harman/kardon®
Power for the digital revolution.™

Digital Technologies in the AVR 7000 and AVR 500

Harman Kardon products have delivered unparalleled performance, elegant design and ease of operation for almost half a century. Our new lineup of audio receivers is one of the most advanced and comprehensive ever produced. These receivers incorporate a number of unique technologies, which provide the listener with exceptional sound quality.

Logic 7® Digital Signal Processing for Movies and Music
(AVR 7000 & AVR 500)

Why do I need Logic 7?

The film industry is demonstrating the advantages of 5.1-channel sound in almost every feature released this year, and 5.1-channel music software is just beginning to become available. But, while technologies such as Dolby® Digital and DTS® bring 5.1 to the consumer today, most consumers still own extensive libraries of two-channel material – on CDs and cassettes for music and on VHS tapes for video. In addition, virtually every network television show is produced in stereo, and an increasing number feature surround encoding. Playing stereo material on a multichannel system does not allow the listener to take full advantage of the new systems, and many people are reluctant to replace their entire collection with expensive digital software.

The benefits.

Logic 7 is a proprietary technique developed by Lexicon, a sister company to Harman Kardon within Harman International, for creating multichannel surround playback from two-channel sources. Logic 7 is stereo-compatible, and offers a powerful solution to the problem of making a truly universal playback system. When activated, Logic 7 needs no adjustment to successfully play many types of program material such as stereo recordings, television and radio broadcasts, and standard Dolby Surround films or television shows. With Logic 7, all sources are optimally reproduced.

For movies (Cinema Mode).

In the Cinema Mode, Logic 7 decodes matrix-encoded sound tracks (Dolby Surround, DTS Surround and UltraStereo™ material) into a *simulated* 5.1 multichannel playback. Film soundtracks will have solid center-channel dialogue with outstanding clarity and intelligibility, better channel separation with smoother pans front to back, and an exceptional transition from speaker to speaker with few or no dropouts when panning. Logic 7 also creates a wider soundstage and enhanced spaciousness for movies, with superior resolution in the surround channels. The decoding used by Logic 7 provides considerable separation between the left and right rear channels, giving the listener the feeling of actually being in the movie.

For music (Music Mode).

While some brands promote their products with the use of artificial DSP surround modes that often destroy the musical integrity of the original signal, Harman Kardon's Logic 7 is based on solid research that relates the environments of concert-hall acoustics to our perception of sound. Highly regarded in the high-end market, Logic 7 is one of the most sophisticated decoding algorithms ever designed. Logic 7's Music Mode is designed for use with two-channel stereo programs and produces a wider soundstage while maintaining the original integrity of the signal. Since Logic 7 is an active system, it increases or decreases the signal to the center channel during music playback to highlight vocals and improve the overall soundstage. Reverberation is detected in the signal and is selectively attenuated in the rear channel. The end result is a dramatic increase in the soundstage, and an enveloping musical experience for the listener.

VMAx® Virtual Multi-Axis Sound (AVR 7000 & AVR 500)

How we hear.

Natural hearing is the reference by which all sound recording and playback systems should be judged. We have the remarkable ability to distinguish sounds in a three-dimensional manner and to localize a sound's point of origin. You might say that we hear in perfect 3-D. True 3-D audio creates credible directional and spatial illusions and, of course, no system is accurate unless it reproduces sounds in this manner. This is the Harman Kardon approach. This is VMAx.

The benefits.

The recording industry is committed to multitrack, multi-mike recording methods. By using digital processing, we are able to simulate the illusion of multichannel sound from only two speakers. The science behind VMAx involves carefully researched measurements of how we hear sound information. Scientists and engineers have calculated formulas that describe how we can sense the point of origin of a sound based on how we hear it (e.g., pitch, loudness). This type of technology is currently being used in state-of-the-art virtual-reality games and by selected computer manufacturers.

In any system using two speakers, there is a location in between the two speakers called the "sweet spot." VMAx's proprietary processing creates as large a sweet spot as possible, enabling the listener to sit closer to or farther back from the speakers while retaining the full benefits of VMAx. Moving to the left or right will cause a slight change in the soundstage but, overall, the effect is very convincing.

VMAx allows the listener to experience a realistic, high-fidelity, multichannel effect from any source with just a single pair of loudspeakers. Since the processing of Dolby Pro Logic® and Dolby Digital is done first, VMAx can accept any of these signals. (The subwoofer output is not processed when VMAx is engaged.)

High Definition Compatible Digital® (HDCD®) (AVR 7000)

HDCD overcomes the limitations of the CD.

When the original "Red Book" CD standard was developed, many musical purists and some sound engineers felt that the 16-bit words and 44.1kHz sampling rate limited the integrity of the original recording session. These limitations are overcome in new, higher resolution formats such as DVD Audio and Super Audio CD. However, these new technologies are expensive and it will be a number of years before they'll be featured on a wide array of CD titles. Today, however, the HDCD process enables CDs to offer a dramatic increase in CD audio fidelity.

The benefits.

HDCD is a sophisticated 20-bit encode/decode process. Simply put, HDCD allows the original format of the CD to capture and store extra data on a disc to deliver higher resolution. The digital master recording with all of the ambience and harmonics of the original recording session is fed into a professional HDCD encoder, and this CD-compatible data is carried through to the CDs you purchase.

When you play an HDCD-encoded disc through the new AVR 7000 via the coaxial or optical inputs, the digital data stream is processed by a built-in HDCD decoder to deliver all of the ambience, overtones and harmonics of the original recording session. HDCD also delivers a smoother, more natural sound to the vocals and instruments, along with a broader, more open soundstage.

In addition to providing the high quality inherent in HDCD-encoded discs, the HDCD circuits in the AVR 7000 provide an additional margin of quality due to their superior performance. (For more information about HDCD, visit www.hdcd.com.)

AKM 96kHz/24-Bit D/A Converters (AVR 7000)

Asahi Kasei Microsystems (AKM) has developed the audio industry's most dynamic and ultraquiet digital-to-analog converters (DACs). These DACs accept up to 96kHz/24 bits of information with a dynamic range up to 120dB. This is a substantial improvement (by a factor of two) over conventional consumer DACs. All this translates into exceptional sound quality with wide dynamic range from your music CDs and DVD movies, or any other digital source.

This means that using the AVR 7000 for playback of *any* digital source provides a demonstrable quality increase. Hook up any CD or DVD player with a digital output to the AVR 7000 and you have the equivalent of a free CD-player upgrade. Your CDs will sound better than ever before! (Further information is available at www.akm.com.)

In Summary

Logic 7, VMAx, HDCD and AKM D/A converters – digital processing technologies for the most accurate reproduction of music and cinema performances possible. A winning combination found only in Harman Kardon receivers.