not a sine wave. In this test, separation in the wide mode was 46 dB to 48 dB at all frequencies except around 1 kHz, where there was a bump to 34 dB, showing loss of separation. This is difficult to explain, as there can be many causes of FFT measurements differing from static sine-wave measurements on a stereo FM tuner. The two kinds of test signals are very different. (In the narrow mode there was no bump—stereo separation ranged from 29 dB at the lowest frequencies to 33 dB at 1 kHz and then to 35 to 48 dB at frequencies above 2 kHz.)

As I said, my FFT analyzer (IQS hardware installed in an old Apple II computer) uses an impulse as the test signal. This imposes strict conditions on the circuitry which must pass that signal, particularly with respect to slew rate and stability. I use a band-limiting filter (15 kHz) before the FM generator to soften the effect of the impulse test signal, but I observed the same result with the filter in or out. I hesitate to attribute a cause for this bump in the graph, but I do see a close correlation between FFT and sine-wave test results on supertuners with very good stereo decoders. Still, the bump ob-

served here on the Fanfare could be an artifact. There was never an audible defect in listening.

As a further test, I performed a "waterfall" plot on the FT-1A. Problems often show up in this kind of test, but nothing wrong was observed in this case. The waterfall or TEF plot is typical of what I have seen in FM tuners—not perfect here, but close. Decay is clean and uniform across the audio frequency range, with normal slow decay in the bass and ringing at 15 kHz, caused by the sharp cutoff of the anti-alias filter in the stereo decoder (necessary in FM MPX systems). Stereo impulse was also tested, and it shows a good result. The impulse here is typical for a stereo tuner, showing a very slight spurious output and normal well-damped ringing at the 15 kHz MPX filter upper frequency (16 kHz).

The distortion and separation test results given above are typical for FM tuners using modern chipsets. Given proper implementation, any tuner using today's integrated circuits will work well. The FT-1A shows attention to build quality and works without a fault, at least as a means to listen to local FM stations. Supertuners, such as my own McIntosh MR-78, fill a niche market—DX-ers who want to receive stations that cannot be received otherwise. The Fanfare FT-1A is mainly a local-station tuner.

I checked to see the effect of signal strength on separation, measuring the performance of the blend function as signal is reduced. By blending stereo channels (reducing separation), noise is reduced on weak stereo signals. Starting with strong signals, 100 μ V to 1 μ V, stereo separation was 40 to 42 dB at 1 kHz and 36 to 39 dB at 5 kHz. With the signal strength reduced to 100 μ V, the separation dropped to 34/35 dB at both frequencies. With 50 μ V, separation was further reduced to 33 dB at both frequencies, and with 25

Circuitry of the Fanfare FT-1A

Before we look at this tuner, a word about the revolution the Internet is providing for radio listeners and how that affects the choice of tuners. A couple of years ago, streaming audio was a curiosity and the stream often muted. Now things are much more reliable, and with ADSL or a cable modem good fidelity can be achieved. Even with a telephone line, it is possible to get quality equal to what would be DX quality on an FM receiver. With the dramatically wide (thousands all over the world) choice of stations to listen to on the Web, it does not make much sense to purchase a "supertuner" to DX a station. That is good news because super-tuners are no longer being sold, except for the Accuphase. Those who do not want to have a computer in the listening room and/or do not want to deal with Web sites will be able to use Internet radio devices, come the summer of 2001. At the CES I saw at least six of these devices, including ones by such heavy hitters as Philips and RCA. Many of these units placed restrictions on where you could listen, and Real Audio support appeared nonexistent (this is less and less an issue, as most Internet stations move to the cheaper, more reliable, and better-sounding Microsoft audio player).

So, if you purchase a new tuner, it should be aimed at giving good reception of local stations. The need for extraordinary image rejection, IF selectivity, etc., becomes less important. That said, we can still find significant differences in tuner design. This tuner is an interesting mix of very strong and very weak. The overall construction is strong, with excellent metalwork. The PC board is double-sided and stuffed with surface-mount components. This tuner is manufactured as well as any hi-fi product I have seen. My guess is that it is manufactured under contract by B&K, which does a great job.

What is less than good are the active parts used on the board (the passive parts are high-quality stuff). The power transformer is a low-priced unit, and the front end is even lower. It is a tiny 4-gang system that appears to be a standard off-the-shelf item from the Far East. At this price I expect to see a custom-designed front end. That is always the case with a good tuner, be it the classic designs from Marantz, McIntosh, GAS, Sumo, or most of the units we have reviewed in *The Audio Critic*. Fanfare makes a big deal out of the fact that this tuner has a "UNISSET™" microprocessor-controlled frequency monitor...with none of the 'transistor edge' that typifies the sound of most 'frequency-synthesized' FM tuners today." Well, all I found was an ST Microelectronics TDA 7427 frequency synthesizer chip on the front panel board (Fanfare chose not to supply schematics). While they could be using sections of the chip in a novel way, or turning off the synthesizer and

falling back to an AFC mode after acquisition as Yamaha does, neither case can be determined from board evaluation alone. I will say that modern frequency synthesizers have such low phase noise that the issue should be irrelevant. The front-panel board also contains the main frequency-reference crystal and the micro-processor. All other components, including the RF front end, are on the main signal board.

For reasons unknown to me, the National LM1865 is used for the IF-strip amp and quadrature detector. The Sanyo LA3450 is a more modern chip with better performance. As I have stated in previous issues, a quadrature detector cannot provide state-of-the-art FM demodulation. You need a PLL pulse-count detector or a digitally based demodulator to achieve excellent performance. I saw two ceramic filters on the board but I also saw a significant amount of ceramic chip-carrier passive components that may be associated with the IF filter. Another small IC found on the front board may be involved with the IF.

The ST Microelectronics TDA 7338D is the stereo decoder. This is a modern BiCMOS part designed for automotive applications. Its main feature is an impulse noise reduction system that reduces ignition noise in cars. It also is designed to use the minimum number of external components. It uses switched capacitor-based notch-filter pilot-tone cancellation instead of the Walsh-function-based stereo demodulator used in the Sanyo LA4350. The latter chip significantly outperforms the TDA 7338D as a result, and one is left to wonder why it—or a more advanced discrete stereo decoder—is not used in a tuner at this price point. Burr-Brown OPA2604 op-amps are used to drive the single-ended and balanced outputs of the tuner. They are serviceable in this application but hardly an upmarket choice for a design that is said to emphasize sound quality.

All these mediocre chips add up to mediocre performance. THD at 1 kHz was 13 dB worse than the one-third-priced Yamaha TX-950, which was itself 3 dB worse than the Accuphase T-109. 10 kHz IM distortion tests were an order of magnitude (20 dB) worse than on the Yamaha and the equally cheap Harman Kardon TU9600. Stereo separation was about average at 1 kHz, although 4 dB worse than on the Accuphase. At 10 kHz the 32 dB measured result was 8 dB worse than what we got off the cheap Harman Kardon TU9600. The Yamaha beat that by yet another 6 dB, with the McIntosh MR7084 up another 4 dB. The Harman Kardon and the Yamaha both use the Sanyo LA4350.

Overall the worst measured performance of any tuner we have looked at to date, save the Magnum Dynalab FT-101A, which certainly didn't impress us.

-David Rich

μV to 29/30 dB. With a signal strength of 10 μV , separation was only 23 dB at 1 kHz and 27 dB at 5 kHz; and then, going to 9 μV , there was a sudden switch to 13 dB separation, which remained relatively constant as the signal was reduced to the point where the modulation was lost in noise.

The stereo blend is only slightly effective in reducing noise. More sophisticated circuits, as used in some supertuners, work better. I designed, and received a patent for, such a circuit (dynamic stereo filter), which was prototyped for the MR-78 but not used. Instead, a good static filter was used, which worked well. McIntosh used variants of the dynamic filter in later tuners.

Note that the Fanfare stereo blend does not appear to be frequency sensitive. Effective stereo blend circuits blend the higher frequencies first/most in order to maximize noise reduction. The Fanfare circuit blends all frequencies uniformly, which is less effective in reducing noise. Again, the performance of the Fanfare on weaker stereo signals points to the best use of this tuner on stronger local signals. There the Fanfare works well.

In summary, the build quality of the FT-1A is good; it is built like a computer, using PC boards and components of a quality seldom seen in a hi-fi component. The power supply is a simple, very sensible, straightforward design, using ordinary rectifiers and solid-state regulators. It is of the "always on" type, with backup circuitry running constantly, so the remote control's power on/off button works. The microprocessor has battery backup, apparently for memory, using a cell of the type used for BIOS backup in computers. I would assume a 5 to 10-year life for this battery. The battery is in a clip and is easily replaced.

—Richard Modafferi

2-Channel Line-Level Preamplifier

Morrison E.L.A.D. (follow-up)

Morrison Audio, 650 Kingston Road,
Toronto, Ont., Canada M4E 1P9.
Voice: (416)694-0492.
E-mail: donmorrison@accglobal.net.
Web: www.donmorrisonaudio.com.
E.L.A.D. 2-channel line-level preamplifier,
\$790.00 (direct from Morrison). Tested
sample owned by *The Audio Critic*.

This amazingly perfect little preamp, the best we have ever measured, was reviewed in depth in Issue No. 25. Meanwhile the unit has undergone some minor changes and improvements, hence this follow-up. (Of course, a mediocre preamp that has been made a little less mediocre would not call for a second look.)

For those who did not read the original review, here is a brief description of the Morrison E.L.A.D. The most important thing about it is that its circuitry is designed around the Analog Devices AD797, a highly advanced op-amp made with a fully complementary IC process. This complex device, consisting of 60 transistors, settles to a full 16-bit resolution in under a microsecond, has a noise spec equivalent to a 50-ohm resistor from 10 Hz to 1 MHz, and achieves lower THD + N levels than any discrete audio circuit that has come our way. The preamp consists of two AD797's with associated circuitry—including separate volume controls for each channel—in one metal box and



Main circuit board of the Morrison E.L.A.D.

a fairly elaborate power supply in another. In early versions the preamp circuitry was potted (to keep it safe from the soldering irons of untutored tweeko "modifiers"); in the current version this has been eliminated and an improved board substituted (the danger being less now that the unit has a solid high-end reputation). The gain can now be switched from 6 dB to unity by means of DIP switches on the board. In addition, an input coupling capacitor has been added, partly on the advice of David Rich in Issue No. 25. Slight cosmetic improvements complete the changes.

I measured the preamp all over again to see whether the already astonishing specs have been further improved. They have. Frequency response at 1 V output is -0.05 dB at 10 Hz and -0.11 dB at 200 kHz. Between 15 Hz and 40 kHz it's ± 0.00 dB. Channel separation at 1 V output is 100 dB or better at all frequencies below 20 kHz; at most frequencies it hovers around 102 dB. Noise floor, with inputs shorted and gain at maximum, is 0.1 to 0.2 μV below 1 kHz, 0.7 μV at 20 kHz, and 2.3 μV at 200 kHz. THD + N now bottoms out at 2.3 to 2.4 V instead of 10 V, a most sensible change in view of the maximum inputs of power amplifiers; and (get this!) the bottom is now -106 to -105 dB, except at 20 kHz, where it is a mere -102 dB. This as close to "a straight wire with gain" as we are likely to get.

Don't for a moment misunderstand me and think that this level of performance is audible—it could be 40 dB worse and you still wouldn't hear a difference. It's nice to know, however, that the heart of your stereo system is utterly transparent—and at a cost of only \$790, not \$10,000.

—Peter Aczel

By Peter Aczel, Editor
David A. Rich, Ph.D., Technical Editor
Glenn O. Strauss, Contributing Editor

Dispatches from the Six-Channel Front

6-Channel Power Amplifier

Amplifier Technologies AT1506

Amplifier Technologies, Inc. (ATI), 1749 Chapin Road, Montebello, CA 90640. Voice: (323) 278-0001. Fax: (323) 278-0083. Model AT1506 six-channel power amplifier, \$1995.00. Tested sample on loan from manufacturer.

A six-channel power amplifier is a relatively rare beast but the right solution if your 5.1 surround system has a subwoofer without a built-in amplifier. Actually, all ATI power amps are basically the same, regardless of the number of channels, because of their modular design. For more channels more modules are added. Modules may be removed for servicing so that the whole amplifier doesn't have to be shipped. The circuit design is by Morris Kessler, who was also the designer of the old SAE amplifiers.

The ATI amplifier circuit is totally complementary from input to output. The dual-complementary differential input stages are followed by full-complementary push-pull predrivers, which in turn are direct-coupled to two push-pull drivers. All stages up to this point are operated in true class A, and all stages after the ac-coupled input are dc-coupled. The drivers then drive the full-complemen-

tary output stage consisting of 6 high-current transistors per channel. The power supply of the amplifier is designed with a toroidal transformer and two 18,000 μ F filter capacitors for each pair of channels (thus a total of 108,000 μ F capacitance in the case of the six-channel model). The construction of the amplifier is very solid; the six-channel AT1506 weighs 88 pounds and has massive heat sinks running the full length of both sides.

Measurements ranged from good to excellent. Frequency response (1 watt into 8 ohms) was down 0.15 dB at 13 Hz and 20 kHz. The distortion curves are completely noise-dominated, bottoming out at -83 dB into 8 ohms and -80 dB into 4 ohms, except the 20 kHz curves, which are 6 to 7 dB worse at their minima (moderate dynamic distortion, not very significant). Clipping occurs at 200 watts into 8 ohms and 310 watts into 4 ohms when only a single channel is driven. Crosstalk varies somewhat, depending on whether adjacent or widely separated channels are measured, but it all ends up around -75 dB across most of the audio band (good enough but far from brilliant). The PowerCube measurements (short-burst power into 20 different resistive and reactive loads) showed close to ideal dynamic characteristics, with only slightly declining voltage/power into decreasing imped-

ances and slightly elevated voltage/power into reactive as against resistive loads. Into $8\Omega/0^\circ$ the output was 47 V (277 W) and into $1\Omega/0^\circ$ it was still 31 V (966 W). Both the continuous-power and the dynamic-power readings indicate solid, conservative design, with basically nothing to apologize for.

I deem the AT1506, at \$332.50 per channel, to be an outstanding value, considering the high level of engineering and performance. It is powerful enough for just about any application and of course it has no sound of its own (if that needs to be pointed out to new readers who have not yet absorbed our philosophy regarding electronic signal paths). I wish all reviews could be so simple.

—Peter Aczel

7-Channel AV Surround Receiver

Denon AVR-5800

Denon Electronics, a division of Denon Corporation (USA), 19 Chapin Road, Pine Brook, NJ 07058-9777. Voice: (973) 396-0810. Fax: (973) 396-7448. Web: www.del.denon.com. AVR-5800 AV surround receiver, \$3800.00. Tested sample on loan from manufacturer.

I don't exactly know why the "ultimate" AV surround receiver, which the AVR-5800 almost surely is, should

come from Denon rather than any other Japanese or American manufacturer, but this 62-pound monster clearly reflects a conscious effort to ex-

ceed all others in every parameter. It is a self-consciously leadership-craving product. It would actually have made more sense as two separate units—a

surround processor/tuner and a multi-channel power amplifier—but Denon found the demand to be overwhelmingly for an all-in-one receiver. As

Circuitry of the Denon AVR-5800

A bargain at the price. The unit includes a decoder for AC-3 encoded laser discs (who knows why it needs one these days). The S/PDIF decoder is not the standard Crystal device. The digital horsepower is two 32-bit floating-point Analog Devices SHARC DSPs (far, far beyond the crunching power of a cell phone—see my comments on the Sunfire processor below). These are followed by a custom ASIC which converts the data format and also may do sample-rate conversion. The DSPs are supported by 4 high-capacity SRAM chips and 2 high-capacity flash chips. Two 100-pin microcontrollers are used by this unit. A software upgrade path does not look simple here.

The Analog Devices AD1853 DACs (4 of them for the 8 channels) are driven by the format converter. Each DAC gets its own subregulator (take *that*, Sunfire). Burr-Brown OPA2134 op-amps do the current to voltage conversion. These are not the best but they are not the cheapest by a long shot. This is followed by a National Semiconductor LM833 op-amp for the balanced to single-ended conversion and three LM833s, which are part of the GIC-based anti-aliasing filter (this requiring three op-amp sections instead of the usual one—only one is part of the signal flow). Relays switch in the two—count them, two!—6-channel inputs for the analog pass-through. Two-channel analog inputs can pass through an optional analog highpass filter, so that small speakers can be used as the main speakers, even in an all-analog mode. The digital ".1" signal bass management is usable with the analog pass-through mode. The bass of the 2-channel signal is converted by the ADC, processed by the DSP, and sent to the .1 channel. In the stereo digital mode two DACs are paralleled by a relay, reducing noise by 3 dB from the 8-channel mode. All these stereo modes are very neat and elegant. The 6-channel inputs do not support bass management and do not have analog highpass filters. We will have to wait for the AVR-5900 (?) for that.

The digital volume control is done fully differentially for all 8 channels, for low, low distortion (try and find this on a high-end stereo preamp that costs about the price of the whole unit). A passive chip containing resistors and CMOS switches is at the center of this circuit. NJM2068's do the balanced conversion and LM833's buffer the CMOS switch. The Analog Devices AD275 (a more expensive op-amp) does the conversion to unbalanced mode. Tone controls (relay bypass) are an analog circuit (saving DSP cycles for other things and optimizing DAC

dynamic range) and are formed with two more op-amps and another passive MDAC per channel.

The 7 identical power amps have the three-gain-stage topology used in Denon's top-of-the-line separates. The front gain stage lives on regulated rails. The rest of the power amp has unregulated supplies. All three voltage-gain stages are differential pairs with resistor tails. The first two stages have resistor loads, the third has an active load. The output devices are a modern composite. A single device connects between the third voltage-gain stage and the speakers. Current is sensed at each speaker terminal, and this value goes to one of the two microprocessors. Relays are in series with each output. They are driven from the microprocessor through a relay-driver IC.

Analog inputs are all buffered with LM833's, but the tape outputs are not buffered. CMOS switches select the inputs. An AKM 5354 ADC is used to convert the analog signals. The video switching circuit is designed to be very wideband and it uses TK15420M video op-amps to drive the video-outs. The video display generator is in the Y channel of the S-video only, so it does not affect color signal quality. Component video switching is passive, using relays for high bandwidth.

The power supply is more complex than I have ever seen. There are two transformers with a total of 9 secondaries and 9 bridge rectifiers. The power amps get their own supply, as does the digital section, the ADCs, the tuner, the preamp, and the video. 8 big discrete regulators are included in the power supply. The total number of regulators exceeds 20, with most supplies subregulated by integrated regulators. Over 100,000 μF of capacitors are on the unregulated supply rails.

It is all put together wonderfully. The DSP and ADCs are at the bottom of the unit. Denon calls this the SHARC tank. The analog and video switching is at the rear. The power supplies are at the left and right (4 channels each side) with big heat sinks and a fan. The big main transformer is in the center, with the big regulator board and its big heat sink forward of that. The tuner board (think table-radio performance, although I have seen worse) is on the front wall. The bottom board and the switching boards are double-sided, and everything else is single-sided.

OK, I would like some op-amp and passive component upgrades, but this receiver is a remarkable statement that is worth every penny they charge for it. The Denon design team has my highest respect for delivering the most advanced AV product ever produced. **-David Rich**

Features

THX Surround EX; DTS Extended Surround Discrete 6.1; DTS ES Matrix 6.1; DTS Neo:6 Cinema & Neo:6 Music Matrix

Dolby Digital; Dolby Pro Logic; DTS

Lucasfilm Home THX Cinema 4.0 and 5.1 postprocessing

Dual Analog Devices SHARC 32-bit floating-point DSP processors

7-channels equal-power amplifier section

170 watts per channel (8 ohms, 20 Hz–20 kHz, <0.05%THD)

THX Ultra Certified

24-bit, 96 kHz A/D conversion

Analog Devices AD1853 24-bit, 192 kHz DACs, each audio channel operating in dual-DAC differential mode

Pure Audio mode, featuring 4 DACs per audio channel in dual-differential mode

Alpha 24 processing in Stereo/Direct/Pure Direct modes (left/right channels) via SHARC DSP

Real 24-bit, up to 192 kHz digital interface receiver

3 sets of component video inputs, allowing wideband (480p, 720p, 1080i) response for progressive DVD, DTV (50 MHz)

8 sets of composite and S-video inputs

One AC-3 RF digital input for laser disc

2 sets of 7.1 external wide-bandwidth (100 kHz) inputs for special multichannel formats (such as DVD-Audio)

9 assignable digital inputs

13 analog inputs, including built-in AM/FM tuner

Multi-Zone 1 stereo preamp outputs with video output

Multi-Zone 2 outputs, preamp outputs or speaker outputs

RS-232C port for external controller

IEEE 1394 Firewire-prepared DSP section, interface panel

RC-8000 LCD touch-panel remote, with IR and RF transmission capability, included

RC-8001ST charger/RF base station included

such, it is an excellent value even at \$3.8K, but it is the amazing processor that makes it so, good multichannel power amps being widely available.

The features of the AVR-5800 are far too numerous to be discussed



here item by item; it is probably the most complex piece of equipment to be reviewed in this publication. The two sidebars summarizing features and circuitry will have to do. As for measurements, I could have made many more, the circuit and control ramifications being nearly endless, but I stopped after establishing the obvious superiority of the receiver. If I hadn't, this review would extend over more pages than we can possibly allow for it.

Perhaps the most telling mea-

surement is of the processor only, in the analog pass-through mode (Ext. In, Pre Out). Distortion in that mode, with unity gain, is completely noise-dominated, bottoming out in the -94 dB to -99 dB range at all frequencies except 20 kHz, where the curve begins to break toward slight dynamic distortion at -81.5 dB. This is performance comparable to the best separate preamps. When the power amplifier is included in the same measurement (Ext. In, Front Left out) the results are equally impressive. The 20 kHz curve does not change at all, proving it is completely preamp-dominated; the 20 Hz and 1 kHz curves are virtually identical, bottoming out at -90 to -92 dB into 8 ohms and -88.5 to -89.5 dB into 4 ohms. Clipping occurs at 180 watts into 8 ohms and 300 to 340 watts into 4 ohms (depending on frequency). With all of the audio circuits but none of the video circuits included (CD in, Pure Direct, Front Left out), more or less the same results are obtainable, depending on gain. The additional circuitry appears to be basically transparent. Digital to analog conversion through the receiver's 9 digital inputs remains close to the theoretical limits of accuracy set by the word length, within a couple of dB.

Basically everything about the Denon AVR-5800 is right up there with the best of the competition and then some—and that includes units on one chassis or two or three—except of course the tuner, which simply does the job and that's all. In terms of surround-processor versatility and performance, I am unaware of its equal, let alone its superior. (One more thing. The RC-8000 touch-pad remote control is one of the most versatile I have ever seen, probably state-of-the-art, but I hate touch-pad remote controls with a passion and got only minimally involved with it. Sorry about that.)

—Peter Aczel

DVD Audio/Video Player

Onkyo DV-S939

Onkyo U.S.A. Corporation, 18 Park Way, Upper Saddle River, NJ 07458. Voice: (201) 785-2600 or (800) 229-1687. Fax: (201) 785-2650. E-mail: onkyo@onkyo-usa.com. Web: www.onkyousa.com. DV-S939 DVD Audio/Video player, \$1799.95. Tested sample on loan from manufacturer.

The review of this player, so far the standout in a very limited crowd, appears elsewhere in this issue as part of the feature article on DVD-Audio.

Surround-Sound Processor and Tuner

Sunfire Theater Grand Processor II

Sunfire Corporation, 5210 Bickford Avenue, Snohomish, WA 98290 or P.O. Box 1589, Snohomish, WA 98291-1589. Voice: (425) 335-4748. Fax: (425) 335-4746. Web: www.sunfire.com. Theater Grand Processor II surround-sound processor, \$3495.00. Tested sample on loan from manufacturer.

Bob Carver is probably more comfortable in the analog than the digital domain, but in this case he and his digital team have done an excellent job, with some uniquely Carverish touches. What other digital home-theater front end has a holographic image mode? Or switches automatically to the proper input when a program source is turned on? Of course, you pay for all the goodies (see the list of features) and the rounded-edges-and-corners metalwork because \$3495 isn't exactly a bargain-basement price, although in today's high-end marketplace the Sunfire processor probably qualifies as upper-midpriced "value." Remember, unlike Bob's recently resurrected Carver Corporation, Sunfire has definite high-end leanings.

Simplicity—or, more precisely, the avoidance of complexity—is the organizing principle of the Theater

Grand II. There are no unnecessary bells and whistles, no exotic ambience modes, just a very complete set of useful features, all of them controllable from the front panel. They are of course also controllable from

the touch-pad remote—but here I must insert a disclaimer. I hate all remote controls, and especially the touch-pad variety. I want the control functions to be positive, unequivocal, and intuitive, and that can only be

Circuitry of the Sunfire Theater Grand II

This a very expensive piece of equipment filled with very cheap NJM2068 op-amps. The digital signal path starts with a Crystal S/PDIF decoder with no attempt at jitter suppression. A 24-bit Motorola DSP running at 100 MHz does all signal processing. This is about the power found in a high-end cell phone. High-speed off-chip SRAM connects with the DSP. A Motorola microprocessor gets its program from an upgradable 4 Mbyte flash memory.

The state-of-the-art AD1853 sigma-delta DAC is used for all channels, but it may not yield its best performance since no sample-rate converter precedes it to reduce the clock jitter. NJM2068's do the current to voltage conversion and another one does the differential to single-ended conversion. The six-channel input is multiplexed in with a CMOS mux, as is the sonic holography signal. The six-channel inputs are buffered by you know what. The mux is followed by the Crystal CS3310 multiplying DAC, which provides the gain-adjust function in 0.5 dB steps. These devices have internal CMOS op-amps that show dynamic distortion above 1 kHz. The output of the Crystal chip is buffered by an NJM2068, and another is used to create the fully balanced output signal. All outputs are muted with bipolar transistors, not relays. The two 7-axis outputs (side channels) are developed in the analog domain by summing-in some antiphase signals into the opposite front channel. The sonic holography is also performed on the front channels. It is a monster circuit in the analog domain, with each channel filtered and cross-summed by eight stages of NJM2068's. Why do they not do it in the digital domain? Do not ask me. Note that bass management occurs *before* the six-channel analog in, so you must use full-size speakers to hear all the bass on a DVD-A.

The power supply has separate windings for the ± 15 V supply that feeds the NJM2068's. But the analog supply for the DACs (+5 V) and MDACs (± 5 V) comes off the digital windings. The digital supply of course has its own regulators, so the full complement of 78/79xx class regulators pushes 9 in total. A total of 35,000 μ F is on the unregulated supply rails.

This unit has no two-channel analog pass-through. All two-channel inputs are converted by a Crystal CS5394. This is the second-best ADC from the company. It samples at 48 kHz, not 96 kHz like Crystal's best ADC. All analog inputs and tape monitor outputs are buffered (you know the op-amp). The switching is done by CMOS switches, not relays. The switches drive another pair of NJM2068's before going to the DACs.

Overall, a nice design but way overpriced.

-David Rich

Features

Auto signal-sensing input switching
Dolby Digital, DTS, and Dolby Pro Logic decoding
Additional simulated surround modes convert stereo inputs into five or seven channels of output
Holographic image mode
FM/AM tuner with multipath and noise-reduction circuitry
Five audio/video analog inputs, including five S-video inputs
Two wide-bandwidth component-video inputs
Four analog audio inputs
Six digital audio inputs: six coax and three optical
One coax digital (S/PDIF) output
Phono stage with standard moving-magnet input level for LPs
Balanced outputs for six main channels
Five- and seven-channel surround
Tone controls
Dimensions: 19" wide, 6.5" high, 15.75" deep
Net weight: 25 pounds
Two-year parts and labor warranty

achieved with crisply responding buttons and switches. I think touch-pad remotes are high-tech chic rather than a serious advancement. I don't have fat fingers, far from it, but they are too fat for the closely spaced touch-pad keys of the Sunfire remote—I have to be very, very careful, and that's not what remotes are supposed to be about. Yes, the Sunfire remote is extremely versatile, but no, thanks.

When it comes to the performance measurements, the Theater Grand II acquits itself very well. The most direct input/output path, involving no digital signal processing, is via the unit's 6-channel input, which

is a DB25 computer connector. Frequency response in this connection mode, at 2.0 V output, is dead flat (+0/-0.07 dB) from 10 Hz to 25 kHz, dropping to -1 dB at 95 kHz. The distortion curves are entirely noise-dominated, bottoming out at -93 dB with a 1 kHz input, -91.5 dB with 20 Hz, and -86 dB with 20 kHz (unimportant dynamic distortion). The clipping point is 7.1 V. Crosstalk between the front left and right channels at 2.0 V output averages -85 dB at 20 kHz, declining steadily to -112.5 dB at 200 Hz and more or less flattening out below that frequency. Using an input that engages the DSP and tone control circuits, we can expect to see less good numbers, and we do. Frequency response at 2.0 V output plummets like a stone past 20 kHz. The distortion curves worsen by a whole order of magnitude (20 dB). Front left/right crosstalk at 2.0 V output is -55 dB at 20 kHz (30 dB worse) and then improves 6 dB per octave with declining frequency. Digital-to-analog measurements show perfect gain linearity (0.2 dB linearity error at -100 dB) but excessively high distortion at 0 dBFS with the gain set to 2.0 V output. At that setting, THD + N measures -57 dB (0.14%) across the audio spectrum, with negligible fluctuations. That this is relatively innocuous gain-related analog distortion is shown by the -20 dBFS reading, which translates to -99 dB when normalized to full scale. This was obtained with a 24-bit input, indicating that 16½ bits is about the limit of the system.

Other than my strictly personal problems with the remote control, my in-use experience with the Theater Grand II was entirely positive. It is a quality processor through and through, and is easier to use than just about any other.

—Peter Aczel

5-Channel Power Amplifier

Sunfire Cinema Grand Signature

Sunfire Corporation, 5210 Bickford Avenue, Snohomish, WA 98290 or P.O. Box 1589, Snohomish, WA 98291-1589. Voice: (425) 335-4748. Fax: (425) 335-4746. Web: www.sunfire.com. Cinema Grand Signature five-channel power amplifier, \$3495.00. Tested sample on loan from manufacturer.

I have already exhausted all my superlatives on the subject of Bob Carver's unique power amplifier in its earlier version (see Sunfire, Issue No. 22, p. 31, and Issue No. 23, pp. 25-26). This is basically the same amplifier, except that it has five channels and can deliver 60 volts of short-burst power per channel instead of 56 volts. It looks different, however—much more deluxe, with rounded edges and corners, and a big analog meter calibrated in joules (the mks-system unit of work or energy) on the front panel, a typical Bob Carverism. The sleek black 43-pound brute spells "wow" before you even turn it on.

The design principle of the Sunfire power-amp circuit was explained in detail by David Rich in Issue No. 22, so I can go right on to the measurements. The frequency response isn't totally flat; it has step in it centering on approximately 1 kHz, so that the 10 kHz level is 0.5 dB below the lower frequencies, which begins to be marginally audible. David Rich ponders this peculiarity in his circuit commentaries (see sidebar). The distortion curves are altogether untypical; they are not at all noise-dominated but tend to rise in the single-digit watts before bottoming out well before the clipping point, in the 100- to 200-watt range. When they do bottom out they are only at -68 dB into 8 ohms and -63 dB into 4 ohms, except the 20 kHz distortion, which bottoms out at -57 dB into 8 ohms

Circuitry of the Cinema Grand Signature

This unit is virtually identical to the Sunfire power amp I discussed in Issue No. 22 except that it has five channels instead of two. I will not repeat myself here. As in the two-channel unit that preceded it, only a pair of tracking downconverters (PWM power supply driving the analog amplifier) are used for all five channels. This works as long as the signals between the channels are correlated. Recall that in the Carver Corporation's implementation of this design a separate downconverter was used for each channel. It is possible to come up with a set of signals that would cause both the positive and negative downconverters to move apart instead of following the desired constant 14 volts distance that they should have. As far as I can tell, the amp has no shutdown for the condition that the power dissipated across the analog power devices exceeds the SOA as a result of badly correlated signals coming into different channels.

The PowerCube shows that the power supply, output transistors, and downconverter have tremendous short-term current-sinking ability. The amplifier is driving approximately 1600 watts into 2 ohms. One assumes that with all five channels running the amp cannot do this, but we do not have a five-channel PowerCube. Drive into reactive loads is not so good because of the simple current limiter that looks like it came out of Phase Linear from the '60s. Even the cheapest Japanese circuits now use much more complex current-sensing systems, and we get better PowerCubes from them as a result. The simple circuit Sunfire uses protects the unit well for fault conditions (and with a monstrous voltage and current output it had better) but it cannot tell a reactive load from a fault.

The low signal-swing section of the analog power amp is made up of low, low-end TL072 and TL081 op-amps, yet this amp has been very well received by the subjective community. Why? Maybe the not-so-flat frequency response is why. This lumpy response comes from a second-order allpass filter that delays the signal into the input of the analog power amp. This gives the PWM supplies some time to get to the correct supply voltage. Not only does this affect the amp's phase response (for all you fans of constant group delay) but it also appears that the right-hand plane zeros are not canceling the left-hand plane zeros in the frequency domain. Is the resultant response lump a consequence of poor component matching in the allpass filter or is it intentional? I do not know.

Overall, this amp swings more volts into five channels at the same time than any single amp on the planet, even into some less than ideal loads. All this at a fair price. Now, could we have better protection, separate tracking downconverters for each channel, and flat frequency response?

-David Rich

and -54 dB into 4 ohms (dynamic distortion, for sure). Clipping occurs at approximately 400 watts into 8 ohms and 800 watts into 4 ohms—monstrous! I need to point out again that Bob Carver considers harmonic distortion to be a nonissue, as long as

it is reasonably low (0.5% or -46 dB, the specified maximum for the Cinema Grand). Crosstalk between the front left and front right channels starts at an average of -49 dB at 20 kHz and decreases 6 dB per octave with declining frequency until it levels

off at -70 dB below 200 Hz. That's good enough but far from spectacular.

The PowerCube measurements were a mixed bag, partly sensational, partly not. This is a test of short-burst power capability into reactive (i.e., real-world) loads, which no other American audio magazine performs. (For details see Issue No. 20, where the test was first introduced.) Into 8Ω and 4Ω loads, both resistive and reactive, dynamic power was huge and even, approximately 60 V regardless of phase angle. That comes to a whopping 450 W into 8Ω and 900 W into 4Ω, give or take a few watts. Into 2Ω there were problems. As long as the load was resistive (0°) or capacitive (-30° to -60°), the output held up pretty well (56 to 58 V), but into inductive loads (+30° to +60°) it collapsed. Into 1Ω loads, resistive or reactive, the collapse was total; I don't even want to tell you what the numbers were. According to Bob Carver, the ultrasonic switching noise of the amplifier confuses the PowerCube instrument, but David Rich (see sidebar) has a different explanation. Be that as it may, 8Ω and 4Ω are the more important loads and there the PowerCube is unconfused and near-perfect. I pass.

It needs to be pointed out that all of the above measurements were taken from the "voltage source" terminals of the amplifier, which present a near-zero output impedance. The "current source" terminals are driven from a 1Ω series resistor, a Bob Carver gimmick I refuse to take seriously. Let me hasten to add, on the other hand, that the basic circuit of the Cinema Grand Signature is not a gimmick but a very serious advancement in amplifier design. Minus the Bob Carver eccentricities it is arguably the best way to design a power amplifier at this time. (And, hey, it really sounds different through the current-source outputs!)

-Peter Aczel

AV Surround
Preamplifier/Processor

**TAG McLaren
AV32R Theatre**

TAG McLaren Audio, 1506 Providence Highway, Unit 25, Norwood, MA 02062. Voice: (781) 769-6611 or (888) 293-9929. Fax: (781) 769-6615. Web: www.tag-mclarenaudio.com. AV32R Theatre surround preamplifier/processor (assembled in England), \$4500.00 (6.1 version with Surround EX) or \$4000.00 (5.1 version). Tested sample owned by reviewer.

Editor's Note: I cannot entirely share Glenn Strauss's enthusiasm about the TAG McLaren AV32R, although it is built and performs exactly as he says. I think there is something seriously questionable about a \$4500 AV processor that lacks component video inputs/outputs and 6-channel analog inputs for DVD-Audio. To dismiss these features as irrelevant or unessential or subject to a workaround is a form of Britannic arrogance. At that price there should be no exceptions and no excuses.

My first exposure to a McLaren product was in the late 1960s when, as a young man obsessed with cars and motorsport, I was a spectator and obtained a paddock pass to the Can-Am racing series. Can-Am cars were the absolute brutes among road-racing machines: incredibly low, loud, light, wide, and tremendously powerful, pushing 1000 hp. And my favorite was the McLaren M-12, painted in the company's trademark orange-yellow. I have always admired McLaren, which had built a reputation for precision engineering, fanatical attention to detail and race preparation, and only one objective: to be the best, and win.

Fast-forward thirty years, and I find myself behind the wheel of a McLaren—well, in this case it is behind the volume control of the TAG McLaren AV32R Theatre surround preamplifier. It is low, relatively light,

and has tremendous processing power in the digital realm. I had the highest expectations for this unit based on its pedigree. I was not disappointed.

Everything about this product exudes quality. The design is handsome, in charcoal finish with milled aluminum knobs, a nice silver-blue fluorescent display, and an understated elegance that bespeaks Kensington Gardens rather than Piccadilly. Overall dimensions are compact for the current crop of AV processors, being just over one and a half rack spaces high. This allows a limited amount of real estate for I/O switching—so if you require such a unit to be the connection point for all your audio/video gear, check to make sure it has what you need. There are five analog inputs, five digital, and four each S-video and composite video. (In the U.S., most people will not use its video bus for DVD playback, preferring to connect directly to their video units.) There is no component-video hookup or throughput, and likewise no 6-channel input capability for DVD-Audio (TAG is betting that DVD-Audio won't be a player until it provides a digital bitstream). I found myself wanting for nothing, except for a second subwoofer or center-channel output. On the other hand, TAG McLaren offers a communications bus to connect its T32R tuner and its stunning DVD32R DVD player to the AV32R, sharing control and display information. Plus, TAG allows a re-clocking signal to be shared with the DVD32R to minimize jitter at the S/PDIF.

A pretty face does not guarantee a pretty heart, but the AV32R delivers the goods internally as well. In fact, with its superbly crafted, gold-plated, multilayered PCB you could say it has a heart of gold. The board has all the quality design features: glass-epoxy material, careful routing of signal and

ground planes, and plated-through holes for reliability and freedom from jumpers. TAG McLaren is known in the Formula 1 ranks for its onboard electronic wizardry, and the unit displays all the best design-practice details for mixed-speed processing. The components are surface mounted and closely aligned to the processors; the leaded components are wave-soldered and spotless; there are no socketed chips. (Compare that with the Van Alstine D/A processor reviewed by David Rich in Issue No. 26.) The power supply is highly proper as well, with a large toroidal transformer with many secondary taps to feed the local regulators—I counted 15 of them in all. There are regulators for the input receiver, A/D converters, D/A converters, and even the Crystal-processor-based analog volume control. The main regulator devices are heavily heat-sinked. There is no point-to-point wiring in the unit whatsoever. Particularly interesting is the absence of a 3-conductor ac power connection—this is the only unit I have reviewed that uses double-insulated construction. TAG McLaren claims this reduces noise and the potential for ground loops—it adds to the cost, of course.

Active devices include the Analog Devices ADSP-21065L 32-bit floating-point SHARC digital signal processor, Crystal CS8414 receiver, CS5352 A/D converters (20-bit), and AKM 4393 D/A converters, which support 24/96 processing if your source component can provide it. The analog operational amplifiers are Burr-Brown OPA2314's. Passive parts are of the highest quality as well: Wima and Elna capacitors, Vishay resistors, and the like. The only obvious concession to performance is that AKM makes some technically more perfect D/A converters. All in all, the unit is worth its cost and should provide long life. And it has an RS-232

port on the back to accept PC-driven software upgrades over the Internet—TAG has been particularly active in providing free or reasonably priced upgrades to its customers (something Sony promised but never delivered on the TA-E9000ES). There is even provision to add a second SHARC DSP, should additional processing horsepower be needed to support emerging technology directions.

My review unit had the latest software; it was a 6.1 unit with THX Surround EX, DTS-ES Extended Surround, 7.1 surround capability via TAG McLaren's excellent matrixing, THX Ultra certification (for those who even care about THX's increasingly irrelevant certification and signal processing), and other goodies. The matrix modes were particularly excellent, the best I have heard; they feature direct stereo feeds to the L/R front channels, and add image centering and ambience clues to the center and surround channels. This provided very convincing and natural soundscapes from 2-channel sources. The EX version also has IR remote pass-through capability to take its cues from controllers other than the one supplied, as well as a clever switching system to allow triggering of amps, screens, lighting controls, and the like. (Bear in mind that you will need to provide the voltage sources for the triggers, and I had to cobble up a solution for my rather complex system with relay-triggered amplification.)

Setup was fast and easy, using the comprehensive screen Wizard as a guide through the settings and parameter selection. McLaren eschews overcomplexity, so one does not find the number, depth, and variables for some of the settings that would be found in a Lexicon unit. So if you feel deprived that you can't alter the rear surround channel's high-frequency rolloff, look elsewhere. As I never used

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SGHT, February 1999

"(the VTF-2) could be reasonably compared to the performance of the \$3,000 B&W ASW 4000!".... "At \$499, it sets a new price/performance standard...I don't think you'll find a better bargain anywhere."

Richard Hardesty, Subwoofers Buyer Guide 2000

"The VTF-2 blasted out 20 Hz at 93 dB and delivered 107.1 dB SPL over the 25- to 62-Hz range – impressive for any sub, especially one with a 10 inch driver." "There are subs costing twice as much that can't match this performance."

Tom Nousaine, Sound & Vision, May 2000

"If you want a subwoofer with maximum boom for the buck, it's hard to beat the offerings from Hsu Research."

Robert Deutsch, SGHT, December 1999

"Allied to this transparency, was a leap in dynamic range from the Quads... widest and deepest soundstage..."

Paul Seydor, TAS, #118

"If you're looking for more bounce from your audio bucks, the Hsu VTF-2 has no equal." .. "...easily the best \$500 "tweak" I've ever heard."

Steve Guttenberg, Audio, November 1999

"101dB at 12.5 Hz, 110dB at 16 Hz, 114dB at 20Hz..."

Don Keele, Audio, August 1998

"Bargain of the Century"

Tom Nousaine, CSR, May 1998

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those adjustments when I owned a DC-1, I did not miss them. One feature I did miss was the ability to set different highpass frequencies for each speaker—on the AV32R it is either full-range, 50, 80, or 120 Hz for all speakers. While Tomlinson Holman disagrees, I prefer to be able to set the highpass frequency to 50 Hz for the Waveform Mach 17's used as L/R speakers and the Aerial CC3B used as center, while using 80 Hz for my THX sides and smaller rear surrounds. The learning remote is the ubiquitous SL-9000 universal, tailored to TAG McLaren's specifications.

In actual use, I found the performance of the AV32R to be exemplary. It was completely silent mechanically in operation, with no trace of hum or the high-pitched whining I experienced from the Sony TA-E9000ES's display. And I found it to be the quietest unit electrically in my system, as well. I have always had a nagging residual hum in my system, low level but occasionally distracting. With the McLaren, there was total silence, with just the faintest white noise from the tweeter when you put your ear up to it. Maybe the double-insulated design has its merits! As I have found with my Bryston amplifiers, lowering the noise floor always seems to relate to subjective satisfaction, as there seems to be a bit more nuance and cleanliness to the sound than I had experienced with the much noisier Sony and Lexicon units that preceded the McLaren. Lacking any technique for evaluating surround performance objectively, all I can say is that I threw every music and video blockbuster I had at the AV32R, and it handled them all with aplomb.

Measurements

The measured performance of the AV32R in the laboratory of *The Audio Critic* did not disappoint. Analog-in/analog-out frequency re-

sponse was ± 0.0 dB from 10 Hz to 10 kHz and -0.5 dB at 20 kHz; distortion was completely noise-dominated and bottomed out at -87 dB, except for 20 kHz, which was worse by 8 dB (slight dynamic distortion). This is an excellent result considering that it included A/D and D/A conversion. Noise in the analog-in/analog-out mode was -93 dB below the clipping point (with one particular setting) of 3.5 V; crosstalk in the same mode averaged -97 dB at the lower frequencies and -80 dB at the top end, 20 kHz. The digital-in/analog-out results were equally impressive. Frequency response was ± 0.08 dB from 10 Hz to 10 kHz and $+0.26$ dB (just a little strange) at 20 kHz; crosstalk averaged -118 dB at the lower frequencies, rising to -96 dB at 20 kHz. Distortion at 0 dBFS hovered around -99 dB at most frequencies in one channel and -94.5 dB in another, but with the digital input reduced to -20 dBFS and the distortion normalized to the 0 dB level, it was close to -107 dB in both channels, proving that gain-related analog distortion skewed the reading at full scale. That result was obtained with a 24-bit input, so that the real-world resolution of the AV32R is about 18 bits. As for gain linearity, it was absolutely perfect, with $+0.1$ dB error at -100 dB and $+0.95$ dB at -110 dB. It doesn't get any better than that.

The video bus ever so slightly rolled off the extreme video frequencies, as determined by using test patterns. I detected no added chroma noise or other artifacts. This will of course have no perceived downside when viewing program material and is comparable to the throughput of other AV preamplifiers. Considering all the signal traces and their relative proximity, it seems impossible to get the last iota of high-frequency video signal that is available from stand-alone professional video gear.

Customer Service

TAG McLaren's Web site is unusually well-designed and customer-centric, and it sponsors a lively Discussion Forum where owners and others can ask questions and exchange ideas. The CEO of TAG McLaren, Dr. Udo Zucker, is a frequent participant and seems sincerely interested in ensuring that his company provides world-class support. TAG McLaren frequently updates its operating software to address operational glitches that pop up from time to time, as they did on the review unit. They also offer many free-of-charge functionality and sound-shaping updates via Internet download. This is not particularly cost-effective for a company, but speaks to the issue of customer satisfaction.

In the final analysis, one can get perfectly adequate performance from a less costly design, or even one of the new mega-receivers. But for those who value upgrade capability, high quality of design and assembly, leading-edge performance, and the pride of ownership that comes from a device with this look and feel, one would be hard-pressed to make a better choice. Just as in the past and present world of auto racing, TAG McLaren Audio represents precision in design, engineering, and execution—it is a winner.

—Glenn Strauss

DVD Audio/Video Player

Technics DVD-A10

Panasonic Consumer Electronics Company, a division of Matsushita Electric Corporation of America, One Panasonic Way, Secaucus, NJ 07094. Voice: (201) 348-7000. Fax: (201) 348-7209. Web: www.panasonic.com. Technics DVD-A10 DVD Audio/Video player, \$1200.00. Tested sample on loan from manufacturer.

The review of this player, seemingly the first out of the starting gate, appears elsewhere in this issue as part of the feature article on DVD-Audio.

TAC

Getting Centered

Every now and then we come across little secrets. For example, the dot-coms were not making any money. Deregulation in California seems basically to have been designed by regulators for bankrupting utilities. The Bureaus in Washington are the fourth branch of government where the staff isn't elected, can't be fired, and can wait out any administration or legislature when they don't want to do something. The news community sometimes needs stories so badly they will set a truck on fire when it won't do so of its own accord in a crash test. DVD-A doesn't have bass management, and so on. Generally these things don't get mentioned until somebody blows the whistle. If the whistle blower happens to be an insider, dismissal, law suit, and movie rights follow.

The audio/video industry has its own little secret about home-theater systems that nobody (except me) ever talks about. Most designers know about it, yet they continue making and selling products that more or less intentionally degrade performance. As is often the case, enthusiasts join right in and buy flawed systems without even a whimper. What's this scam? Wires? Nope, most people are on to that one. 24/96? No, the market will let that albatross sink. Well, what then?

The single biggest perfor-

mance constraint in most multi-channel systems is the horizontally arrayed center-channel speaker. You know what I mean. Those long, skinny centers with twin woofers flanking a tweeter. They get made and sold that way because they are considered to be better-looking than a vertically arrayed model. There is a major performance issue here.

That basic design has come to be known as the D'Appolito, after designer Joe D'Appolito, who popularized it. The design features improved horizontal directivity (better off-axis performance) with the trade-off of worse vertical directivity when the speaker is used vertically. Standing up, in other words.

Most speakers with the Mid-Tweeter-Mid (MTM) array are not real D'Appolitos because the woofers are usually not close enough together and the crossover is too high. But the MTM is very popular and can offer excellent performance when it is vertically deployed.

Ever wonder why most speakers feature vertically arrayed drivers (the woofer over or under the tweeter)? It's because you get interference patterns off axis in the horizontal plane when you mount drivers side by side. Vertical arrays direct the off-axis lobing up and down and away from the main listening area. What happens when you lay a speaker on its side? You allow the

worst off-axis sound to enter the listening area. And, most center channels are *intentionally designed* that way.

Don't fall for it. If you want to optimize performance, use a vertically arrayed center-channel speaker. The coolest way to implement one is with a perforated screen, with your center channel mounted behind it out of sight. It's easy. [*Yes, in a front-projection TV system, but how many have one?—Ed.*] An excellent method is to just use a high-quality 6.5-inch 2-way monitor as your center speaker. There are many available and most of them are far superior to a "toppled D'Appolito." If you already own an MTM center, try standing it up. It'll sound better.

I wonder why no one ever talks about this. It's no mystery, but marketers never mention it, I never hear about it at trade shows or engineering conferences, and it's never mentioned in owner's manuals. Occasionally a manufacturer will use a design that avoids the problem, but I have yet to see it used as a promotional tool. It's a dirty little secret of the industry. I don't get it. And neither should you.

Nobody likes bad news. That's why you need to read *The Audio Critic*. This is one of the few places where you'll get the whole story without apology.

TAC

Has Tom Holman gone off the deep end?

I have always had the highest respect for Tomlinson Holman, beginning with the Apt/Holman power amp of the early '80s and continuing with his involvement with THX and Lucasfilm. I even awarded him a White Hat in Issue No. 25 as one of the good guys of audio. It is with the greatest chagrin, therefore, that I must comment on a puerile travesty of an audio demonstration he was responsible for at the recent 2001 International CES in Las Vegas.

Holman's TMH Corporation was promoting a 10.1 channel surround music system at the CES, with continuing demonstrations all four days. Whether 10.1 channels yield better sound than 5.1 channels is moot; under optimal conditions they probably do; but in the TMH demonstration the music sounded canned and unnatural, with Holman's live speaking voice in startling contrast to the obviously electronic quality of the loudspeakers' output. I am mentioning that only because the question naturally arises, but in this case it was completely beside the point. The point here was the manner in which the demonstrations were conducted.

After endless waiting on line, the hapless visitor was led into a completely darkened room by a

person with a movie usher's flashlight. After everyone was seated, the flashlights were turned off and the door closed. The room was now completely dark—I mean pitch black, even after one's eyes got adjusted and the pupils opened up all the way. All right, I thought; they want us to pay close auditory attention when they begin. The demonstration began, and I fully expected the lights to come on after a few minutes, at least dimly, as the show segued to its next phase. I was wrong. We were made to sit in total, sensory-deprivation darkness for half an hour. It was, in my lifetime experience, one of the most unpleasant half hours that I can remember.

If I had wanted to leave—because of a nature call, or another engagement, or simply because the demonstration was lame—there was no way. I couldn't even have found the aisle, let alone the exit. It was, in effect, what the law calls false imprisonment. The police, if called, would have agreed. And I shudder to think what would have happened if a fire had broken out in that crowded room. Absolute disaster. A phone call to the fire marshal would have shut down the show, pronto, if someone had thought

of it. I only did afterwards, and it was toward the end of the last day.

What boggles the mind was the adolescent arrogance of the whole scheme. It was something a couple of obnoxious fourteen-year olds might have concocted. "Hey, Beavis, let 'em sit in totally awesome darkness so they'll have to listen." "Yeah, cool, heh-heh, heh-heh." It was altogether unnecessary, because a properly set up multichannel system offers no clue to visual localization, and contrary to natural listening conditions because it had nothing to do with an ideal concert-hall experience. Bluntly put, it was simply stupid. That the sound wasn't at all realistic just made the whole exercise even more ridiculous, but it would have been intolerable even with great sound.

I simply cannot fathom how Tom Holman, a thoughtful and sober technologist, could have been responsible for these shenanigans. Has his relatively modest success completely gone to his head? Has he lost all sense of proportion? Has he gone off the deep end?

TAC

Capsule CD Reviews

By Peter Aczel, Editor

These are mostly recent releases, interspersed with a few older ones that I wanted to catch up on. Note that the year in parentheses after the CD number is the year of recording, not the year of release.

Arte Nova Classics

This label is still another fiefdom of the BMG empire.

W.A. Mozart: *Violin Concertos No. 1, 2, 3, 4, 5; Haffner Sere-nade.* Pamela Frank, violin; Ton-halle Orchestra Zurich, David Zinman, conductor. 74321 721042 (2 CDs, 1997-99).

Mozart's youthful but far from juvenile violin concertos, all of them extremely beautiful music, are performed straight up by Frank and Zinman. One cannot fault these warm, gracious, stylistically pure performances. Pamela Frank is a very serious artist, in the musicianly rather than glamorous mold. The Zurich recording could be a little more spacious and a little less aggressive but it is still highly listenable.

Delos

John Eargle has refined his Dallas/McDermott Hall recording technique to the point where it is infallible—simply the best recorded large-orchestra sound available today.

Lowell Liebermann: *Sym-phony No. 2, Op. 67; Concerto for Flute & Orchestra.* Eugenia Zukerman, flute; Dallas Sym-phony Orchestra, Andrew Litton, conductor; Dallas Sym-phony Chorus, David R. Davidson, director. DE 3256 (1999-2000).

If you told me that the Liebermann symphony was composed in 1890 instead of 1999 (this is its world premiere recording), I'd believe it un-questioningly. Not that I have anything against its total lack of contemporaneity; it's the piling of 19th-century cliché

upon cliché, without a single original idea, that bothers me. The huge orchestra and chorus (words by Walt Whitman) are manipulated with consummate craftsmanship, but every pro-gression, every cadence is ut-terly banal and predictable. The flute concerto, composed in 1992 when the composer was only 31 years old, sounds slightly more contemporary (maybe 1920-ish) and is virtu-ous in the extreme, but I still could not detect any significant musical ideas in it. Eugenia Zukerman, on the other hand, is a brilliant flutist, no question about it. What is utterly re-markable about this CD is, again, the sound. If there ever was an orchestral demo disc, this is it. From the topmost highs to the lowest bass (and there's plenty of both), the or-chestra and the chorus appear to be completely untrammled and transparent. The sound-stage is huge, panoramic. What's more, when played through a good 5.1 surround-sound system with Dolby Pro Logic decoding, the recording acquires an extra dimension—truly state of the art. Bottom line: musically negligible but harmless, sonically maybe the best John Eargle effort so far.

dmp

Tom Jung remains the master of the in-your-face, up-front, hard-left-center-right jazz/pop sound. Of its kind, it's the best.

Bob Mintzer Big Band: *Homage to Count Basie.* CD-529 (2000).

Listen to the most elabo-rate track of this "Mintzerized" Basie potpourri, "One O-

Clock Jump" (more than 11 minutes long) and you'll be a believer. It's a blast, with some really outstanding solos by first-rate instrumentalists, par-ticularly Byron Stripling on trumpet. All the other tracks (there are 8 in all) have some-thing "Basiec" to offer, also. The sound is simply the best you-are-there big-band sound on the planet—or maybe it's closer to they-are-here. This is a live-to-2-channel Direct Stream Digital recording and as such it is an argument in favor of that technology.

EMI Classics

This great British classical label some years ago consolidated all its affiliated labels (His Master's Voice, Columbia, Angel, etc.) under one name. It does make things simpler.

Peter Ilyich Tchaikovsky: *Symphony No. 6 in B Minor, Op. 74 ("Pathétique").* Münchner Philharmoniker, Sergiu Celibidache, conductor. CDC 7243 5 56523 2 4 (1992, issued 1997).

This is one of a series of live performances issued after Celibidache's death, after much hesitation and agonizing by his widow and son. He did not believe in recordings, in fact he was dead set against them, and until this series there were very few of them of his performances in acceptable sound. Specifically, he believed that the correct tempo in a re-sounding symphonic space would be perceived as too slow when heard in a recording. This particular Pathétique comes off as monumental rather than slow, although it is

perhaps a little slow in places. Never mind, this symphony can take it. The playing is tautly controlled (Celibidache was an expenses-be-damned rehearsal freak) and utterly grand in concept. It is, every-thing considered, a magnifi-cent reading, by a unique musical personality. The first movement, especially, is im-mensely moving. If the Mu-nich orchestra were on the Berlin or Vienna level, the thrill would be that much greater; as it is, they're good but not great. The recorded sound is thoroughly modern and wide-range but far from extraordinary. Of course, we're lucky it exists at all.

Naxos

The breadth of the Naxos cat-alog continues to astonish. Not everything in it is first-rate—but that would be asking the impos-sible—but this level of activity in the struggling classical recording market is phenomenal.

Enrico Caruso: *The Complete Recordings, Volumes 1 & 2.* New restorations by Ward Marston. 8.110703 & 8.110704(1902-06).

In the last issue I reviewed RCA Victor's amazing Caruso CD with modern orchestra and cleaned-up vocal tracks. These two CDs, the begin-ning of a new series on the Naxos Historical label, are different. They give us the original Caruso tracks, totally restored in terms of noise re-duction, intelligibility, and pitch but with nothing added, in chronological order beginning with the earliest. The restorations, by the blind

specialist Ward Marston, are simply the best ever, making thoroughly enjoyable voice recordings out of the impossibly scratchy and hissy originals without altering the basic musical characteristics of the voice. Brilliant work. The results are a revelation, especially when it comes to these earliest and therefore most primitive Caruso recordings. The young Caruso, here only 29 to 33 years old, possessed an unbelievably sweet, effortless voice that was at the same time powerful and authoritative, expanding gloriously on the climaxes. He sang with abandon and ease, without staginess, as if it were mainly for his own pleasure. Nearly a hundred years later, there has still not been another tenor remotely like this. It was only later that his voice darkened and his style developed the now familiar mannerisms. If you're a tenor aficionado (like me), you owe it to yourself to check out these recordings.

A. K. Glazunov: *Symphony No. 5 in B-flat Major, Op. 55; Symphony No. 8 in E-flat Major, Op. 83- Moscow Symphony Orchestra, Alexander Anissimov, conductor. 8.553660 (1997).*

Glazunov was a distinctly reactionary composer, a contemporary of Sibelius and Richard Strauss but more like a minor-league Tchaikovsky, from an earlier generation. That does not mean his formal structures and orchestration aren't of the highest quality, because they definitely are. This is actually very beautiful music, striving for the big statement and rising to its greatest heights in the scherzos. The performances by the Moscow orchestra are very strong and obviously authoritative; the recorded sound is of near-demo quality.

Jean Sibelius: *Symphony No. 6 in D Minor, Op. 104; Symphony No. 7 in C Major, Op. 105; "The Tempest" Suite No. 2, Op. 109, No. 3. Iceland Symphony Orchestra, Petri Sakari, conductor. 8.554387 (2000).*

Late Sibelius is a mixed bag and a matter of taste; some think the 7th is his greatest work, but personally I prefer the early Sibelius of the 1st and 2nd Symphonies. I must admit, however, that these are absolutely first-rate performances, beautifully played by an orchestra I had not heard before. Only a major-league band can produce such precise gradations of dynamics. The craggy Nordic landscape inherent in the music is authentically rendered. The recording is vivid but occasionally overbright on top. (For a very different interpretive approach, grander and more romantic, listen to Sir Colin Davis and the London Symphony Orchestra on RCA Victor.)

Richard Strauss: *Don Quixote, Op. 35; Romance for cello and orchestra. Alexander Rudin, cello; National Symphony Orchestra of Ireland, Gerhard Markson, conductor. 8.554175 (1997).*

Richard Strauss was a great composer and *Don Quixote* is arguably his masterpiece—more subtle, more sophisticated, more humane, and less grandiose than his other tone poems. (The presentation of the rose in *Der Rosenkavalier* comes to mind as of comparable subtlety.) This is a careful, well-articulated performance, attentive to the smallest details of the score, perhaps a little undernourished in the massed string passages. (I was raised on Reiner's incomparable 1959 recording with the Chicago Symphony Orchestra.) The Russian cellist Alexander Rudin is virtuosic and moving as the Don's voice. The recording is extremely clean and transparent.

Philips

This was another famous classical label caught up in the great PolyGram shakeup; it is now part of the Universal Music Group.

Franz Schubert: *Piano Sonata No. 21 in B-flat Major, D. 960; 3 Klavierstücke, D. 946. Mitsuko Uchida, piano. 289 456572-2 (1997). Piano Sonata No. 19 in C Minor, D. 958; Piano Sonata No. 20 in A Major, D. 959. Mitsuko Uchida, piano. 289 456579-2 (1997).*

Mitsuko Uchida is a world-class pianist with a magnificent technique and an obviously keen intellect. She plays these all too frequently recorded masterpieces in the grand romantic manner, with many tempo changes, lots of pedal, distensions of phrasing, the whole bit. I don't mind; it works—these sonatas can take it. She presents late Schubert as a big, big composer, and she makes the point unequivocally. I prefer Stephen Hough's mellower, more naturally flowing style in this music (see Issue No. 26), but this is another valid approach and thrilling in its own way. The recording is perhaps a little thick in the heaviest passages but wide in dynamic range and on the whole quite up-to-date sonically. The C Minor, recorded a few months later than the others, sounds leaner and better—indeed, just about perfect.

RCA Victor

I can't emphasize sufficiently how good the sound of RCA Victor has become, after decades of mediocrity. And they don't even feature the recording engineers in their literature; small-print listing on the back of the CD box is all the engineers get.

Gaetano Donizetti: *La Favorita (original French version). Vesselina Kasarova, mezzo-so-*

prano; Ramón Vargas, tenor; Münchner Rundfunkorchester, Marcello Viotti, conductor. 74321-66229-2 (2 CDs, 1999).

Donizetti wrote French grand opera as well Italian bel canto, and this is one of his best. It is sung here in the original French (the Italian adaptation, *La Favorita*, is a debased version, unworthy of performance). The opera is a continuous outpouring of beautiful melody; start the recording anywhere and stop anywhere, it's like one unending, gorgeous aria. The Bulgarian mezzo Kasarova and the Mexican tenor Vargas are not only marvelous singers but astonish with their stamina—they are both "strong like bull" in this live recording, fresh-voiced to the end and not flagging for a moment. Really amazing. (How can a no-talent journeyman tenor like Andrea Bocelli be so much more famous than the brilliant Vargas?) The recording is state-of-the-art of its kind, with a somewhat shallow theatrical acoustic but sparkingly live.

"Emil Gilels, the Giant." W. A. Mozart: Fantasia in D Minor, K. 397; Piano Sonata in A Minor, K. 310. Ludwig van Beethoven: Piano Sonata No. 8 in C Minor, Op. 13 ("Pathétique"); Piano Sonata No. 14 in C-sharp Minor, Op. 27 No. 2 ("Moonlight"); 32 Variations on an Original Theme in C Minor, WoO 80. Franz Schubert: Moments musicaux, D. 780 (Op. 94). Robert Schumann: Arabeske in C Major, Op. 18. Franz Liszt: Rhapsodie espagnole. Maurice Ravel: Pavane pour une infante défunte; Jeux d'eau. Alexander Scriabin: Piano Sonata No. 3 in F-sharp Minor, Op. 23- Artists of the Century," 74321 75523 2 (2 CDs, 1965-84).

This unique collection of live recordings of the 48- to 67-year old Gilels documents his blazing virtuosity as well as his exceptionally warm musical per-

sonality. He was definitely one of a kind. The recordings are clear, with good presence, but very tinny on top, with the exception of the Scriabin piece, recorded in 1984 and quite up-to-date in sound. Funny that we have come to a point in time where recordings from the 1960s are "historical." Be that as it may, Gilels is important history.

Gustav Mahler: *Das Lied von der Erde*. Waltraud Meier, mezzo-soprano; Ben Heppner, tenor; Symphonieorchester des Bayerischen Rundfunks, Lorin Maazel, conductor. 74321-667957-2 (1999-2000).

In Issue No. 26 I spoke highly of the recent De-Young/Villars/Oue recording of *Das Lied* on RR. This one is better. The tenor part of Mahler's masterpiece strains every tenor voice in the world to the limit and beyond—except Ben Heppner's. He sails through the brutal high/loud passages as if he were singing Schubert's *Lindenbaum*. Meier also gives a beautifully controlled performance, especially in the *Abschied*. Indeed, control is the salient feature of the orchestral playing as well; the technical ease of the singing allows Maazel to realize the subtlest details of the score. The recording is perhaps not quite as magnificent as the demom-quality RR but is excellent in its own right, with an exceptionally wide dynamic range.

Richard Wagner: *Rienzi: Overture; Lohengrin, Act III: Prelude; Faust: Overture; Die Meistersinger: Prelude; Siegfried Idyll; Götterämmerung: Dawn and Siegfried's Rhine Journey. Berlin Philharmonic, Lorin Maazel, conductor. 74321-68717-2 (1999).*

There is today no better combination of forces to play Wagner than Lorin Maazel and the Berlin Philharmonic. That they can play these warhorses in their sleep is beside the

point; here they play focused and inspired. Even though Wagner is listenable when played by a less than first-rate orchestra, the greatness of the music—and it is great, regardless of the overexposure—emerges fully only with a world-class string section and winds. This CD, by the way, reminds me once again that Wagner is still better than any of the post-Wagnerians. Maazel opts for generally slow tempi, which the Berliners can sustain without loss of tension. The recorded sound is big, juicy, and basically flawless.

Telarc

Telarc's Michael Bishop continues to be my favorite recording engineer—or maybe only my second favorite, after Delos's John Eargle. They are, in any event, sufficiently different that they can easily coexist in my audiophilic pantheon.

Gustav Mahler: *Symphony No. 4; Songs of a Wayfarer. Frederica von Stade, mezzo-soprano; Atlanta Symphony Orchestra, Yoel Levi, conductor. CD-80499 (1998).*

Every conductor who is anybody has tried his hand at this most relaxed and genial of the Mahler symphonies, but not everybody has been able to achieve Yoel Levi's level of clarity in its complex orchestral fabric. As for Frederica von Stade, she is a truly fine singer but her mature voice lacks the naïve quality the fourth movement requires. The four *Lieder eines fahrenden Gesellen* are another story. Although told in the first person by a male protagonist, von Stade is thoroughly convincing in the role. This is exquisite singing. And the recording—wow! Every detail stands out in perfect sonic proportion; I cannot imagine a more beautiful Mahler sound. Note the bass drum, a Telarc specialty. Recommended.

CD Surround Reviews

By Glenn O. Strauss, Contributing Editor

Some are surround versions of fairly recent stereo releases, others reinterpretations of favorite classics.

DTS Entertainment

Steely Dan: *"Gaucho."* 5.1 mix by Elliot Scheiner. dts 1014 HDS-4434 (1970).

Steely Dan's recent Grammy for *Two Against Nature* after a 20-year-plus hiatus was merely a reminder for the faithful who recall one of the most innovative and accomplished bands of the '70s, '80s, and some would argue, all time. Donald Fagen and Walter Becker's eclectic mix of jazz mosaic with back-beatin' rock foundations won them critical and popular acclaim. *Gaucho*, arguably their most polished and popular effort, had all the "Dan" trademarks: humor, satire, suggestions of recreational drug use, erotica, and relentless, shifting rhythms. Hey—sex, drugs, and rock 'n' roll works! I was a bit apprehensive about this reworking of one of my all-time favorites—would it destroy or enhance a classic work of art?

Elliot Scheiner did a great job of transferring this to surround. "Babylon Sisters," the opening cut, eliminated any concerns I had—Fagen's voice is mixed "dry" in the center channel, with reverb in the remaining channels to add realism, and has great clarity. Bass is nicely balanced without the overbearing weight heard on some other dts efforts. Becker and Hugh McCracken's guitar solos on "Hey Nineteen" are at least as sharp as the stereo version, perhaps with even a bit more bite. The great background singers are recorded in the surround channels with blend into the fronts, creating a wonderful soundscape. Even

the surround gimmickry is used with taste and great effect—the wind chimes, percussion shots, and other effects add a bit of aural excitement to the mix without being distracting. All this comes together in the title track—a complex, beautifully crafted work that uses the surround capabilities perfectly. The chorus builds to a cathedral-like effect with the instrumentation and voices creating a cupola of sound that is involving and dramatic. It might be described as similar to the swell setting on an organ.

It is rare to find a 1980s rock recording that doesn't have a number of tracks that sound dated and silly; that *Gaucho* still has the magic is a testament to its artistic strengths, and this surround version builds on them nicely.

Larisa Stow: *Moment by Moment.* 5.1 mix by David Tickle. dts CD (1999).

This disc has gotten a lot of play in my household in the last year—even my wife and toddler like it, which is unusual for many of the high-quality audio discs I use for system evaluation. Stow is a fresh talent supported by her touring band, Billy's Sister. The songs are sophisticated and well arranged, and the musicians are skilled and well served by the recording. I especially like the way the kick drum is captured—it has punch and a startling sense of depth. This is done using a technique widely used by the best practitioners of surround sound: the center channel gets a delayed echo of the drum's

— CD Surround Reviews

harmonics. Another surround trick-of-the-trade that adds to the lead instruments' sense of space is to bleed some of the surround mix back to the front, which tends to pull the perceived instrument into the room a tiny bit, providing a sense of palpability.

Generally, the surround effects are subtle and tasteful, and do not distract from the music. "Innocence," the final track, is an exception. Here, the dreamy, transcendental theme is supported and enhanced by swirling surround effects and vocal overdub movement. It is entrancing and convincing, forever relegating the side-to-side pans of stereo recording to the history book of audio reproduction.

We will have to see if Ms. Stows follow-up recordings have the legs of this one, but she certainly has a production team that delivers the goods. Well worth a listen.

High Definition Surround

Santana: Abraxas. 5.1 mix by David Frangioni. High Definition Surround HDS-4434 (1970).

If Steely Dan's *Gaucho* shows what can go right with a surround remix of an old classic, this is an example of what can go wrong. After listening to the first two cuts, I had to double-check if my surround processor was still functioning properly! This is a horrid mess that eviscerates a seminal rock album of the 1970s, adding nothing and taking away a lot. Surround effects are way over the top, sounding as if someone turned a junior high-school class loose in a recording studio—"Hey, let's see what this knob does!". Example: on "Black Magic Woman," Carlos Santana's buzz-saw guitar entry is shoddy. On this and other

cuts, his guitar is mixed back to front at times and is very distracting. Instruments come and go and move around the mix in a seemingly haphazard manner.

The bass mix approach on this album also evades me. This is most apparent on "Oye Como Va." The bass is mixed in the right surround channel primarily—little or no bass comes from the L, R, or LFE channels. Now, my system has six surround speakers, two of which have response below 40 Hz. This is way beyond what passes for a surround speaker setup in the average kit, and still the cut sounded very thin and weird. And the bass mix varied quite a bit from track to track, at times satisfactory, at other times not. Perhaps it sounded good in the studio, where they may have had surround channels that precisely matched the fronts, but I doubt it.

Just to ensure that my

memory of the original stereo releases hadn't gone stale, I dragged out both my CD copy and, amazingly, the LP album I used to listen to while I was an undergraduate at Dartmouth! The CD had much more body and just sounded more balanced; even the record, clicking and popping with the accumulated ravages of college life in the '70s, gave a better account.

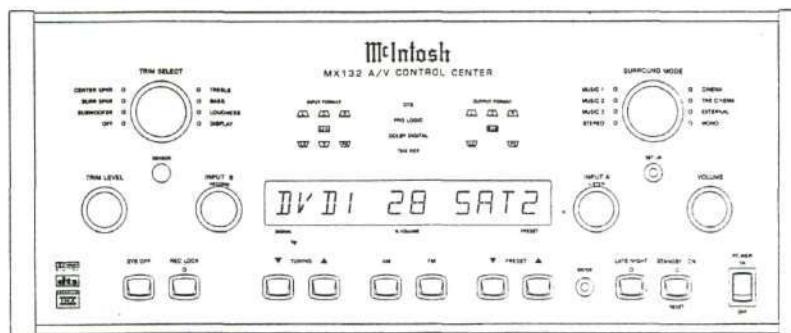
The only possible use for this recording might be in one of those ghastrly Circuit City surround displays—you know the kind with clipping amplifier, blown tweeter, and the cheap subwoofer set at a +20 dB level? This disc would be great selling surround sound to the untutored: "Hey, did you hear that over there? No, wait, now it's over here! . . ." I can see no use for it, and I cannot recommend it for *The Audio Critics Hall of Fame*. TAC

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