test report BY DANIEL KUMIN

Harman Kardon

AVR 510 Digital Surround Receiver

Harman Kardon's AVR 510 boasts several intriguing features. It's the first digital surround receiver we have reviewed that incorporates stereo decoding for MP3-format digital audio files. Of course, it also does Dolby Digital, DTS, and Pro Logic decoding for surround sound, and there are additional surround modes, including Harman's own Logic 7.

Neat feature No. 2 is an all-new preprogrammed/learning universal remote control that incorporates a microphone and sound-level meter so you have everything you need to automatically balance the levels of the five main output channels. Harman Kardon calls this feature EZSet.

Like most A/V receivers in its class, the AVR 510 also provides a set of fully independent line-level stereo outputs for a second zone along with a multiroom infrared (IR) control input so you can select programs and control volume from the remote room. Harman Kardon even includes a separate, basic remote control for use in the second room.

PHOTOS BY TONY CORDOZA

And check out this unusual wrinkle: the front-panel A/V jacks not only provide a convenient extra input for a camcorder or videogame console, but an onscreen menu lets you convert them to *outputs* for feeding a recorder. An adjacent LED indicator turns red when the jacks are in output mode, reverting to green for input whenever the receiver is turned off and on again. The front panel also sports a pair of digital audio connectors, one optical and one coaxial, which normally function as inputs. Like the analog jacks, the coaxial input can also be converted to an output. Talk about flexibility!

The AVR 510 has the same handsome design Harman Kardon has used for several years, with black glass covering the top half of the front, including the large, three-part display. A big volume knob sits above three small knobs for bass, treble, and balance — I'm seeing fewer and fewer such easy-to-use rotary controls these days. The tone controls operate in all surround modes as well as in stereo, but only on the front left/right channels.

The receiver's back panel has a healthy assortment of inputs and outputs. All video paths offer a choice of composite- or S-video connectors, and there are two sets of component-video input jacks, hard-wired to DVD and Video 2. (Like most receivers with component connections, the AVR 510 cannot send onscreen menus to its component output.) Other highlights include preamp outputs and power-amp inputs for all five amplified channels as well as a 5.1-channel analog input for a DVD-Audio or multichannel Super Audio CD player. (As

fast facts

RATED POWER 70 watts x 5 into 8 ohms from 20 Hz to 20 kHz with less than 0.07% THD, channels driven individually
DIMENSIONS 17¼ inches wide, 6½ inches high, 17⅛ inches deep
WEIGHT 35 pounds
PRICE $999
MANUFACTURER Harman Kardon, Dept. S&V, 250 Crossways Park Dr., Woodbury, NY 11797; 800-422-8027; www.harmankardon.com

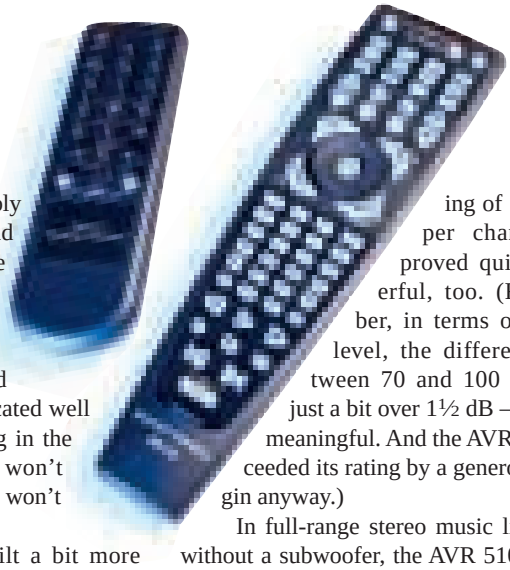
key features

- Dolby Digital, DTS, and digital-domain Pro Logic decoding
- Decodes MP3 data fed to digital inputs in standard (SPDIF) digital audio format
- Logic 7 surround modes for music and TV/movie sound
- 1 Theater mode, 2 Hall modes
- Level/bass-management settings stored separately for each surround mode
- Decodes HDCDs
- VMAx virtual surround for two-speaker playback
- Front-panel A/V and optical/coaxial digital audio inputs; all but optical jack can be converted to recorder outputs
- 3 A/V inputs, 2 A/V outputs on back panel, all with S-video, 2 with component video
- 2 optical and 2 coaxial digital audio inputs, 1 optical and 1 coaxial output on back; can be assigned to any digital source
- 5.1-channel external analog audio input
- 2 analog audio-only inputs, 1 tape loop
- 5-channel pre-out/main-in jacks
- Headphone jack
- Multiroom stereo audio output and IR control input
- AM/FM tuner with 30 presets
- Binding posts for all speaker outputs
- Preprogrammed/learning main remote control with microphone and sound-level meter for automatic EZSet speaker balancing; 5-macro capability
- Simplified second-room remote control

with every receiver we know of, the multichannel input signals go straight to the amplifier section, bypassing the bass-management circuitry.) All this combines to earn the AVR 510 a solid A grade for flexibility — maybe an A+.

After introducing the receiver to my usual suite of reference speakers and source components — setting all speakers to "small," with bass directed to my subwoofer — my first order of business was to put its EZSet auto-level-balancing gizmo to the test. Simply hold the remote upward at arm's length while you're in the main listening position, keep it steady, and hold in its SPL (sound-pressure level) key. The receiver automatically cycles twice through the five channels, playing level-set noise and robotically fiddling levels up and down while an LED on the remote changes color from red (too loud!) or amber (too soft!) to green (j-u-u-st right!).

The system worked very well, but with one caveat. The final levels were all within 1 dB of those I arrived at by performing the same task manually using my tripod-mounted sound-level meter — pretty darned good and considerably better than most users could do by ear. The caveat? While you hold the remote at the listening position, it must have a clear line of sight to the receiver for its infrared signals. If the receiver is located well to one side instead of being in the front of the room, EZSet won't work properly — but it also won't give you an error message.



Harman Kardon has built a bit more flexibility into the AVR 510 than many receivers offer, so it demands (and rewards) a bit more planning on the part of the user. For one thing, any of the six digital audio input jacks — counting those on the front as well as the back — can be assigned freely to any source. For another, the receiver remembers your surround-mode, speaker-size, and channel-level settings individually for each assigned source.

You could, for instance, set up the DVD input with Dolby Digital as the default surround mode, "small" speakers plus a subwoofer, and channel levels calibrated for movies, while leaving the CD input set up for stereo and "large" (full-range) front left/right speakers. These two inputs might even be supplied by the same component — a DVD player's optical digital audio output could be assigned to the DVD input and its coaxial output to the CD input. What's more, each surround mode stores its relative channel levels individually, so you might use the calibrated balance dialed in by EZSet for Dolby Digital while setting the surround channels in the two Hall modes a couple of decibels higher.

All this makes the AVR 510 highly customizable if you're prepared to take the trouble. The downside is that it's more complex to set up, particularly since you must set the channel levels and bass management individually for each input you want to use.

The AVR 510 sounded excellent in both two-channel stereo and surround modes — and despite its relatively modest power rating of 70 watts per channel, it proved quite powerful, too. (Remember, in terms of sound level, the difference between 70 and 100 watts is just a bit over 1½ dB — hardly meaningful. And the AVR 510 exceeded its rating by a generous margin anyway.)

In full-range stereo music listening, without a subwoofer, the AVR 510 played very loud without distortion — almost as loud as the 150-watt-per-channel receiver I'd been using previously. Pushed too hard, however, it began sounding "hazy," and when I forced it a couple of decibels further out, it distorted on large transients.

Performance with standard 5.1-channel material was first-class, as on the energetically mixed (and surprisingly good) soundtrack of the *Rocky and Bullwinkle* DVD (all right, all right, so it was family night at the Kumin residence . . .). The series of well-done helicopter flybys at the start of Chapter 8 were impressively tight and smooth in both the Dolby Digital and DTS soundtracks, as were the film's innumerable sound and musical effects.

The receiver's additional surround modes are all variations on ambience extraction as opposed to ambience synthesis — no artificial reverb is added. Among the most engaging are Logic 7 M (music) and Logic 7 C (cinema), intended for stereo music and surround-encoded TV sound or movie soundtracks, respectively. The two are similar, though with the music mode there was more ambience from the surround channels. With Logic 7 M, live acoustic music recordings were naturally spacious and vocals sounded excellent in the center channel, both contributing to a consistently believable front soundstage and a restrained but spacious surround. The music mode did a great job on studio recordings, too.

As far as playing MP3 files, Harman Kardon claims that the AVR 510 can convert MP3 data received at any of its digital

The AVR 510's performance was first-class with the energetically mixed Dolby Digital and DTS soundtracks of the *Rocky and Bullwinkle* DVD.

audio inputs to analog stereo audio. I was unable to test this because I couldn't find any component that could feed MP3 data in standard (SPDIF) digital audio format to the receiver. Neither of the two MP3-capable CD-R/RW recorders I tried would do it — and one of them was a brand-new Harman Kardon model! Not to worry. The company says that its forthcoming DAL 150 USB-to-SPDIF audio converter ($119) will do the trick, but until then we'll just have to take its word for it.

The AVR 510's main remote control is densely filled, but the keys are thoughtfully arrayed and have a variety of shapes and sizes. Overall, I liked this handset a good deal — especially its Light key, which illuminates *every* button, almost all of which have function labels printed on top where you can see them. Another subtle but useful touch indicates that somebody actually gave ergonomic issues more than a passing thought in the remote's design. Dolby Digital night-mode dynamic-range compression is always available directly, in two levels, via a dedicated key. (Some manufacturers bury this useful feature beneath layers of onscreen menus.)

The remote's preprogrammed library worked fine on a Toshiba TV and an RCA DirecTV receiver, but none of its Sony-brand codes succeeded in operating my 3-year-old DVD player. Fortunately, its learning capability covers that sort of omission.

To pick a few nits: The important OSD key, for calling up the onscreen display, is buried below the ten numeric keys, and the mute key is up in the corner, four rows away from the volume arrows. If you switch the remote to control another component, none of the receiver commands remain active — not even volume and mute — unless you program a "punch-through" command for them. (You can also program punch-through commands in the opposite direction for channel up/down and DVD/CD transport controls.)

Harman Kardon's midprice AVR 510 is clearly targeted to people who are serious about home theater. It has fewer bells and whistles than many other receivers in its price range, but all the important stuff is there: Dolby Digital, DTS, an excellent all-purpose surround mode for music, another for stereo or surround-encoded TV or movie sound, a well-thought-out remote control, and outstanding input/output and expansion options. One omission is 6.1-channel decoding, but we're just beginning to encounter this in midprice receivers, and it's certainly not something most people are concerned with given the relatively small number of DVDs that have Dolby Digital Surround EX or DTS-ES soundtracks. In nearly all respects, the AVR 510 is thoughtfully designed, and its 5.1-channel excellence is beyond dispute. S&V

HIGH POINTS

Very good amplifier performance.
Flexible full-system remote control.
Excellent Logic 7 surround mode for stereo music.
Automatic channel balancing.
Front-panel A/V and digital audio inputs can double as record outputs.

LOW POINTS

No 6.1/7.1-channel operation.
No video for remote-zone output.
Worse AM performance than usual.

in the lab

DOLBY DIGITAL PERFORMANCE

All data were obtained from Dolby Labs' Dolby Digital test DVD using 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, obtained with the volume control set to –7 dB. All are worst-case figures where applicable.

Output at clipping (1 kHz, 8 ohms)
one channel driven.....123 watts (21 dBW)
one channel driven (4 ohms).....185 watts
five channels driven .....74 watts (18.75 dBW)

Distortion at 1 watt (THD+N, 1 kHz)
8/4 ohms.....0.05/0.06%

Noise level (A-wtd, 16-bit data).....–69.8 dB

Excess noise (with sine-wave signal)
16-bit (EN16).....6.6 dB

Frequency response
all channels.....20 Hz to 20 kHz +0.1, –0.15 dB

Subwoofer-output frequency response
18 dB/octave above –3-dB point of 82 Hz

High-pass-filter frequency response
12 dB/octave below –3-dB point of 80 Hz

Maximum subwoofer output (from 5.1-channel, 31-Hz signal at reference volume setting) .....9.2 volts

Subwoofer distortion (from 5.1-channel, 31-Hz, 0-dBFS signal; master-volume at reference level; subwoofer trim set to 0) 0.95%

STEREO PERFORMANCE, DIGITAL INPUTS

Volume setting for reference output level was –7 dB. Speakers were set to "large," subwoofer off.

Output at clipping (1 kHz, both channels driven)
8 ohms .....118 watts (20.75 dBW)
4 ohms .....158 watts

Distortion at 1 watt (THD+N, 1 kHz, 8/4 ohms).....0.03/0.03%

Linearity error (at –90 dBFS).....1.25 dB

Noise level (A-wtd).....–74.5 dB

Excess noise (with/without sine-wave signal)
16-bit (EN16).....+1.25/+1.25 dB
quasi-20-bit (EN20).....+14.9/+15 dB

Noise modulation .....0.6 dB

Tone-control range
100 Hz.....+9.9, –9 dB
10 kHz..... +9.7, –9.4 dB

Frequency response (tone controls off)
20 Hz to 20 kHz +0.3, –0.2 dB

TUNER PERFORMANCE

All figures FM only except frequency response.

Sensitivity
(50-dB quieting, mono/stereo).....21.2/41.9 dBf

Capture ratio (at 65 dBf).....1.5 dB

Selectivity
(alternate/adjacent channel).....58.6/6.4 dB

Noise level
(at 65 dBf, mono/stereo) .....–71.9/–66.6 dB

Frequency response
FM .....20 Hz to 15 kHz +1.2, –1.6 dB
AM .....58 Hz to 3.18 kHz +1.0, –6.0 dB

The AVR 510 easily exceeded its specified power with one or two channels driven and more modestly with five channels driven. Other results were about what we expect in this price range (very fine), with one curious exception: in Dolby Digital mode, the front left/right channels were a few decibels noisier than the other three channels. FM weak-signal reception was only mediocre, and AM reception was poor. — *D.K.*