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YOU ARE SURROUNDED

WHAT'S THE DEAL WITH IN-CAR MULTI-CHANNEL SOUND?
BY MICAH SHEVELOFF

Most in-car video sales today are rear-seat systems designed to occupy the kiddies on long trips to Grandmother's house. Surround-sound technology certainly would not be necessary for such an application, and most of the children use headphones rather than an external speaker system to hear movie soundtracks. Pushing video aside, then, there is some noise being made about multi-channel *audio* reproduction in the automotive environment, and how the various interpretations of the technology might improve the overall listening experience for just about anyone trapped behind the wheel during

the daily commute.

Conceptually, there are two ways to obtain multi-channel audio: One must either have a piece of music encoded in one of several possible formats (SACD, DVD-Audio or DTS) or engage an electronic processor (Dolby Pro Logic II, DTS NEO: 6, Harman International Logic 7) that starts with a two-channel source such as CD or satellite radio and converts it to a simulated version of discrete surround sound.

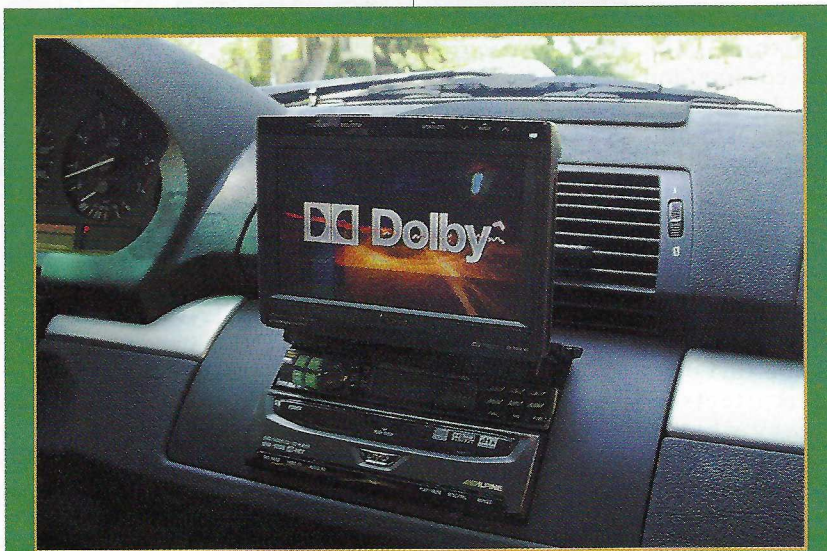
DVD-Audio (DVD-A) uses something called MLP technology (Meridian Lossless Packing), and Dolby is a licensing agent for MLP. All DVD-Audio discs

also contain either DTS or a Dolby Digital 5.1 companion track for backward compatibility, so that consumers can use a traditional DVD player to realize the benefits of multi-channel playback. SACDs use a different format altogether called Direct Stream Digital (DSD) and thus, SACD discs must be played on a compatible DSD-enabled device. There are currently no SACD players designed for automotive use.

SURROUND NEWS AT THE OEM LEVEL

Within the automotive realm, much of the multi-channel audio development is being done at the OEM level, with such systems as Harman's Logic 7 having been integrated into the BMW 7-series cars, E-class Mercedes Benz, and Range Rover models. Dolby's Pro Logic II has been introduced as a factory-installed option in the Volvo XC-90 SUV, and DTS has stated that the first car with its surround music system will debut in the third quarter of 2003.

THX has also explored the automotive environment, although it prefers to wait until consumers adopt one universally accepted software format before designing and introducing an automotive system. Companies such as Dolby, DTS, THX and Harman have found that working



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with automotive manufacturers has been a critical step in the development of multi-channel car audio, because they can tune and calibrate environment-specific systems in a controlled physical space. They know where all of the components will be located, where the passengers will sit and all of acoustic characteristics of the interiors they are dealing with. On the aftermarket, however, it is a completely different story.

THE AFTERMARKET: GAUGING INTEREST

Aftermarket car audio manufacturers have, however, shown a sincere interest in multi-channel audio technology. Companies such as Alpine, Clarion, Eclipse, JVC, Kenwood, Panasonic, Pioneer, Rockford, Sanyo and Sony all have components with Dolby and DTS decoders. "Consumers are discovering a higher level of entertainment now that more and more commercial theaters are equipped with surround sound," reports Rob Lopez, national marketing manager for Panasonic's car audio division. "The mainstream price-points of home theater products readily available today have also boosted consumer awareness that has translated into a desire for multi-channel audio playback," he adds. "I expect that, much the same way e-mail has evolved communications, multi-channel audio will introduce a new standard for music listeners that no one could have imagined years ago. Panasonic is investing time and money into new technologies such as easily incorporated center-channel devices that will support the concept of multi-channel sound, in addition to an array of complete systems solutions."



ALPINE'S PXA-H700 FEATURES BOTH DOLBY DIGITAL AND DOLBY PRO LOGIC II TECHNOLOGY

"Logic 7 overcomes problems within the automotive environment, providing a wide and solid sound stage," reports Rob Barnicoat, director of business development for Harman/Becker Automotive Systems, the OEM division of Harman International. Logic 7 is a derivative of Lexicon technology, adapted by Harman/Becker for automotive use. In addition to BMW, Range Rover and E-class Mercedes, Logic 7 is expected to find its way into more OEM packages in the near future. "It helps improve performance from all seats in the car, and there is no need to manually change effects, such as 'church' or 'hall.' Logic 7 senses the natural ambience from within the recording and redirects that data as multi-channel information," Barnicoat explains. Harman has no immediate plans to rush to market with an aftermarket version of Logic 7. "We are system architects — we have control over what and where components are located and it really requires a controlled environment to work optimally. Until there is a self-calibrating system for Logic 7, I do not expect it to become available through aftermarket channels. We're not

quite there yet," says Barnicoat.

DTS now offers over 100 music titles remastered in a 5.1 format (www.dtsentertainment.com), so that those consumers with a DTS decoder and a DVD transport in their cars can enjoy the full benefits of discrete multi-channel sound. For those without the latest hardware, DTS has developed NEO: 6, a processor that converts a two-channel music source into multi-channel audio up to 6.1 channels. NEO: 6 is available in home audio components equipped with DTS ES; however, DTS is currently in discussions with licensees to bring



THE DASHBOARD OF THE VOLVO XC-90 SUV — THE WORLD'S FIRST OEM VEHICLE WITH A FACTORY-INSTALLED DOLBY PRO LOGIC II OPTION

this technology to the automotive market. NEO: 6 is capable of working in system configurations with or without a center channel — that flexibility making it ideal for the countless automotive interiors that might not easily house a center speaker. NEO:

6 provides either five or six channels of matrix multi-channel sound. "Having heard a NEO: 6 music system, it's like rediscovering your favorite music all over again," comments Glenn Arentzoff, manager of licensing, emerging markets for DTS.

Arentzoff says that several OEM music systems featuring DTS surround technology will be introduced in the near future, the



first of which is likely to appear in the third quarter of 2003. "At the OEM level, we can work with the car manufacturers and make tuning adjustments on a case-by-case basis," says Arentzoff, who also pointed out that the NEO: 6 concept is better suited to the aftermarket than a discrete surround package. "We have to tweak each OEM system to the automaker's standards, a level of control we would not have through aftermarket channels," Arentzoff explains.

CURRENT MULTI-CHANNEL OPPORTUNITIES

The opportunity for aftermarket retailers and installers with multi-channel audio systems does exist based on growing interest among consumers. Surround systems require more components and more labor, and Arentzoff emphasizes the importance of displaying multi-channel audio effectively. "It is the ultimate entertainment experience;

you need to be able to demonstrate a system either in the showroom or in a demo vehicle," he offers. "Illustrate to your customers the value of a head unit that can be upgraded to multi-channel with the addition of a decoder. Offer DTS discs for sale so that they can realize the true benefits of the system immediately after they have made the purchase."

"Alpine has committed its product planning road map to develop a multi-channel system platform," reports Steve Witt, Alpine vice president of brand marketing. "We see the future of high-performance systems being based on multi-channel music

automotive applications," says Witt. With the emergence of multi-channel audio in the 12-volt arena, other system components will need to be created to support the initiative. "Amplifier platforms must also change based on the requirements of multi-channel audio. A one-box solution with a minimum of five equal channels plus a large output sub channel is necessary to develop the market," explains Witt. "Amp packaging is critical, because the customer base that is interested in multi-channel music will be driving new vehicles with less available space — the traditional car audio system designs with multiple amplifiers will no

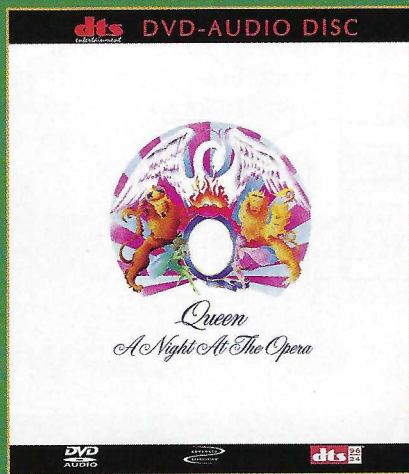
■■■ 'OFF-THE-SHELF HOME-AUDIO-BASED PROCESSING IS NOT SUFFICIENT FOR AUTOMOTIVE APPLICATIONS.' — STEVE WITT, ALPINE ■■■

longer be feasible for this market segment. Simplified installations with less space consumption

will be a mission-critical advancement for the development of the multi-channel category." During the next several years, Witt expects consumers to begin the migration to multi-channel music formats such as SACD and DVD-Audio. Until then, however, playback technologies such as Pro Logic II, NEO: 6 and Logic 7 will be considered a critical transitional step because of the enormous quantity of two-channel

playback, which has resulted in some changes to our system development concepts," Witt explains. "Alpine will be integrating cost-effective DVD mechanisms as a core feature in order to facilitate multi-channel playback capability, with on-board multi-channel signal processing and sound-tuning capabilities designed specifically for the automotive environment. Off-the-shelf home-audio-based processing is not sufficient for

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PART OF THE ARRAY OF TITLES THAT INCLUDES DTS PROCESSING



nel source material in the hands of consumers. "Getting consumers to experience multi-channel's excitement becomes a key factor in developing the marketplace," Witt states, predicting that such an evolution would be good for the 12-volt business. "This will push the distribution channels to learn to sell and merchandise this new category," he adds, "and there is an opportunity right now for the astute retailer to get in on the next fundamental changes in the mobile business, and to be better positioned when the market matures five years forward." The Alpine PXA-H700 processor (shipping now) has Dolby Pro Logic II on board.

Patrick Artiaga and Craig Eggers, two Dolby executives, point out that there is a unique opportunity to provide the best sound reproduction possible in an automobile because it is an enclosed environment. There are several options, they say, regarding format: *Dolby Pro Logic II*, which takes a traditional two-channel source and improves the spatial effect, providing a full-bandwidth five-channel listening experience for consumers who can enjoy their large collection of CDs in a surround-sound format; and *MLP*, the discrete and highly accurate multi-channel format found on DVD-Audio. On most DVD-Audio discs, there are two Dolby formats available: the 5.1 *MLP content*, and the companion Dolby Digital 5.1 track that is located in the video realm of the DVD-A discs (The inclusion of a "companion" Dolby Digital audio track insures the compatibility of DVD-Audio software content,

with the nearly 50 million DVD-Video players in the marketplace.) Additionally, most DVD-A discs have a high-resolution two-channel track as well. Yes, people — all of these options currently exist on most DVD-A discs. According to Dolby, there are two different methods to initiate the playback of a DVD-A disc: If the consumer inserts the disc and presses the CLOSE button, the player will automatically seek out the hi-res two-channel track or the 5.1 track (depending on system configuration) and play them without any further prompts. No video monitor is required in this mode. However, if the consumer inserts the disc and presses PLAY, it will bring up the on-screen menu and allow the listener to select tracks. This process would require some form of visual display.

Artiaga and Eggers also point out the significant improvement in sound realized when using a

ADVANTAGES — & CHALLENGES

Laurie Fincham, vice president of engineering at THX, points out that the car environment presents both advantages and challenges when designing a sound system. "It is advantageous to know where people will be sitting in the car. However, we also know that they will not be in the best position, off to one side in the front or the rear seats," says Fincham. "Multi-channel audio is more satisfying to listen to especially in a car where true stereo is so hard to achieve. With surround, you get more obvious directional cues and it's simply more fun." Admittedly, Fincham would love for people to be able to replicate their THX home theater sound experience on the road, but indicates that it has to make sense for consumers. Such systems, he says, need to be closer in operation to a CD player than a DVD player, requiring no visual interaction for the driver of the car.

Fincham also feels that the cost should be about equal to that of a CD, and a single disc should contain all of the necessary data in

order to make it playable both at home and in the car. "It's all a work in progress, and we at THX are ready once the format has been established," said Fincham.

Based on consumer acceptance of various surround formats for home theater applications, it would seem plausible that multi-channel car audio might catch on in a big way — if it is made simple to understand and to operate. Car stereo surrounds vehicle occupants by design, so to enhance that experience with clever electronic processing seems logical. If such designs can enhance the listening experience for motorists at a reasonable price, multi-channel car audio could prove a welcome profit opportunity for retailers, and give customers another reason to go back into 12-volt showrooms.

■■■ MULTI-CHANNEL CAR AUDIO MIGHT CATCH ON IN A BIG WAY — IF IT IS MADE SIMPLE FOR CONSUMERS TO UNDERSTAND AND TO OPERATE ■■■

multi-channel processor with a center-channel speaker in the automotive environment — it eliminates the limitations imposed by traditionally low door speakers, raises the overall image and creates a magical front soundstage. It makes the use of the balance and fader controls almost optional because the image is so finely tuned, using the natural ambience on the recording and sending that data to the rear channels. Pro Logic II features a Dimension Control, which allows the listener to shift the full bandwidth surround forward and back, to taste. The concept is to enhance the entertainment experience by creating depth and dimension while retaining critical left and right signal separation.