First Listen: Audyssey DSX

This new technology adds a wow factor to any home theater.
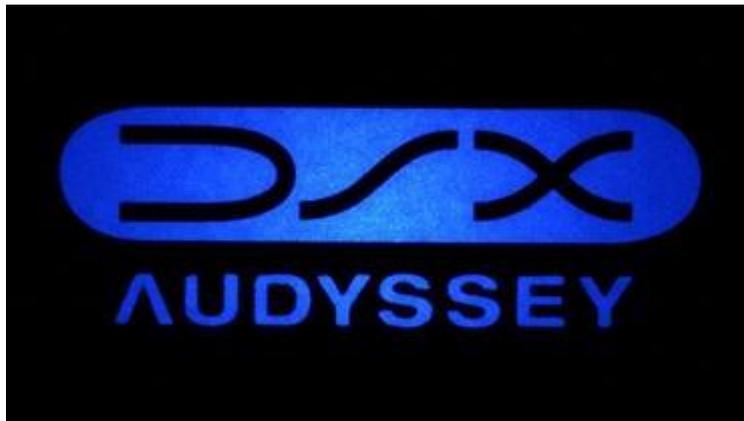
By Brent Butterworth
November 2009

Denon's AVR-4810CI A/V receiver is the first product that exploits the full 11.1-channel capability of Audyssey DSX processing. Here are our initial impressions:

Based on posts I've seen on various websites, I think home theater enthusiasts have reached the point of channel fatigue. Proposals to add more speakers to our current 7.1-channel systems meet with as much enthusiasm as tax increases. So if someone wants us to add more speakers, they'd better make a solid case.

Among enthusiasts and reviewers, Dolby doesn't seem to have made a particularly compelling case for its 7.1-plus technology, Pro Logic IIz, which adds two height speakers to a 5.1 or 7.1 system. When I evaluated PLIIz a few months ago, I heard a subtle enhancement at best; one reviewer I know and respect heard nothing at all.

Audyssey Labs'DSX technology promised to upstage PLIIz by adding two width speakers in addition to PLIIz's height speakers. However, the first DSX-equipped receivers didn't deliver 100 percent of what Audyssey had promised - they could produce height or width channels, but not both at the same time.

The first product that can deliver all of the 11.1 channels of which DSX is capable is Denon's AVR-4801CI, a $2,999 piece that's second-from-top in Denon's receiver line. I begged to take a quick listen to the AVR-4810CI before it went to *Sound + Vision* ace receiver reviewer Daniel Kumin, so I could find out if DSX makes a better case for 7.1-plus sound.

THE SETUP

I used the same speakers for my DSX evaluation that I used to audition PLIIz: a system built around Sunfire's [CRM-2](#) speakers, with the CRM-2C for the center channel and the CRM-2BIP for side surround speakers.

After consulting diagrams provided in the receiver's manual and on Audyssey's website, I placed all the speakers as recommended for DSX. The height speakers (the blue shapes in the accompanying drawing) went on shelves 45 inches above the front left and right speakers (the angled-in green shapes). The width speakers (purple shapes) sat on stands at the same height as the front left and right speakers. The surround speakers (red shapes) were mounted on 5-foot-high stands placed along the walls just behind my couch. The subwoofer (orange shape) sat in its usual place between the center and front right speakers, under my projection screen.

In order to match the setup I used for PLIIz, I used just two surround speakers for most of my listening, but I did listen to a few clips with a couple of KEF iQ10 minispeakers added as rear surrounds. I had to add an external stereo amp to power these, because the AVR-4810CI offers "only" nine channels of amplification. While the rear surround speakers added a bit more wraparound effect behind me, I didn't consider them a big improvement. They'd be useful in a large home theater with two or three rows of seats, though.

The AVR-4810CI carries the full package of Audyssey technologies: MultEQ, Dynamic EQ, and Dynamic Volume. To assure that I got the best possible DSX presentation, I used Audyssey's automatic setup procedure. However, I first I had to tell the receiver what speaker configuration I was using. This procedure proved complicated enough that I had to consult the manual, something I usually don't have to do with receivers. Fortunately, an on-screen graphic showed the speaker configuration I had selected, assuring me that I'd made the correct choices. After letting the auto setup function do its thing, I was ready.

Or so I thought. Even after several minutes of fumbling with the remote and browsing the on-screen menus, I was unable to turn DSX processing on. It took several more minutes of flipping through the lengthy manual to discover that the DSX processing is activated and deactivated through a button on the remote's touchscreen. Denon labeled this button SPKR. (They'll pay for the confusion they caused me - at the next Denon press event I'm going to wear a nametag that says "Jeff.")

THE SOUND

I started my DSX evaluation with the movie that so thrilled me when I heard it in PLIIz: *Death Race*, a post-apocalyptic automotive action flick starring the indestructible and cooly accented Jason Statham. This isn't some character-driven movie where people talk to each other about stuff. It's mostly *Road Warrior*-type patchwork muscle cars outfitted with whirring miniguns, napalm canisters, and hot babes, battling each other to the strains of a heavy-metal soundtrack.

Unlike PLIIz, the effect DSX produced was in no way subtle. The contributions of the height and width speakers were readily apparent. In fact, they seemed to be playing only a few decibels lower than the front left, center, and right speakers.

I particularly noticed the contribution of the width speakers, which greatly enhanced the realism of "fly-by" effects, such as when parts of cars went whizzing from the front speakers

to the surrounds. There's no question the sound was more involving; it seemed almost as if I were strapped to a chair in a special audio simulation test lab rather than sitting on my couch in a normal home theater. While PLIIz delivers an understated enhancement, DSX pushes the added surround effect much further. It mostly makes sonic sense, though. DSX's effect seems to be designed more for greater realism rather than to wow you in the way reverb-soaked digital surround modes included in some receivers do.

However, one could also make the case that the sound with DSX is more confusing. With audio cues spread among more speakers-and with what appeared to be some subtle phase manipulation added to enhance the surround effect - the sound was less focused. In the fast-moving scenes from *Death Race*, audio cues are added to help your brain comprehend the frantic on-screen action. But with less sonic focus, the cues sometimes seemed less effective to me.

I noticed a similar effect when I played the beginning of the brontosaurus stampede from the Peter Jackson-directed *King Kong*. As rocks begin falling from the canyon walls, DSX produced an effect that could simultaneously be considered more realistic (i.e., more ambient) and less impactful (i.e., less focused). I had trouble deciding which sound I prefer - although I suspect that the bigger the home theater, the more I'd appreciate DSX.

Let me give a pat on the back to Denon here: It's simple to turn DSX on and off once you figure out which button to use, and there's a bright blue DSX indicator on the front of the receiver that makes it easy to see which mode you're in. So if you don't like the effect DSX is having on whatever you're listening to, you can turn it off immediately rather than having to wade through on-screen menus.

Ratatouille - a movie that Dolby uses to demo PLIIz - proved revealing of DSX's strengths and weaknesses. The opening rainstorm scene really makes the case for height speakers. Hear it in PLIIz and you'll never want to go back to 5.1. Hear it in DSX and you'll never want to go back to PLIIz. I guarantee you have never heard a surround effect so convincing. You almost want to wipe the raindrops off your face.

However, DSX's effect on the dialogue that immediately follows was weird. It didn't impact dialogue that was "hard center"-i.e., coming entirely from the center speaker. However, the voiceover that begins the movie is spread into the other speakers a bit to give it more of a "voice of God" effect. DSX gets hold of this and blows it all out of proportion. The voiceover becomes unfocused and phasey-sounding, almost as if it has a bit of chorus effect added from a guitar player's stomp box. While this worked great on Andy Summers' guitar track in the Police's "Don't Stand So Close to Me," I didn't dig it on a movie voiceover.

I began with *Death Race, King Kong,* and *Ratatouille* because I knew they'd let me dissect DSX's operation. But with most movies, its effects were subtler and almost never objectionable. I expected DSX to have an extreme effect on such surround-sound classics as *The Fifth Element* and *Star Wars, Episode II: Attack of the Clones*, but it didn't. With both movies, DSX didn't call attention to itself, it simply added extra ambience and made the surround-sound effect more seamless.

Music DVDs sometimes gave me the weird, disembodied effect I noticed in *Ratatouille*, mainly because many 5.1 music mixes spread the vocals among the front left, center, and right speakers. I even noticed this problem when I played James Taylor's *Live at the Beacon*

Theatre - a mix which puts almost all of the singer's sweet voice in the center speaker, with just a touch in the left and right front speakers. Even this center-heavy mix became less focused and intimate when heard with DSX applied.

THE SURPRISE

I originally thought I'd skip auditioning DSX with stereo music. After all, the AVR-4801CI doesn't let you activate DSX when you're listening to a stereo source, and Dolby's competing PLIIz technology was designed specifically for movies, not for music.

But as I was playing around with the receiver I realized that I could tack DSX processing not only onto 5.1 and 7.1 material, but also onto matrix surround sound created with technologies like Pro Logic II (the 5.1-channel version, not the "z" version) or DTS Neo:6. To satisfy my technical curiosity, I decided to see what DSX would do to my favorite CDs. I activated the Pro Logic II Music mode in the Denon, switched on DSX, and sat back to hear what I frankly expected would be sonic carnage.

At first, the results were discouraging. There's no center channel on a stereo CD, of course, and when DSX got hold of vocals split between left and right channels I heard the same ethereal, unfocused effect I got with the voiceover in *Ratatouille*.

Then I remembered that the Pro Logic II Music mode includes a center width control that lets you adjust the mix of vocals into the center channel. The AVR-4801CI uses Dolby's recommended default setting of 3 for this control - midway between 0 (hard center) and 7 (no center). I cranked the control all the way to 0, put on Steely Dan's "Aja" (my reference track for what I consider a "normal" music mix), and was immediately enthralled.

All of the phasey effect from the vocals was gone, and the music seemed to break free of the speakers in a way it couldn't possibly do with a stereo system or even a 5.1 system. It sounded tonally pure and naturally ambient, like a stage full of musicians playing in a small concert hall with the PA system used only for vocals. I heard no weird artifacts or objectionable effects.

Switching to jazz saxophonist Miguel Zenon's *Jibaro* CD, I got a bigger, more ambient, and more involving sound than Pro Logic II Music mode could deliver without DSX. When I shut off all the Sunfires except for the height and width speakers, I was surprised to hear that there was a lot of piano and drums coming from the added channels. However, when I resumed listening after reconnecting the other speakers, my ears didn't localize any particular sounds to the height and width speakers. As with Steely Dan, the presentation sounded simple, natural, and spacious.

The combination of DSX with the PLII Music mode didn't sound great with everything; simple recordings of a couple of guitars and a vocalist sound weird when expanded beyond stereo, no matter what technology you're using. But with the AVR-4801CI, you can go back to stereo sound with the touch of a button if you don't like the surround effect.

THE VERDICT

It's easy to make the case that Dolby erred on the side of restraint with PLIIz. If I were an installer, I'd be hesitant to spec those extra height speakers for fear of my client's wrath if he

or she doesn't hear anything coming out of them. That's no concern with Audyssey DSX, though: There's absolutely no doubt that you'll hear its effects.

What I can't tell you is whether or not you'll like DSX. Applying additional processing to 5.1 or 7.1 is like adding flavoring to a vodka martini. Will you prefer the original, with nothing but vodka and maybe a touch of vermouth, or will you like it better with apple juice or chocolate liqueur added? I don't know.

I will tell you this, though. If I were a real custom installer rather than an A/V geek who occasionally plays at custom installation, I'd want to get DSX into my client's theaters ASAP. While it does occasionally produce effects I don't enjoy, it often delivers a wow factor I've heard in no new audio technology since the introduction of Dolby Digital. And I think that the bigger the theater, the more it'll benefit from DSX. Last, it's a fun new thing for surround-sound enthusiasts to play with, and we haven't had that in quite some time.

http://www.soundandvisionmag.com/tests-reviews/receivers/2010/02/denon-avr-4810ci

Denon AVR-4810CI

Test Report: An in-depth look at Denon's flagship A/V receiver.

February 2010

Key Features
$2,999 usa.denon.com
• 9 x 140 watts (2 channels driven; 20 Hz to 20 kHz, 0.05% THD) • 6 HDMI inputs (1 on front panel), 2 outputs • Transcodes (bidirectionally) component-, composite-, and S-video to HDMI

Denon's AVR-4810CI sits near the top of the company's dizzyingly complete line of 13 A/V receivers. At three large, the AVR-4810CI ain't cheap, but because it's nearly half the price of the flagship AVR-5308CI, and has most of the same stuff where I think it counts the most, it was with some anticipation that I unboxed the 42-pound Denon and hefted it onto my equipment rack.

Among the above-cited stuff is the AVR-4810CI's full complement of Dolby and DTS modes, XM/Sirius satellite-radio readiness, DLNA-certified streaming of networked audio/Internet radio, and a full bag of Audyssey DSP magic tricks, including the now-familiar auto-setup and MultEQ XT room-/speaker-correction routines, along with Dynamic Volume and EQ. And then there's the latest Audyssey entity, DSX enhanced surround, which augments standard 5/6/7.1-channel layouts through synthesizing new width and height signals to send to two or four additional speakers. (The AVR-4810CI has nine onboard amplifier channels, plus preamp outputs to drive a separate amplifier in 11-speaker surround setups.)

• Upconverts lower-rez analog and digital video to 1080p format
• Decodes Dolby TrueHD, DTS-HD Master Audio, and DSD (SACD)
• Audyssey DSX and Dolby PLIIz enhanced-surround modes
• Audyssey MultEQ XT auto setup/equalization with supplied microphone
• Audyssey Dynamic EQ and Dynamic Volume level correction
• Fully graphical HD onscreen displays
• FM/AM/HD Radio XM/Sirius tuner with 56 presets
• XM/Sirius satellite radio-ready
• Assignable powered zone 2/3 (stereo) or 2+3 (mono); zone 4 (optical-digital); zone 2 component or composite video
• 10-component preprogrammed remote, plus secondary remote
• IR in/out, 12-v trigger (2), RS-232 serial port

Dimensions + Weight
17 1⁄8 x 7 5⁄8 x 16 3⁄8 in; 42 lb

SETUP

As is usual in the HDMI age, the hardest part of setting up an A/V receiver, the DenonAVR-4810CI included, was lifting it onto my cabinet. Speaker wires, HDMI cables, and the subwoofer interconnect - the lone analog-audio cable remaining to most systems these days - were strictly plug and play. I placed a pair of excellent two-way speakers for the Audyssey DSX Width channels outboard and just slightly in front of the main pair; for Height, used by both DSX and Dolby PLIIz, I mounted a similar but smaller pair high in the front corners. This is more speakers than most people have in their homes, summer homes, and cars combined, but what the hey.

Audyssey auto setup handled the rest. This is by now so familiar a part of my setup routine that the resultant improvements in spatial clarity and bass definition and evenness no longer elicit so much as an eyebrow elevation hereabouts. It would be nice if it'd include a robotic microphone that moved itself (to the multiple mic positions MultEQ XT requires for its differential analysis of room effects). You know, something like those automated vacuum cleaners, so you could go out for a latté during the whole tedious "bweep-ing" business as Audyssey unleashes its test tones.

PERFORMANCE

As a plain stereo amplifier (remember those?), the AVR-4810CI proved all but flawless. I played a selection of high-rez 96-kHz/24-bit reference tracks, mostly obscure classical stuff but also the rocking "Catch Me Now I'm Falling" from the Kinks' One for the Road, and heard nothing to suggest any amplifier limitations or colorations. Power was more than generous:

My long-term L/R speakers, stand-mounted two-ways, are a decibel or two less sensitive than most, yet the AVR-4810CI produced full-range stereo rock at chest-thumping levels without complaint or any sign of harshness.

Multichannel playback is where I focus most of my energy these days, of course, and the big Denon acquitted itself every bit as expertly there. The new *Star Trek* is one of the year's big-sound Blu-ray Disc highlights, and the Denon produced its soundtrack with enough power to deliver reference levels in my 3,000-cubic-foot studio with ease. The climactic chase-battle-escape sequence in Chapter 13 (not to be confused with the previous 12 chase-battle-escape sequences) demands all she's got from any audio component, and the Denon clearly had plenty to give.

Reviewer Brent Butterworth has ably covered Dolby PLIIz and Audyssey DSX previously, so I will confine myself to a few technical comments: Kewl! Neato! Smokin'! These new multichannel developments may set the bleeding edge of practicality (and spousal acceptance) for most owners, but they really do bring surround - including surround music, and particularly large-hall orchestral music - to a next level.

The effect of DSX is neither subtle nor debatable. Engaging it on *Star Trek* delivered a palpably more first-run-theater aural experience: bigger, wider, more spatially convincing, and without the faint, DSP-processing tinting of main-channel and dialogue sound that some previous systems have carried. And listening to a superb SACD of Ravel's Daphnis et Chloé (BSO Classics) delivered an audibly more realistic musical experience. But if you go the DSX/PLIIz route, be prepared to spend plenty of time tweaking the setup. And don't expect to cheap out by using inexpensive, easily mounted height (or width) speakers - I tried that, and it doesn't work. Instead of blending into the overall surround mix, a pair of small, cheap 'n' cheesy speakers in the Height positions made everything sound cheap'n'cheesy.

The AVR-4810CI's video processing runs on Anchor Bay VRS silicon, with the familiar excellent results I've seen from other products that use this solution. Upscaling of 480i material was free of jaggies artifacts, and conversion from composite- and S-video to HDMI (up to 1080p) occurred without any substantial visible impact.

ERGONOMICS

Some readers may recall that Denon's hybrid "touchscreen" (really just a membrane) remote controller is not among my favorites. (I wouldn't go so far as to say I hate the RC-1126 - oww! Stop twisting my arm! Okay, I hate the thing.) Thankfully, the AVR-4810CI's fast, sharp-looking, intuitive onscreen GUI does nearly all the heavy lifting, so the handset's real-button cursor, volume, and input-select keys are what you'll most need day to day.

In truth, the remote proved decent enough in everyday use, and Denon also supplies a secondary handset - an old-fashioned, all-buttons affair - for remote rooms. Denon's onscreen GUI, which is a lot like Sony's "Xross-media bar" interface turned 90°, seemed a lot more welcoming my second time around (I first encountered it last year on Denon's now-superceded AVR-989), and I only stumbled a couple times mousing horizontally to reach the desired parameter list.

The AVR-4810CI is studded with further features, some cool, some probably superfluous, and many related to multiroom custom installation, hence the "CI" in its name. Most of these will have to content themselves with mention in our Key Features list.

The AVR-4810CI is the first receiver I've encountered that offers direct iPod connection via USB, without requiring a proprietary (or third-party) dock accessory. You can simply plug in your iPod, hit the appropriate onscreen source icon, and start mousing through your Albums, Artists, Playlists, and so on directly on your TV using the Denon remote's cursor keys. (There's also a front-panel HDMI input for plugging in a game console or high-def camcorder.)

You can access audio and photo content via a wired Ethernet or Wi-Fi connection, streaming from the Internet (Rhapsody and Napster trial accounts are provided), or from your networked PC/Mac. The latter requires that the computer be running DLNA-compatible media server software such as Windows Media 10 or higher, or TwonkyMedia, which I employed on my Mac. This worked fine in my setup, with dramatically faster browsing and file selection that was also freer from momentary lockup than the last iteration I tried, on Denon's aforementioned AVR-989. But I can't be certain whether this was due to the AVR-4810's hardware or some external change. (I'm now running a newer version of Twonky.) The AVR-4810CI also can stream 96/24 FLAC audio content directly - yippee!

BOTTOM LINE

Stuff is good, and more stuff is better (sometimes), but either way, having the underlining chops to back up your stuff is best of all - just ask Muhammad Ali. The Denon AVR-4810CI has it in spades, and so ranks as one of the best A/V receivers out there for those to whom abundant features, controls, and setup and surround options seem more alluring than off-putting. I'm still too much of a cheapskate to call any $3,000 receiver a "value," but if you've got that kind of coin to spend on one, Denon's prepared to deliver your money's worth.

TEST BENCH

MEASURED POWER OUTPUT

183w — 1 CHANNEL
164w — 2 CHANNELS
140 Watts — Rated power per channel, 8 ohms
132w — 5 CHANNELS
60w* — 7 CHANNELS

* Simultaneous power tests on 7 (or more) channels quickly induced current limiting to a level of approximately 60 watts for all channels.
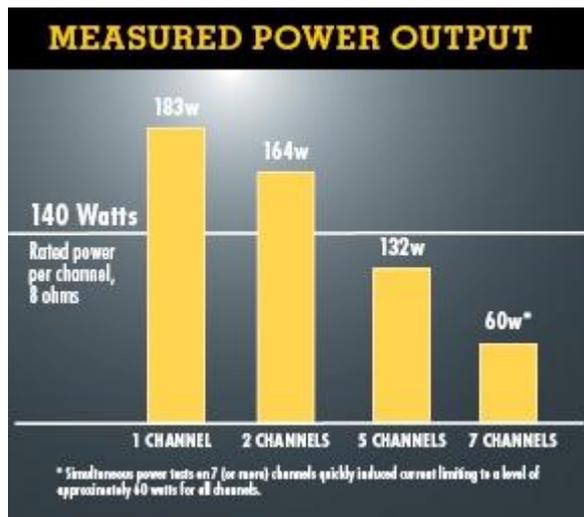
DOLBY DIGITAL PERFORMANCE

All data were obtained from various test DVDs using 16-bit dithered test signals, which set limits on measured distortion and noise performance. Reference input level is -20 dBFS, and reference output is 1 watt into 8 ohms. Volume setting for reference level was 1.5. All level trims at zero, except for subwoofer-related tests, all speakers were set to "large," subwoofer on. All are worst-case figures where applicable.

Output at clipping (1 kHz into 8/4 ohms)
1 channel driven: 183/298 W (22.6/24.7 dBW)
5 channels driven (8 ohms): 132 W (21.2 dBW)
7 channels driven (8 ohms): 60 W (17.8 dBW)*
* Power tests on more 7 channels simultaneously (or more) quickly induced current limiting to a level of approximately 60 watts on all channels

Distortion at 1 watt (THD+N, 1 kHz)
8/4 ohms: 0.02/0.03%
Noise level (A-wtd): -75.9 dB
Excess noise (with sine tone)
16-bit (EN16): 0.2 dB
Frequency response: 20 Hz to 20 kHz +0, -0.1 dB

MULTICHANNEL PERFORMANCE, ANALOG INPUT

Reference input and output level is 200 mV; volume setting for reference output level was 2.
Distortion (THD+N, 1 kHz, 8 ohms): 0.015%
Noise level (A-wtd.): -92.3
Frequency response: <10 Hz to >200 kHz +0, -3 dB

STEREO PERFORMANCE, DIGITAL INPUT

Reference level is -20 dBFS; all level trims at zero. Volume setting for reference level was 1.

Output at clipping (1 kHz, 8/4 ohms, both channels driven): 164/235 W (22.1 /23.7 dBW)
Distortion at reference level: 0.02%
Linearity error (at -90 dBFS): 0.0 dB
Noise level (A-wtd): -75.7 dB
with >96-kHz/24-bit signals: -88.6 dB

Excess noise (with/without sine tone)
16-bit (EN16): 0.1/0.1 dB
quasi-20-bit (EN20): 7.4/7.4 dB
Noise modulation: 0.1 dB
Frequency response: <10 Hz to 20 kHz +0, -0.15 dB
with 96-kHz/24-bit signals: <10 Hz to 44.8 kHz +0, -0.8 dB

BASS-MANAGEMENT PERFORMANCE

Measured results obtained with Dolby Digital test signals.
Subwoofer-output frequency response (crossover set to 80 Hz): 24 dB/octave above -6-dB rolloff point of 80 Hz
High-pass-filter frequency response (crossover set to 80 Hz): 12 dB/octave below -3-dB rolloff point of 80 Hz
Maximum unclipped subwoofer output (trim at 0): 4.1v
Subwoofer distortion (from 6-channel, 30-Hz, 0-dBFS signal; subwoofer trim set to 0): 4.5%
Crossover consistency: bass crossover frequency and slope were consistent for all sources and formats; however, filter slopes were less smooth and accurate with Dolby Digital signals
Speaker size selection: all channels can be set to "small"
Speaker-distance compensation: available for all main channels.

I've long come to expect superb technical performance from Denon receivers, and that's what we got from the AVR-4810CI. Power was amply above spec, up to and including 5 channels driven (Denon's specs, like many today, only explicitly mention a maximum of 2 channels driven at once); 7 and 8-channel tests ran into deliberate limiting triggered by more than a second or two of clipping-level drive, which is neither uncommon nor particularly meaningful. Better still, virtually every low-power noise and distortion test was an all-time best, including PCM-stereo signal-to-noise that was bang on the theoretically perfect value (-75.7 dBw) for our dithered-noise test environment (the only meaningful way to express S/N for a digital-audio device), and similarly perfect excess-noise and linearity results.

One anomaly: the Denon receiver's crossover-filter slopes, which with PCM-stereo signals kneed precisely at the selected frequency (80 Hz for our tests) and displayed perfectly smooth 12/24 dB-per-octave rolloffs, were somewhat less accurate, and visibly less smooth on Dolby Digital signals, though not to any degree I could expect to be audible.