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The Kayenne ClipStore

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APPLICATION NOTE



Introduction

The Kayenne ClipStore from Grass Valley, a Belden Brand, incorporates K2 media server technology by embedding either a 4-channel K2 Summit or a 2-channel K2 Solo. Each of these server channels records and plays a video and key pair. The ClipStore video and key are kept in one single file (not two files) so that video, key and audio are always synchronized without the need to gang channels.

The ClipStore records and plays back using AVC-Intra 100 compression format. Clips imported in DVCPRO HD, DVCPRO 25/50, DV and MPEG-2 will play natively. The ClipStore supports record and playback of embedded audio. The server's AES I/O is not used in this application.

Control and use of the ClipStore is completely integrated into the Kayenne's control panel and menu. There is no need to ever use the server's native AppCenter Elite user interface. Indeed, using this interface could cause conflicts with the switcher if used at the same time.

Of course the ClipStore provides the means to ingest material. Additionally, it provides the means to edit and trim clips, and to assemble a video/key/audio clip from separate files. This is described later in this document. However, what is most important is the way the ClipStore is integrated into the switcher's control system, so that in addition to the manual loading of clips using the switcher's menu, clips can be loaded, cued and played using E-MEM, macros and Q-MEM. It is this integration, which makes the ClipStore so valuable and versatile.

Unlike other K2 media servers and media players in a facility's network, the ClipStore is intentionally isolated from that network, and embedded in the switcher's control system. The ClipStore is provided for direct control by the technical director/vision mixer, and is considered to be local storage completely under the user's control. Let's first look at how clips can be manually loaded and played. Then we shall see how this is done under E-MEM control and Macro control.



Fusion adds value to Grass Valley solutions by providing tighter integration, unique functionality and increased flexibility when our products are connected together — leading to more efficient and faster production. With Fusion, a ClipStore is part of the Grass Valley Kayenne Video Production Center.

Loading and Playing

ClipStore playback is found in the Kayenne menu system under Image Store/Record and Replay. This selection has three tabs: Stills, Clips and Clip Record and Edit. When selecting the 'Clips' tab, the clips in the currently selected folder are displayed as thumbnails or in a list view. To load a clip, select a channel by touching its output icon, and then touch the clip. As soon as the clip is loaded and ready

to play, the thumbnail is displayed in the channel's icon. There is a full range of motion control for the clip, playing at unity or variable speed, forward or reverse and of course fast forward and rewind. The menu also has a jog knob to precisely move the clip as well as setting precise mark-in and mark-out points. Also, most useful for animated backgrounds, is the ability to loop a clip continuously.



Cueing and Playing using E-MEM Keyframe Triggers

To build a show, it is important to include the load and play of clips into E-MEM effects. This is done easily in the same menu by using keyframe triggers. When the 'KF Triggers' button is pressed, the keyframable options become jeweled in the menu, so they can be turned on or off. A keyframe can optionally load a clip (making it current), cue the current clip to mark-in, play the current clip and loop it. It is generally best to go to the Master E-MEM section of the control panel and learn the 'Load Trigger' into a new register. This keyframe remembers the output, the clip name and the directory location. Then, insert after the current keyframe, a new keyframe containing a 'Play

Trigger'. So the first keyframe loads the clip and the second plays the clip. The ClipStore channels CS-1 to CS-4 default to MISC levels 1 to 4 of Master E-MEM. However these channels can be assigned to any level. Most usefully, the channels can be made definable and placed as sub-levels within an M/E. In this case the M/E and the clip can be driven from a local E-MEM panel rather than the master.



Cueing and Playing Using Macros

To create a macro for the ClipStore, first ensure that 'KF Triggers' are turned off. Now ClipStore functions accessed through the menu can be recorded into a macro, including Load, Cue, Play, Stop, Rewind and Audio Mute. Initiation of the macro record can be performed on the control panel or the macro menu. In both cases it is the same, select a macro and press 'Record.'

Then go to the ClipStore Menu, select the output channel, and then select the clip. Before recording the playing of the clip it is necessary to insert a delay of at least three frames before the play command is recorded; use the 'Insert Delay' button to insert this delay. Not only does the macro record the name of the clip, but also the directory in which it is located — which is necessary where different shows have the same clip name such as 'Opening.'

Loading and Playing using Q-MEM and the Device Control Module

Alternatively, channels can be controlled using Kayenne's Device Control Module (DCM) and learned into Q-MEM (cue memory). To start, channels can be loaded onto one of the letter buttons A through F by rotating the top knob until a channel is displayed and then holding down learn and pressing the letter button. This assignment of the channel to a letter button (or say all four channels to A through D) can be learned into a Q-MEM on its own, so that the DCM can be rapidly delegated to controlling the ClipStore. Once a channel is selected, rotating the second knob scrolls through available clips, and pressing the load button loads the clip onto the channel. The power of Q-MEM is fully utilized when named clips, in and out points and auto-play are learned into one of the 100 Q-MEM registers together with learning the delegation(s) to letter buttons.

Q-MEM registers can be recalled directly from the panel. If auto-play was not learned into the cue, then the TD can watch the clip being loaded on the monitor wall, and then press the 'Play' button as needed. Alternatively, the Q-MEM register number can be learned

into an E-MEM and recalled when the E-MEM is recalled. By default Q-MEMs are stored in MISC level 16. The Q-MEM sub-level can be made definable and assigned to an M/E level. The advantage of using Q-MEM registers in E-MEM effects is that the same Q-MEM register can be used in multiple effects without having to re-learn the cue. So, for example, the cue for the animation "breaking news" could be recalled from any M/E, or used in different effects such as full-screen or in an over-the-shoulder shot. Of course, macros can be used to recall Q-MEM registers too.

Ingesting Material

Let's now look at the process of ingesting material into the ClipStore. This can be done in two ways: either by recording video, key and embedded audio directly, or by importing files.

For recording there are two elements: video and key. Either of these may contain embedded audio, although it is usually associated with the video. A clip can contain one to three tracks; the tracks being video, key and audio. These tracks can all be recorded at the same time

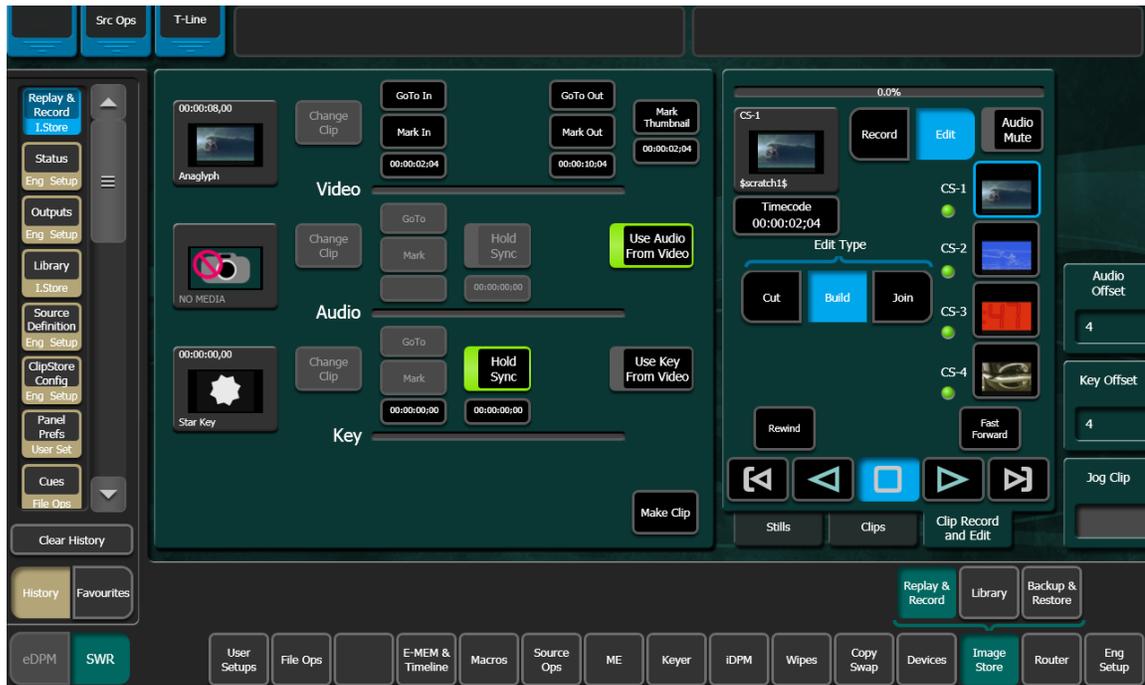
to form a clip, or recorded separately into clips with only one (or two) tracks, and then assembled into a single clip using the editing tools in the ClipStore editing menu. Recording a clip can be open-ended or for a fixed duration.



Ingesting Material (Cont.)

The ClipStore menu editing tools allow you to trim clips, create sub-clips from a longer clip, join clips together (concatenate) and most importantly, combine tracks from separate clips into a single clip. In the illustration below, we see three different clips, one with video, the second with audio and the third with key. For precise and accurate

alignment, the individual tracks can be offset (jogged) relative to the video. When the 'Make Clip' button is pressed, a new clip is created containing all three tracks.



This process of assembly is very important where video and key material is provided sequentially on a single tape. This can be recorded as a whole, and then sub-clips created, which are assembled so that video and key are synchronous.

More and more, the industry is finding it easier to transfer material as files. The ClipStore provides tools for both import and export of files. The ClipStore supports import of files in GXF, MXF, AVI and MOV formats, however it is only the GXF format that can have video and key combined in the same file, so it is only GXF format that is supported on export.

Ingesting Material (Cont.)



Files can be imported directly by plugging a USB memory stick into the Kayenne Menu Panel, or over the network from any NAS. All directories mounted as D:, E:, F:, etc. by the underlying Windows operating system are shown in the Kayenne Library menu for the ClipStore. Using this menu, files can be copied into and out of the ClipStore. The left hand side of the menu is always the source and the right hand side the target. Files can be copied and deleted using this menu. Once a file is imported into the ClipStore, it can immediately be load-

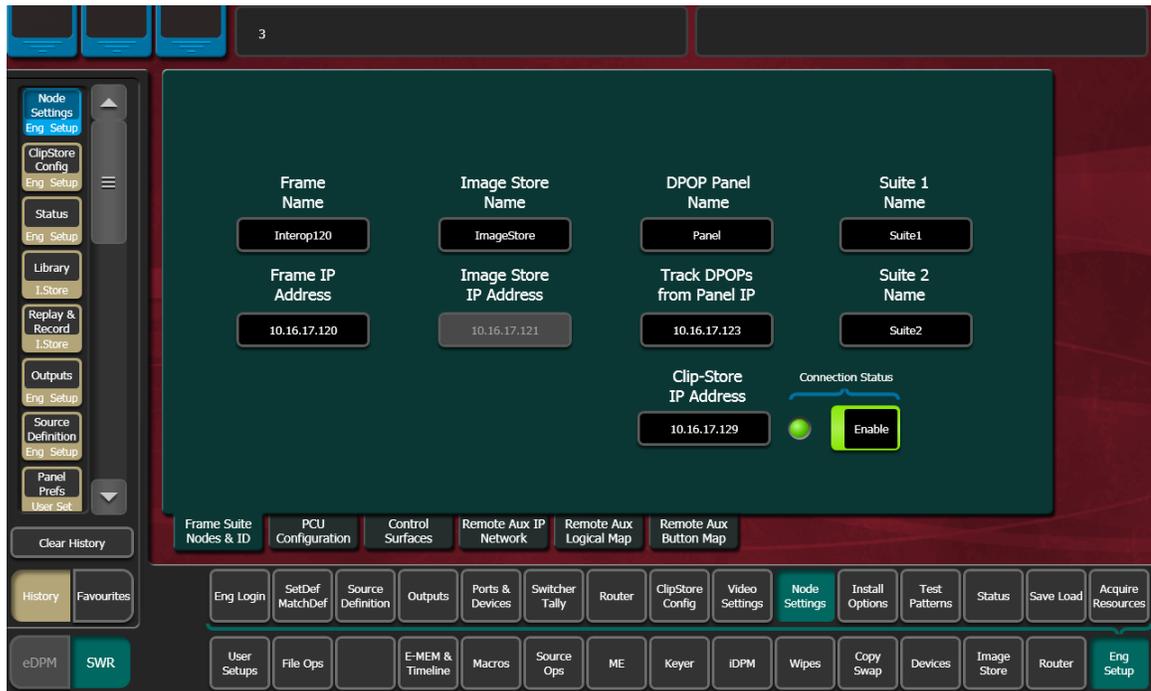
ed and played. In a workflow that is centered around the ClipStore, clips will be in the high-quality AVC-Intra 100 compression standard. In workflows that integrate with other third-party equipment, files in native DV50, DV100, or similar, can be imported and played.

Setup and Configuration

The ClipStore itself is entirely configured using the Kayenne menu. Additionally, to set up the ClipStore you need to cable and configure its inputs used for recording (sends from the Kayenne switcher) and its outputs used for playout (returns to the switcher). Once this is done, the ClipStore is ready for use.

Connection to the ClipStore is made by configuring its IP address in the Eng Setup / Node Settings / Frame Suites Nodes & ID menu and pressing the 'Enable' button.

Configuring the ClipStore Using the Kayenne Menu



Setup and Configuration (Cont.)

The green LED indicator shows that the ClipStore is operating and connected. Once the ClipStore's IP address is configured, each ClipStore channel automatically appears in the Enables/Devices menu. The following illustration show how a four-channel ClipStore appears in that menu. The ClipStore is not treated as an external device and

should not be configured in that menu — doing so would cause conflicts due to a duplicate configuration.



Setup and Configuration (Cont.)

The ClipStore itself is configured using the ClipStore Config/Eng Setup menu. It is recommended that the configuration is first retrieved from the ClipStore, using the 'Read from ClipStore' button, the desired changes are made to the configuration, and then the ClipStore is configured by pressing the 'Send to ClipStore' button. Using this

menu, various settings can be made, such as configuring the aspect ratio conversion or the freeze mode.



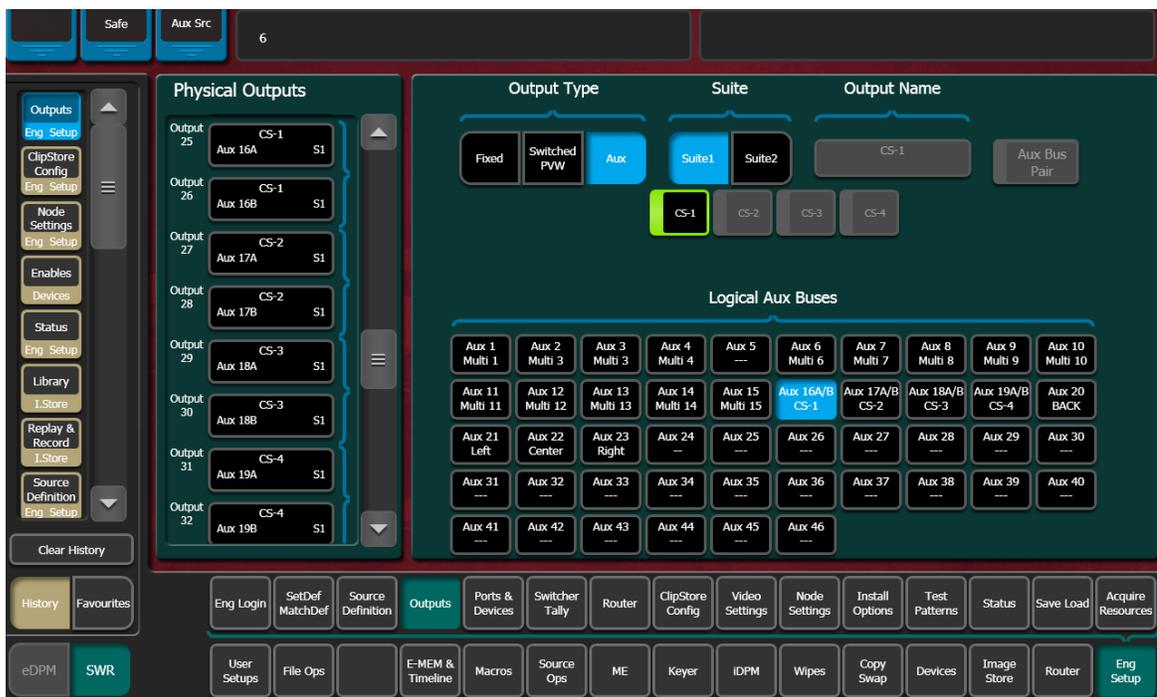
Cabling and Configuring ClipStore Inputs

The ClipStore's inputs are used for recording material. Each channel has two BNCs for recording (one each for video and key). How these are connected is very much up to the system designer. The standard way (described below), is to use a Kayenne video key Aux Bus pair to feed each channel. However, in many cases, there is no need to simultaneously record on more than one channel. So, a single Aux Bus pair can be used from the switcher, and this output is sent to all ClipStore channels by using an external distribution amplifier (DA). Where there are two suites, one Aux Bus per suite could be used. In some sites, the ClipStore inputs are directly connected to a router and switcher Aux Buses not used at all.

For a standard configuration (using one VK Aux Bus pair per channel), start by cabling the switcher output BNCs to the ClipStore. Each channel should have four cables: two cables for record, one for video,

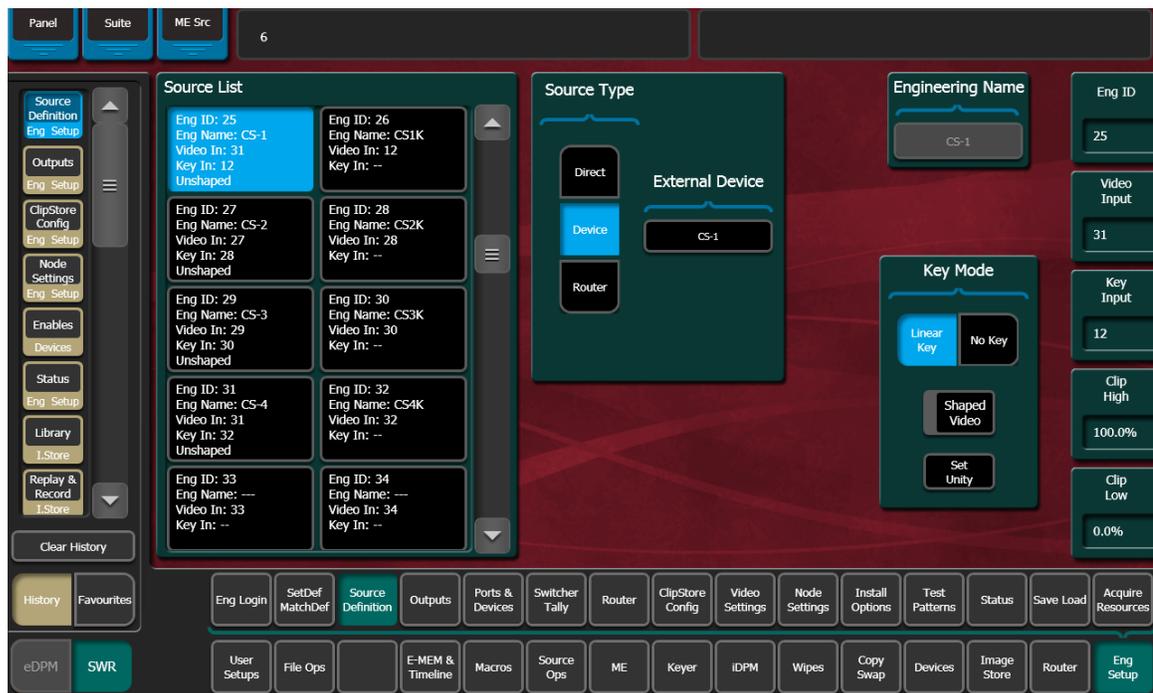
the other for key. On the switcher side, they should be connected to adjacent BNCs, with video on the odd numbered output, and key on the even numbered output. Then proceed to configure the Aux Buses as shown below.

In this example outputs 25 and 26 form a pair that is connected to ClipStore channel 1 (CS-1).



Cabling and Configuring ClipStore Outputs

Similarly, each ClipStore channel has a pair of outputs (video and key) that are cabled to switcher inputs for playout.



In the menu illustration above, the user selected source 25, selected device, and then selected CS-1 (Clip Store Channel 1) from a pop-up list of devices. Similar configurations were made for logical sources 27, 29 and 31. Any input BNCs can be used for the returns from the ClipStore. In the example of source 25, the video is on input 31 and the key on 12. All that is necessary for operation of the ClipStore is to

configure the sources as in 25, 27, 29 and 31. However, the creator of this configuration chose to additionally configure logical sources 26, 28, 30 and 32, which are the key-only side of the ClipStore output for each channel.

Conclusion

The Grass Valley Kayenne Video Production Center ClipStore is highly integrated into the Kayenne control panel. Sends to the ClipStore from the Kayenne (for recording) are there on the panel when a row is delegated to Aux Bus Control. In this mode, sources can be selected for recording. The returns from the ClipStore are logical sources that can be mapped to any source select button for any shift level. These are inputs which can be taken on any bus. Given the overall storage capacity of the ClipStore (30 hours for the 4-channel unit, and five hours for the 2-channel unit), and its tight integration into the switcher, the ClipStore is the gold standard for live production.



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