



## MIPS for your Media Room

MIPS/Dolby Team to Accelerate Audio Deployment

Are you trying to dash to market with a set-top box or video recorder/player that has one or two new things to offer? Keeping up with the latest evolving standards and getting your design certified can be among the most time-consuming tasks in readying a media-enabled system-on-chip (SoC) for the market. The constant improvements in technology in every area of home entertainment from high-performance displays and sound systems through advanced content-delivery mechanisms has kept embedded system designers in a frenzy just keeping up with the competition in this rapidly changing landscape.

With HDTV now making the transition from exotic to ordinary, consumers naturally expect the audio portion of their experience to keep pace with the vast improvement in video quality. While stereo, lower-fidelity sound might have been perfectly acceptable with standard definition television and movie programming, the consumer's standard for acceptable audio performance is elevated considerably by the act of plunking down a few thousand for the latest-generation plasma or DLP monitors with HDTV tuners and

DVRs. Chances are, they've got a similarly expensive sound system with way more than two channels eagerly awaiting top-quality content that will make their guests dive for cover when that low-flying helicopter passes overhead.

Digital surround sound has been with us for years now, but with broadcasters wanting to deliver more high-quality channels to the consumer and with high definition recording standards putting a premium on storage space, the compression of high-quality, multi-channel audio is becoming a critical differentiator in the content creation and delivery race. Keeping all the marchers in the AV band in step, however, is a serious industry challenge. Audio gold-standard setters such as Dolby Laboratories, IP providers such as MIPS Technologies, OEMs marketing devices like set-top boxes, HD DVD and Blu-ray recorders and other gear, and broadcasters and content creators developing and delivering the programming that consumers crave all have to be on the same page when it comes to adopting and successfully deploying improved

compression techniques.

Dolby Laboratories has recently come to the rescue on the audio bandwidth front with a new codec called "Dolby Digital Plus" that can deliver the standard 5.1 channel digital audio with 33% less spectrum. The extra bandwidth means that the 256Kbps data stream that used to support only digital stereo sound can now deliver 5.1 surround (which had previously required up to 448Kbps).

For broadcasters and HD recorder manufacturers, those extra bits will come in extremely handy when they're trying to squish several hours of the latest Hollywood extravaganza onto a disc or through a broadcast pipe. For broadcasters, less bandwidth means more content and features can be pumped into your living room at the same cost. For packaged media such as HD DVD and Blu-ray Disc, it means that more audio channels and higher quality audio can be provided on the same media. In fact, HD DVD has made Dolby Digital Plus a mandatory component of the standard.

For equipment designers, MIPS is a familiar name in processor IP as the company has captured the lion's share of the market for processor cores in the entertainment market over the past several years. In fact, the company is reported to have earned over 70% market share in processor IP for both the cable set-top box and the DVD recorder markets. The features and capabilities of MIPS IP offerings have been a good fit for the performance, price and power demands of home entertainment equipment and, as a result, a robust support infrastructure of third-party software, middleware, IP, and other design accelerators has evolved around the company's cores.

Traditionally, when a new codec such as Dolby Digital Plus has arrived, a design team working on SoC support would need to license an appropriate processor core from a company like MIPS, license the Dolby reference software (in source code form) from Dolby Laboratories, then go through a lengthy process of porting, performance optimization, and certification testing in order to get the all-important logos stamped on their chips. The OEMs using those chipsets would have to go through an additional stage of certification before the logos could be painted on the front of their box. Altogether, the porting, optimization, testing and certification was a lengthy and complicated process for the SoC design teams and the OEMs, as well as for gatekeepers like Dolby Laboratories, who needed to verify dozens of different implementations of their standard algorithm as optimized by various design teams.

This time, however, the two industry leaders decided to take a different

approach. Working in cooperation with Dolby, MIPS technologies has produced a pre-optimized and tested version of the Dolby Digital Plus software that customers can use to dramatically shortcut the porting, tuning, and testing process. For design teams, this obviously means a huge roadblock has been removed from their path to market. For MIPS and Dolby, it means more efficient designs and faster time to volume adoption of their technologies as working systems reach consumers faster.

The new algorithm will become the seventh in MIPS Soft Audio Suite, which also includes MIPS-optimized versions of the Dolby Digital Decoder, the Dolby Pro Logic II Decoder, the MPEG-1 Layer I and II Audio Decoder, the MPEG-2 Layer 1 and II Audio Decoder, the MPEG-2 AAC Low Complexity Audio Decoder, and SRS TruSurround XT. In audio-related designs using MIPS processors, the Soft Audio Suite simplifies support for all these algorithms with pre-optimized and pre-tested software IP.

Once a MIPS processor is on-chip doing your audio, of course, it is natural to extend the reach of the core(s) to perform other functions in the system. While most video processing functions are still out of reach for even the highest performance processor cores, they have a number of capabilities such as application layer software and the security features that are increasingly important to service and content providers. Over time, more functionality will be moving into the software domain from specialized hardware – shortening the design cycle and improving system flexibility and serviceability.

The Dolby deal is the latest in a string of announcements from MIPS over the past few months as the company has aggressively fortified its position in the consumer experience space through partnerships and licensing agreements with major suppliers throughout the industry. Most system designers have developed a less-than-ecstatic response to these types of announcements, as they tend to bring little tangible value to the product development process. The Dolby/MIPS cooperation, however, promises to simplify a significant segment of the development process. As such, it merits more than the usual quick dismissal we typically give to such partnership proclamations.

The kind of cooperation represented by this partnership is becoming more commonplace as the embedded technology space morphs into a matrix structure built from horizontally competent companies like MIPS, Dolby Laboratories, and others cooperating to provide pre-linked building blocks to vertically-oriented integrators developing and marketing final products for the consumer. As specialized layers like silicon platforms, hardware and software IP, middleware, operating systems, and connectivity standards become more

refined and more interoperable, the job of the vertical integrator will become increasingly simple, and even very complex systems will become somewhat commoditized. At that point, functionality will begin to take a back seat to other concerns such as aesthetics, an effect that is already dictating new rules for markets like cell phones and portable digital music players.

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