

# APPLICATION NOTE

## **3D Production Using Grass Valley Production Switchers**

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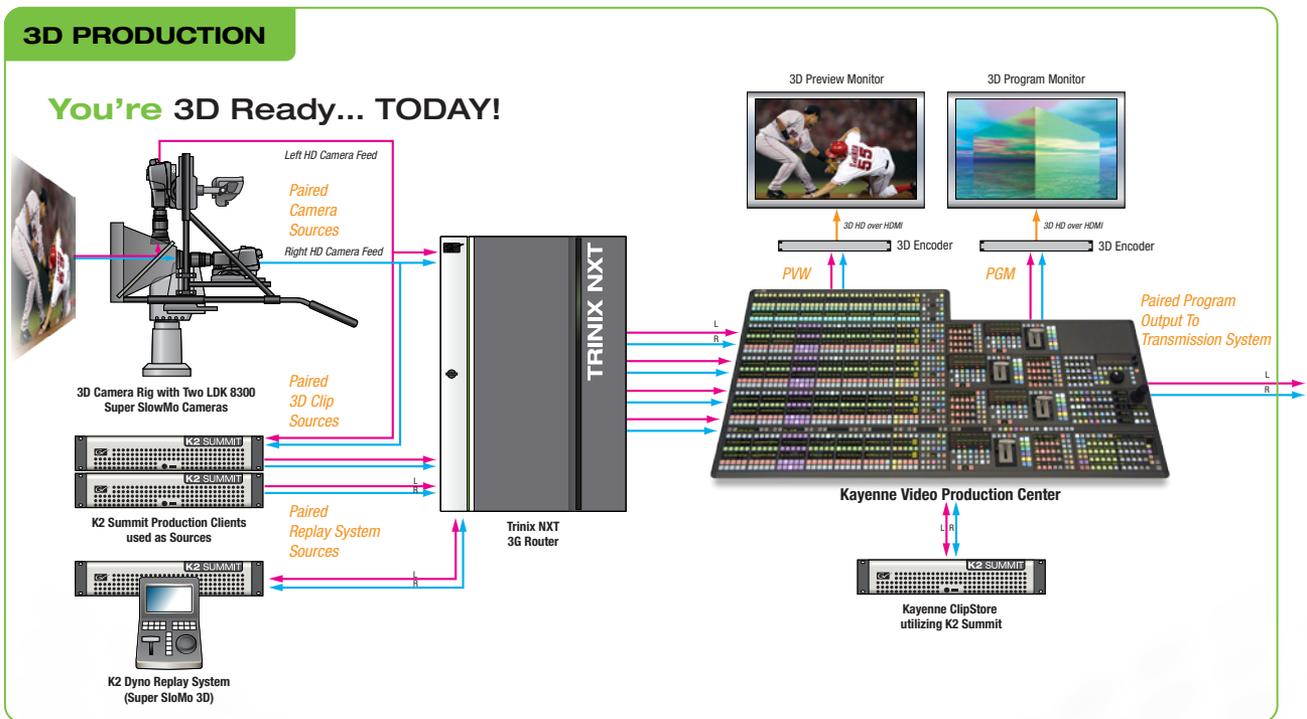
Grass Valley™ production switchers are already making 3D television programs, and have been for many years with no external processing required. Our latest switchers continue to deliver the ease of operation and high production values our users expect, using our standard software and hardware.

# Introduction

Live 3D television production is one of the most exciting developments in recent times and is poised to stretch both production and technical teams worldwide as they pursue the ultimate experience for their viewers.

Grass Valley and its solutions sit at the heart of the 3D television production experience with LDK cameras being used in 3D rigs, K2 Summit™ and K2 Solo™ media servers with ChannelFlex™ technology built for 3D left-eye/right-eye recording and playout on a single channel, reliable and scalable routing systems, and both Kayenne™ Video Production Center and Kayak™ HD switchers easily able to put a 3D show on air.

The core of the Grass Valley switcher concept for 3D operation is in maintaining the traditional 2D workflow understood by producers, directors, and technical directors, without adding complications or special tricks. 3D TV requires a transparent ability to process the two parts of a 3D show: the left-eye and the right-eye camera signals. This must take place under the same control scheme as a regular 2D show, using the knowledge and techniques which keep the production pacing and desired on-air look without compromising any production values.



# Kayenne's Approach

The Kayenne has a powerful video processing frame of up to 4.5 M/Es — each with six keyers, six outputs, up to four iDPMs, and each able to run Grass Valley's DoubleTake™ software modes. This means that with no extra or optional software, a Kayenne M/E is able to be split so that one transition control area and lever arm is used to cut, mix, or wipe a 3D pair of left-eye/right-eye cameras within each of its M/Es and offer twin preview outputs for each M/E. This results in a 4.5 M/E Kayenne becoming a 4.5 3D M/E switcher with each M/E having three 3D keyers of which two have full DPM capability in each of the four full M/Es and with a simple half M/E having three 3D linear/luminance keyers with no DPMs.

The TD uses the included Multiple Bus Linking software and a 3D source table to ensure that while they cut the left-eye camera that the Kayenne automatically cuts the companion right-eye camera in the separate M/E partition and matches transitions using DoubleTake techniques and the new Key Chaining software which is part of the version 2.0 software release.

Key Chaining ensures that keyers in a chain always match status, so with 15 chains in a fully loaded Kayenne there are 15 3D key pairs. TDs need only command one part of any pair to ensure that both parts correctly follow in both on-air status and preview.

Importantly, the preview outputs of the switcher allow the TD to show 3D preview or individual left-eye or right-eye camera signals should troubleshooting be required. This is easily achieved using the built-in preview router, which is on the control panel above Program/Preset.

Every one of the 1,000 E-MEM registers for Mix Effects banks is a twin register for the 3D effect.

iDPM channels do not require any extra or special software to be used in 3D. Grass Valley iDPMs use well-proven 2D/3D geometry developed to ensure that DPM operations project movements in 3D correctly and preserve 3D camera rig setup or graphics as they are flown in exactly the same way as they always have been. By allowing the TD to easily control all iDPMs within a Kayenne simultaneously, and at a minimum as 3D pairs, 2D iDPM moves are easily replicated in the 3D world.

eDPM, the four-channel DPM, which has its own control system within Kayenne mirroring the feel of an external DPM, also requires no special software to allow it to be split into a 3D two-channel effects device with two physical channels becoming the left-eye and two the right-eye processors. It mirrors the switcher section by also using 1,000 twin E-MEM registers for control and recall of effects.

Of course graphic replay is integral to both production requirements and to Kayenne's control system. ClipStore uses either a Grass Valley K2 Summit or K2 Solo media server with Channel Flex to record, edit, and replay video clips with left-eye/right-eye video, matte, and audio. Stills are handled by an onboard RAM system with manual or timed backup of the valuable media files to hard drive as part of the software. Both stills and clips show thumbnails to aid in speed of operation.

The TDs, engineers, and production teams who work with Kayenne to build live, high-quality, 3D TV are able to use all their current 2D knowledge and skills in a 4.5 M/E 3D production environment learned and perfected in the 4.5 M/E 2D world.



# Kayak HD's Approach

Within the standard software of a Grass Valley Kayak HD, M/E Couple allows any M/E to be the master of any other. Simply put, source selection of left-eye on the first M/E will force selection of right-eye on the second by the selection of a 3D source substitution table. Background and key transitions are matched across the coupled 3D M/Es, and the result is a massively powerful 3D M/E with up to six keyers and 3D preview.

When using the Kayenne XL panel, 1,000 macro registers ensure control is maintained with no extra learning time for the TD.

iDPM channels, which may optionally be placed within the four full keyers of each M/E bank, are easily controlled in pairs or simultaneously. This means that the TD uses knowledge gained in 2D production to easily step into 3D. Again, the Grass Valley DPM geometry software ensures that camera rig setup or graphic perspective is accurately translated inside the DPM effects with no extra software.

The internal RAMRecorder™, for short clips, or Media Player control of K2 Summit or K2 Solo media servers, again allows the high production value of graphics to be used with no extra software or training. Thumbnails of both internal and external clips as well as RAMRecorder stills speed up operations. Replay wipes rendered in 3D can

be played out as two key/fill pairs in parallel from the internal RAMRecorder, allowing a manual fader controlled replay transition.

By slaving M/Es using M/E Couple, a powerful 3D 2 M/E Kayak HD system built from a 4 M/E frame allows production teams to go to air with no compromises and no extra software or training.

For even smaller systems or to save hardware resources—depending on your system—a 3D production can be accomplished in one physical Mix Effect bank. For detailed setup or more information please contact your regional Grass Valley Technical Sales Support person.



## Conclusion

Grass Valley switchers have been delivering the highest level of 3D production values paired with easy operation. Using the experience that our users continue to share with us, we are moving towards fast-track 3D setup options to further improve our 3D production support.

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