



3D TV Software-Enhanced Set-Tops

Addressing the Challenges of the 3D TV Experience



3D TV: Here Today and Getting Bigger

3D TV is emerging as one of the hottest technology trends of this decade. Consumers are anxious to replicate and expand upon an experience that was once confined to movie theaters. The interest in bringing 3D into the living room is further fueled by the growing availability and affordability of 3D televisions and an increasing proliferation of 3D content. The potential exists for 3D TV to rival HD as the next 'must have' video experience in the home.

However, there are many challenges to making 3D TV as ubiquitous and profitable as HD. The companies most in tune with consumer behaviors, technical obstacles and competitive advancements will be the ones to reap the greatest benefits over time.

Delivering 3D signals using currently deployed infrastructure and devices is possible today but is far from intuitive for most consumers. Although frame-compatible 3D content can be passed through deployed set-tops and viewed on 3D televisions today, accessing the set-top on-screen guide and menu while watching 3D content provides an unsettling experience. Additionally, the consumer must manually configure their television to 3D mode and the 3D format (top-and-bottom or side-by-side) in order to properly view the channel in 3D. They must then manually configure their television back to 2D mode when they change the channel back to a 2D service. Until these challenges are addressed, mass adoption of 3D TV will be hindered.



Challenges for 3D TV Service

Signaling a TV whether the content is 2D or 3D, and the type of 3D content

Decoding 3D video in a set-top

Reformatting on-screen text and graphics



Solving the Challenges of 3D TV Delivery

Motorola has addressed these deployment challenges by developing software enhancements for its set-top portfolio that provide consumers with an exceptional and seamless 3D TV experience in their home. Motorola's software enhancements integrate 3D signal processing into the set-top, providing the following functionality:

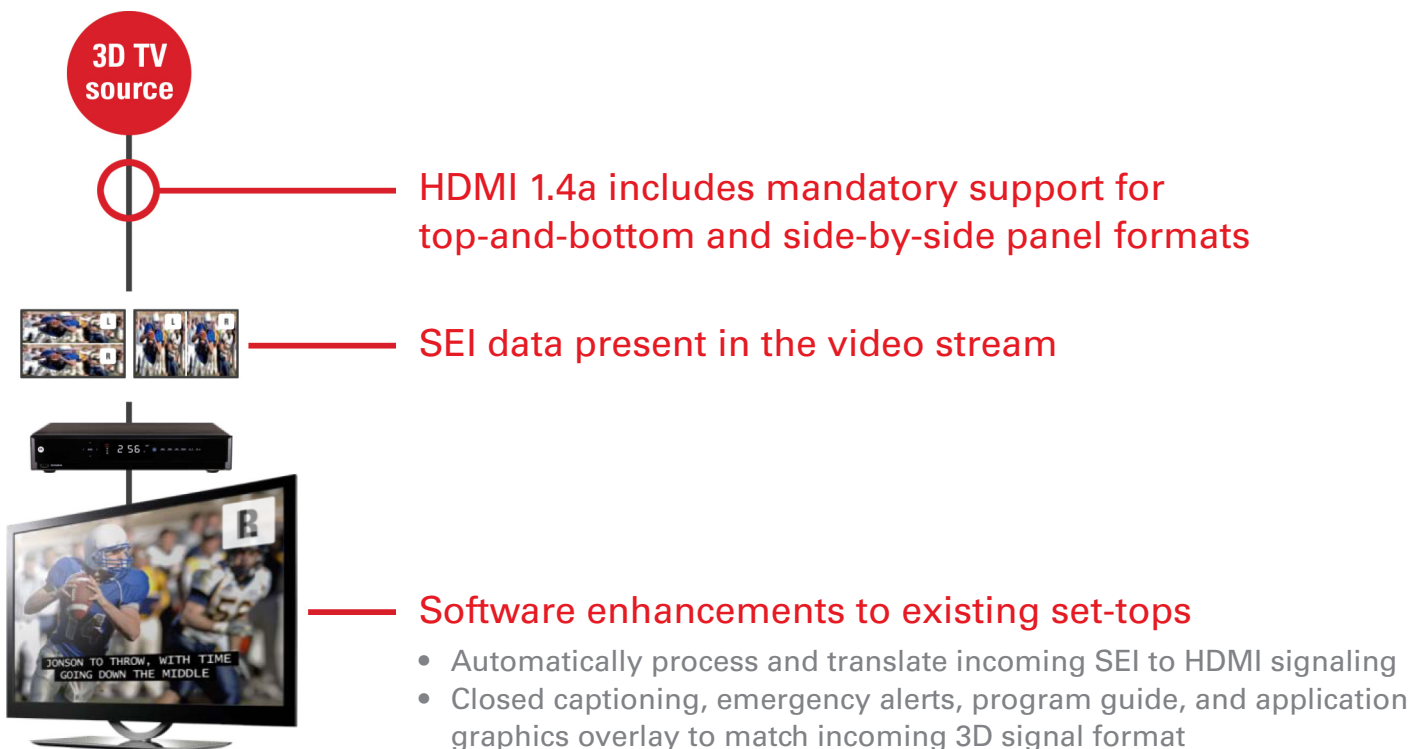
- **3D format detection:** The 3D processing software automatically detects the presence of 3D content and identifies the type of 3D format used to ensure proper delivery and display on the 3D television. As a result, the consumer will be able to seamlessly switch between 2D and 3D channels.
- **Graphics Alignment:** Upon detection of 3D content, the set-top automatically reformats all on-screen text and graphics to match the incoming 3D format so that they can be correctly displayed by the 3D television. The 3D processing software supports all on-screen displays such as closed captioning, emergency alerts, subtitles, application graphics and text overlays.

The Benefits of 3D Processing

Metadata within the 3D transport stream – called Supplemental Enhancement Information (SEI) – identifies whether the video is 3D as well as the 3D format (either top-and-bottom or side-by-side). The software enhancements within the set-top recognize the SEI data and use the HDMI 1.4a signaling to tell the television to switch to 3D mode and the right 3D format. This automates the cumbersome step of requiring the consumer to manually configure their television for 2D or 3D modes, enabling seamless switching from 2D to 3D channels.

Additionally, the software enhancements recognize the 3D format through the same SEI messaging and reformat all on-screen text, graphics and overlays to match the incoming format, and display the format appropriately. This ensures that program guide, closed captioning and emergency alerts are readable while in 3D mode.

Signaling a TV for 3D Format



Provide a Better 3D Experience

3D TV should be a natural extension of watching television. A poor viewing experience will hinder wide spread adoption and slow growth in consumer demand. With Motorola's software enhancements, service providers can offer a better 3D experience. Consumers will be able to interact with their set-top without complicated configuration of multiple remote controls. They will be able to seamlessly switch from 2D and 3D with a simple change of the channel. And they will be able to view their program guide, closed captioning and emergency alert messages regardless of whether they are viewing 2D or 3D content.

It's important that consumers have a positive 3D experience. Motorola helps by removing the guess work. Televisions are automatically configured, text and graphics are instantly reformatted, and channels change easily back and forth from 2D to 3D. The only thing left for consumers to do is to sit back and enjoy.



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