APPLICATION NOTE

Fastrack+K2: Editware Fastrack and Grass Valley K2 Media Server Integration for Hybrid Linear/Nonlinear Post

Hybrid Linear/Nonlinear Editor

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February 2011

In today's marketplace, there are dozens of video server manufacturers. The decision of which to purchase may ride on comparative price, size, speed, memory, format, storage, flexibility, applications, previous working relationships, expandability, ease of use, warranty, country of origin, options, financing… the list goes on.

You need a server to fit into your defined workflow as it exists or is envisioned today. You also need the flexibility to fit into the workflows of tomorrow. Today: News clips. Tomorrow: Promos. The next week: Show fixes. Then what? Live editing on the server from studio direct to satellite? Fastrack+K2 adds value that offers you a multi-purpose, flexible, future-proofed solution that should make choosing the Grass Valley™ K2 media server with Editware Fastrack the clear choice.

This application note covers the unique hybrid capabilities of the Fastrack+K2 application.

Contents

Introduction

Fastrack+K2 is the perfect balance between two editing technologies: linear and nonlinear. It is an editing application designed specifically to interface with, and control, the original Grass Valley K2 media server and the K2 Summit™ series of media servers.

Linear editing is characterized by an interconnected collection of devices including an edit controller, VTRs, mixer, and switcher, with the building of a show from beginning to end. Nonlinear editing is usually a self-contained system requiring that all source media be ingested to local desktop or centralized storage, but with the advantage of being able to immediately access any shot, and place it anywhere on a timeline, in any sequence.

There are some tradeoffs, but for most show or content formats the convenience and speed of linear editing far outweighs the overhead of having to ingest all source material and then render the final show, and then (usually) play out to tape to generate an edited master.

In spite of the advantages of nonlinear editing, large pockets of linear editing facilities persist. That is because some workflows can be much more efficient when done in a linear way. Here are some of the attributes of shows that can be effectively edited using linear editing:

- Significant editing very close to air time
- Live, or near-live, segments combined with pre-produced segments
- Ingest time is high compared to editing time
- Rendering time is high compared to editing time
- Source material is on broadcast server
- Multi-layer effects can be done faster on a production switcher

K2 server users can employ linear peripheral equipment for real-time effects and speed of completion, and also perform nonlinear virtual insert edits into a K2-based program, even if that program is being aired live or delayed. Effects can be added in real time, through Fastrack control of an external switcher and/or through the internal M/E of the K2 Summit, whose M/E effects can be performed between clips loaded on a single channel.

This application note covers the unique hybrid capabilities of the Fastrack+K2 application.

Control

Control of the K2 server is via Ethernet, allowing Fastrack to control any K2 channel on the network, even if those K2 servers are already being used with automation and playout systems or other applications, and even when channels are also allocated to the K2 AppCenter.

The Fastrack+K2 application is enabled by Editware's Fastrack control engine and Grass Valley's dedicated K2 API with the implementation of AMP and .NET protocols.

Multiple K2 servers can be connected to one Fastrack, directly or as part of a SAN, and multiple Fastracks can be connected to the same SAN and simultaneously share the same clips.

The Fastrack+K2 comes with eight GPIs, plus unlimited PEGS to specify and frame accurately trigger almost any combination of switcher effects, and STRINGS, which give the user additional flexibility to send out any protocol command string to a device connected through an RS-422 port.

As many as 80 server channels can be controlled simultaneously and frame accurately, and the Fastrack can be optioned to control and synchronize up to 16 serial devices.

Editing

There are two types of edits that can be performed with the Fastrack+K2 application: linear and virtual. The resulting "edit master" clip is referred to by the K2 server as a "program," and this clip can be viewed, imported, and exported by most other applications.

Linear edits recorded directly to the K2 server that include external mixer and switcher transitions, audio or video pre-read, vari-speeds, audio or video key-framing, and other effects, are performed in real time as they are encountered, left to right, on the timeline. Sources can be all K2 channels or a mixture of

K2, VTRs, and other supported peripheral devices and switcher crosspoints, even other nonlinear editors. There is no additional rendering required for VTR, peripheral devices, or crosspoint sources.

Virtual edits are cuts-only, and are inserted directly and instantly from the Fastrack timeline into the Record Event with a single keystroke. Once the virtual edit is performed, that edit is an integral part of the K2 "program," and no further preparation is required to play, transfer, or archive this master clip.

Workflow Examples

Fastrack and K2 users work with many different types of workflows. The K2 media server and the Fastrack+K2 controller were designed to be adaptable to many different environments and applications. Here are just a few real world examples:

Workflow #1: Uses the K2-H (the predecessor to the Fastrack+K2) to record six "iso" feeds of a sports entertainment program. In post, which can begin while the recording is still in progress, users can edit directly onto the K2 server playing all channels in sync, in real time, through their switcher in order to add effects.

For sections that do not require effects or fixes, they take advantage of the virtual edit capability of the Fastrack+K2 and insert these edits virtually into the program to save valuable time. For lengthy edits that enter with a transition or effect, the transition is executed in real time and the rest of the clip is inserted virtually.

The finished program containing a combination of linear edits with cuts, linear edits with effects and transitions, and cuts-only virtual edits, is then transferred to a Grass Valley Aurora™ system using Grass Valley's MediaFrame, which creates a Bin in the Aurora system that includes the Fastrack timeline (sequence) and all its associated media and metadata. The program is then sent from Aurora back to the K2 as a flattened clip.

In audio sweetening, their Fairlight audio system has immediate visibility of this new clip, and it is imported from the K2 server as an MXF file. They sweeten the edited master in the Fairlight, and the new mix is exported back to the K2 server as a broadcast WAV file, where AppCenter Pro re-associates the WAV file with the flattened clip by creating a new clip, all in perfect lip sync.

Fastrack can now re-load this clip as a new Record Event and make additional insert edit and pre-read fixes directly into this new clip.

Workflow #2: Creates two one-hour syndicated shows per day, six days per week, and uploads them to satellite at the same time each day for their hundreds of broadcast sites to receive.

They record their studio material directly to the K2 servers. Many individual segments of the show are recorded in the field and then transferred and pre-edited on Avid NLE and Fastrack. The finished "clean" pieces that were edited on Avid are then transferred back to the K2 SAN.

The shows are edited directly onto the K2 using the Fastrack+K2. Studio and pre-edited segments are controlled by the Fastrack editor and simultaneously by an assistant director rolling segments and clips via the K2 AppCenter. When the director adds one of these manually rolled segments into the show, the Fastrack editor simply marks the location where it is rolled, and if a fix or re-start is required, the editor can stop the recording and with a keystroke has all the elements controlled at the editor and in sync.

Sometimes the shows are not always ready for air in time. When this happens, the program being edited is still sent to the satellite at the scheduled time while the crews continue to edit it. *They can be as close as 50 seconds behind the satellite feed while still working on the show.*

Workflow #3: Uses the Fastrack+K2 for real-time editing of a live event being delayed. The soccer match starts at 5:30 p.m., goes on-air at 6:30 p.m., and must end at 8:00 p.m. in time for the news.

They start recording the program clip at 5:30 p.m. Any time the director or TD make a mistake, they simply edit the mistake out. These edits can be either cuts or transitions, as the Fastrack also has control of one of the 4 M/E buses in the remote truck switcher. Based on elapsed time, any injury time or other interruptions may or may not be removed. At 6:30 p.m. the K2 plays out the program to air.

As Fastrack is keeping track of the show time, they know exactly when the show closing—which is also on the K2 server—needs to be inserted into the show. This closing is made up of highlights of the game that have been placed into a K2 AppCenter playlist throughout the game. This sequence of clips, complete with pre-built transition effects between each of them, is back-timed with the Fastrack Fit-to-Fill feature to bring the show out on time.

Workflow #4: Is a news organization that uses their K2 SAN as a media bank, and the Fastrack+K2 to edit stories for their broadcasts. They have four Fastracks connected to this SAN of 14 servers. Two of these systems are K2 cuts-only systems, using the K2 for both record and playback. One of these systems is cuts-only, but also has access to a VTR to avoid the necessity of having to ingest last minute material. The last system uses K2 as a recorder, with K2, Profile® servers, VTRs, and other servers as sources, with a 2.5 M/E switcher and an 8 output bus audio mixer... a full-blown hybrid edit suite. This room is also used for editing full-length programming. Once material is edited in any of these rooms, the programs can be transferred to any of five different editing systems for additional work.

Workflow #5: Is a European network affiliate that uses a dedicated K2 server to record news clips from a satellite, edits them for time and content as they download, and makes them available immediately to the control room to use in their broadcast.
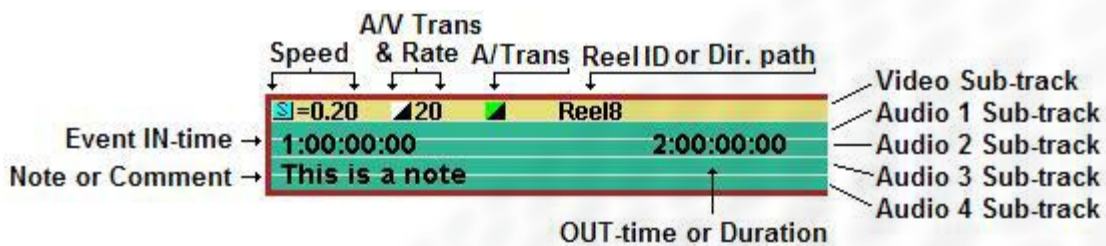
Fastrack+K2 User Interface

The Fastrack+K2 incorporates a very flexible and user-friendly graphic user interface. The use of this GUI eliminates the need for numbers, and makes the editing process more of a nonlinear "see & hear" process.
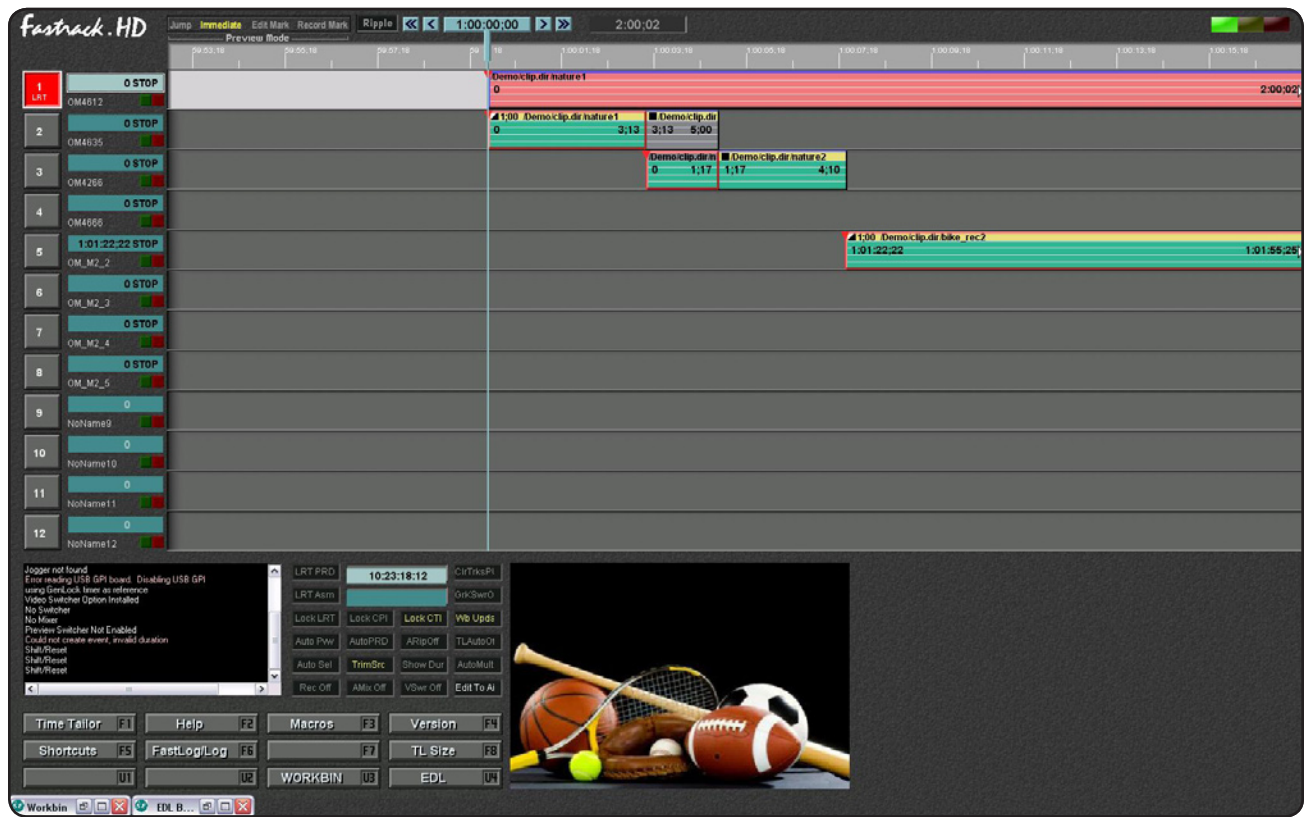
The Fastrack+K2 application includes an SD/HD preview window on the GUI, a dual monitor display, and ten EDL Bins, as well as a text representation of the entire graphical timeline.

The Fastrack timeline works by "encounter," left to right. When you preview or record and edit, the timeline scrolls along. Cuts, transitions, and effects are triggered as they are encountered. Edited K2 programs can be used at any time as sources, allowing the user to create extensive and complex layering while maintaining dominion over each level.

Editing is performed on the Fastrack by placing events (clips) on tracks. Each track displays a source (or sources) and related meta-data on the Fastrack timeline, such as a video server channel or VTR, a character generator, switcher crosspoints, etc. Below is an example of an event and its components.

Fastrack+K2 User Interface (cont.)

Each event placed on a source track represents video and up to eight channels of audio. Record events on the record track represents video and up to 12 channels of audio (device dependent). Only enabled sub-tracks contribute to the end result of the edit. For example, if you are editing to a device with two audio channel capabilities, the record event might look like the example below.

When working with video servers, material already ingested is not re-recorded. Only those parts of the edit that are modified by transitions or effects, or material that has not yet been ingested, will be recorded onto the server during an "optimized" recording. This means that whole tapes need not be pre-ingested just to utilize a small portion.

The "record event" is a graphic representation of a record videotape, and gives the user the ability to visualize insert, assemble, and pre-read edits, as well as to see at a glance where any edit took place, and view its corresponding edit in the EDL with a click of the mouse.
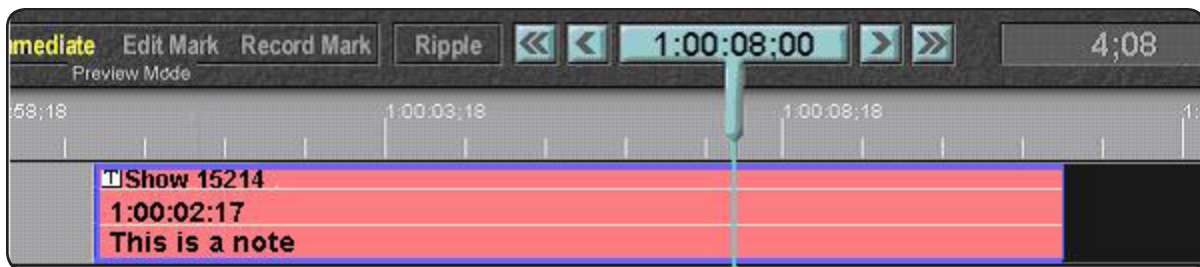
*An example of a record event before editing.*
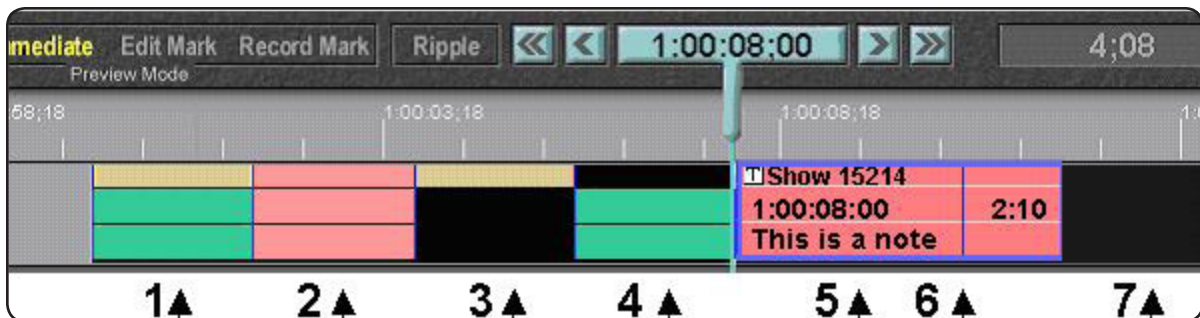
*An example of a record event with multiple edits and their descriptions.*

1: A completed edit of video and channels 1 & 2 of audio

2: A "dummy edit" left as a marker to be inserted at a later time

3: A video only edit

4: An audio only edit with channels 1 & 2

5: The record event defining the next edit

6: An edit mark showing where a previous edit has been performed under the record event

7: All black areas show portions of the clip where no media has yet been recorded

For both linear and virtual edits, the boundaries of the record event define what source material will be included in the edit. Within the record event boundaries, standard Fastrack rules apply. In the following examples, only the material within the record event (the red area) and the striped lines will be inserted into the program.

Fastrack+K2 User Interface (cont.)
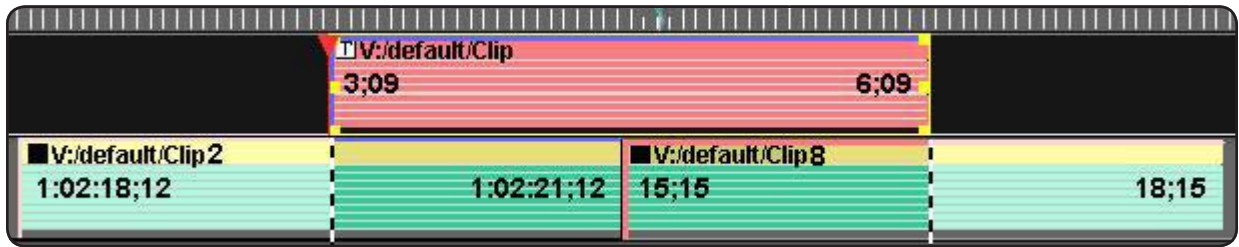
Multiple events on the same track.
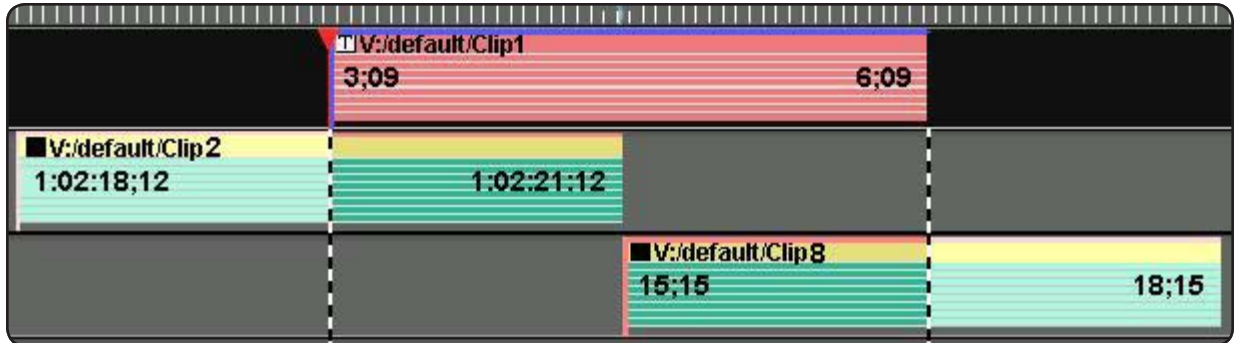
Multiple events on separate tracks.

In the following example of source events, when using an external audio mixer, only audio playback sub-channels 1 and 2 will be heard during the first event, only channels 3 and 4 will be heard during the second event, and only channels 1and 4 will be heard during the third event for this edit.

Any VTRs involved in the edit must pre-roll, but the user has the option of whether the server will pre-roll or not while using the frame-accurate, real-time playout of events on the timeline.

The preview functions allow you to preview the edit from any position on the timeline. You may work with as few as one track for cuts-only editing from a K2, or a minimum of two tracks if transitions or effects are involved or if you are editing tape-to-tape. Using the K2 Summit and its internal M/E, transitions are possible with only a single K2 player channel being utilized.

Up to 80 tracks are supported when displayed in groups of eight, and up to 72 tracks are supported when displayed in groups of 12.

Fastrack Tools and Features

Fastrack employs many special tools and features to make the Fastrack+K2 application as powerful and flexible as it is. Here are a few examples:

All K2 directories and clips are directly accessible from the incorporated Fastrack K2 clip viewer.
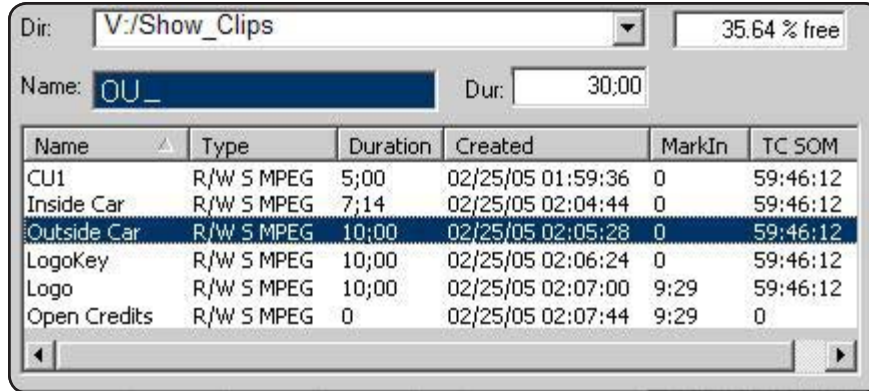
Search for a K2 clip alphabetically, by type, duration, date, or by timecode. It is automatically loaded onto its respective track so you can: reposition, set, mark, trim, shorten, lengthen, modify, copy, paste, add, delete, slip, slide, enable, disable, link, split, or separate as desired.

Powerful features like Fit & Fill can be utilized to force a specified clip to automatically "fit" within a specified time frame, or to "fill" gaps in the timeline.

Here are two events with a gap between them.

With the single push of a button, the speed of the event has automatically been modified so that the event fills the gap.

K2 Summit A/V M/E Control

With the K2 Summit server, you have the option of using the internal M/E for dissolves and fades. Unlike an external switcher, events need not be on separate tracks to perform a transition, as K2 Summit has the unique ability to allow transitions between clips on the same track, back-to-back.

No specific Fastrack settings changes are required for this control, and an external switcher and mixer can still be controlled simultaneously.

You can assign back-to-back clips on a K2 Summit track (see example below). The K2 Summit M/E performs center-cut dissolves. This means that you can set handles on the end of the from clip and the head of the to clip.

Note that in the events shown above that the transition icons are at the end of the events rather than at the beginning. This is because the K2 Summit M/E effect is associated with the end of the selected event; that is, the transition command is placed on the from event rather than the to event. This is a K2 Summit requirement. Transition icons at the beginning of the event still reflect the transitions of any external mixer and switcher.


Fastrack K2 Summit M/E Dialog is shown below:
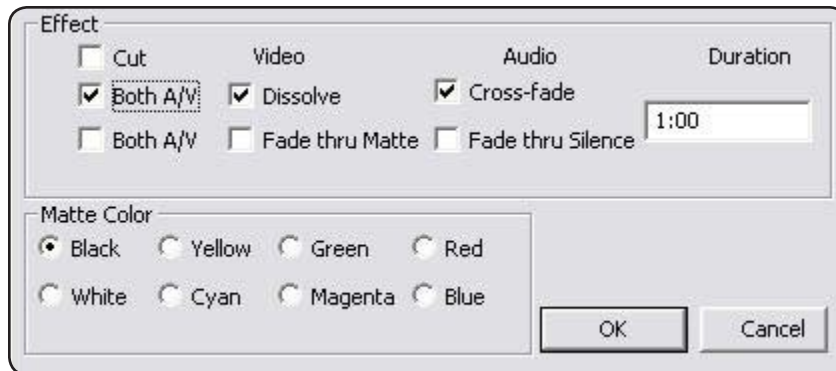
The following transition types are supported by the internal K2 Summit M/E:
• Transition between two K2 clips directly (dissolve clip-to-clip)

• Transition through a matte background (dissolve clip to background to clip)

• Transition through black (dissolve clip to black to clip)

• Fade from black (fade from black to clip)

• Fade to black (fade from clip to black)

The K2 Summit M/E works between clips on the same track. Transitions between clips on separate tracks would be performed by an external switcher. *Note that the two K2 Summit transition engines can be used simultaneously!*

K2 Summit A/V M/E Control (cont.)

If you are using an external video switcher, Fastrack provides for superb control over dissolves, wipes, keys, and switcher memories on most standard analog and digital SD/HD video switchers. The details of an effect are usually set in a switcher dialog (see below, left), but the transition time and type may also be defined directly through keystrokes or a shortcut key.
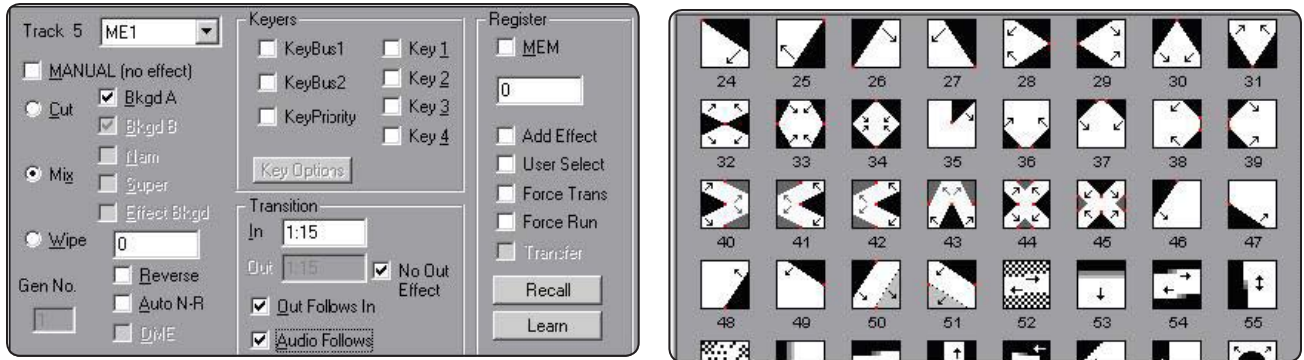
When performing a wipe, depending on the switcher you have assigned, a Wipe & DVE dialog will appear to allow you to directly select the effect you desire (see above, right).
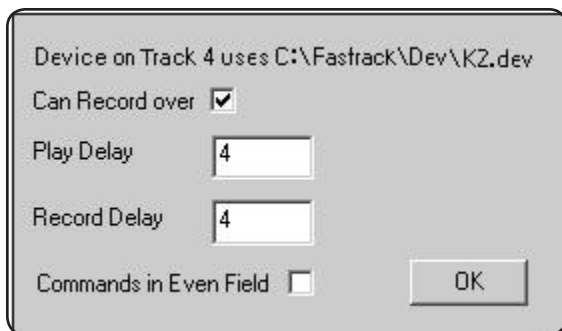
The K2 play and record timing can be adjusted on a track-by-track (channel-by-channel) basis. These settings are deterministic, assuring that all edits and playouts are frame accurate.

Auto cache allows you auto-ingest a selected section of a videotape or server clip to the K2 as a separate entity while maintaining the timecode integrity of the original material. Additional head and tail "handles" can also be added.
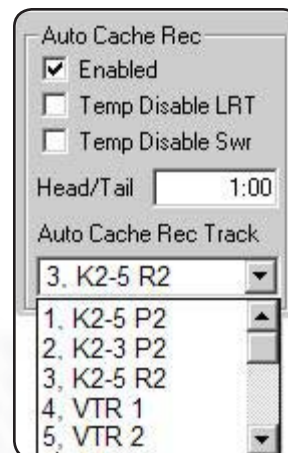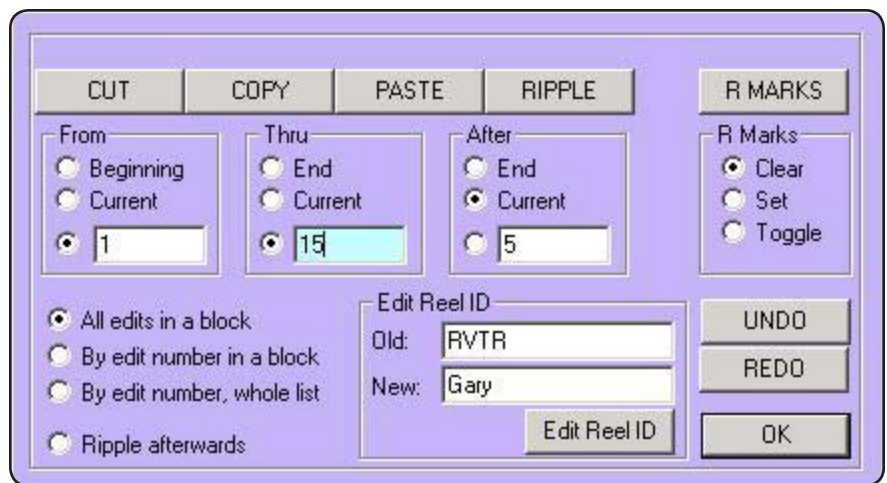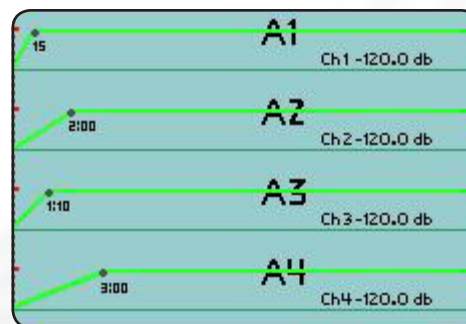
K2 Summit A/V M/E Control (cont.)

Unlimited macros can be programmed, stored, recalled, modified, and run directly from the Fastrack GUI, even during an edit or playout.
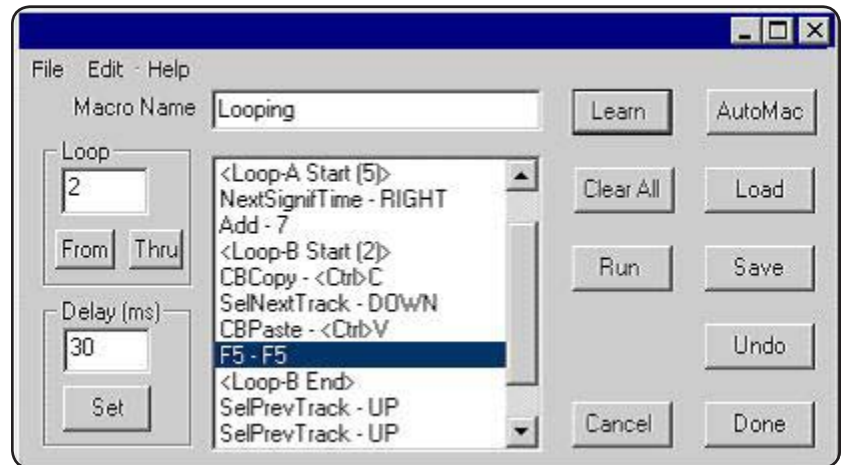
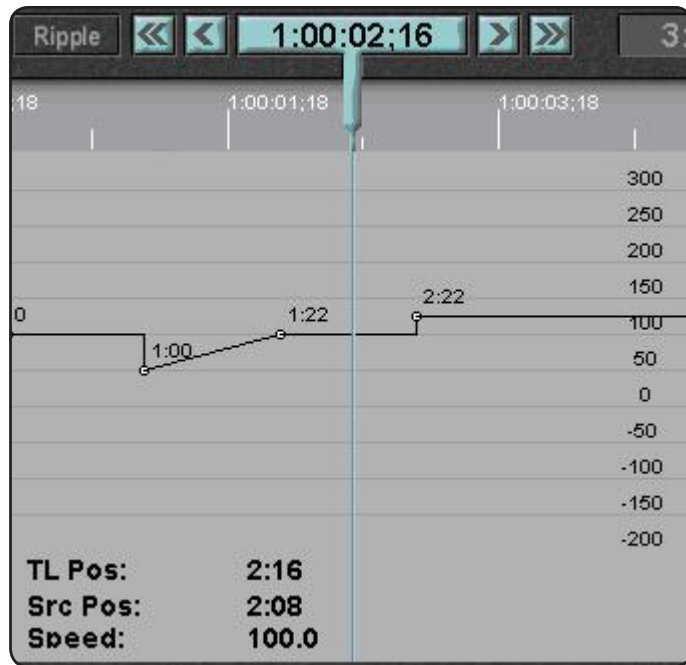The user has complete control over modifications to the EDLs.

Individual audio transition rates for each audio channel (mixer dependent).

K2 Summit A/V M/E Control (cont.)

Graphic control of vari-speed with frame-by-frame calculated ramping.

As well as real-time, keyframed, audio level changes, using the Fastrack Jog Panel or manually mixing while Fastrack learns the fader moves of the mixer console (mixer dependent).
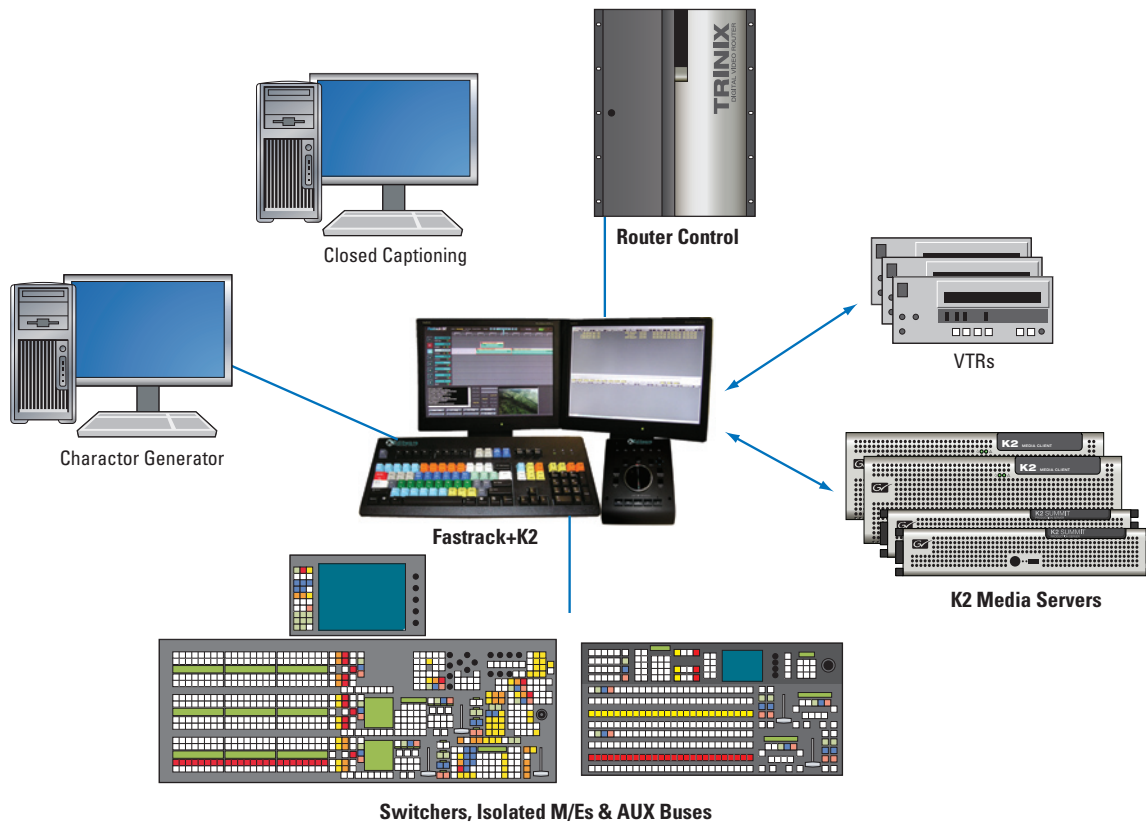
Standard audio mixer protocols include Yamaha serial RS-422 and USB MIDI-Host drivers that allow for two-way communication from and to the mixer. Also available are the Renegade Labs and Graham-Patten D/ESAM4 and ESAM2 protocols.

Standard video switcher protocols include all Grass Valley switchers, as well as Echolab, Evertz, For-A, Ross Video, Snell, Sony (DVS/BVS/DFS), and others.

Protocols for source control of VDCP controlled servers include those from 360 Systems, Abekas, Doremi, EVS, GeeVS, Omneon, Profile (PDR/XP,) SeaChange, Sony (MAV), and Toshiba.

New device drivers are constantly under development by Editware.

K2 Summit A/V M/E Control (cont.)

Closed Captioning

Router Control

TRINIX

VTRs

Charactor Generator

Fastrack+K2

K2 Media Servers

Switchers, Isolated M/Es & AUX Buses

Frequently Asked Questions

Q: How does the Fastrack+K2 application deal with closed captioning?

A: Fastrack+K2has a "shortcut" setting that either enables or disables closed caption data for any or all edits.

Q: How many K2 channels are required for the Fastrack+K2 application?

A: Two are required as a minimum. One encoder channel to record the edit and one decoder channel to playback the edited program during play, preview, and pre-read.

Q: What types of transitions are available on the K2 Summit internal M/E?

A: At this time, only dissolves and fades. What's impressive is that you only need a single playback channel of the K2 Summit to do a transition between clips. They include:
- Transition between two K2 clips directly (dissolve clip-to-clip)

- Transition through a matte background (dissolve clip, background, clip)
- Transition through black (dissolve clip, black, clip)
- Fade from black (fade black, clip)
- Fade to black (fade clip, black)

Q: The K2 Summit has multiple inputs per channel. How does Fastrack+K2 take advantage of this feature?

A: The K2 Summit records each input of a single channel as a "tied pair." But on Fastrack+K2, you can load each half of the pair onto individual channels and split them as you wish.

For additional information on the Fastrack+K2 application from Editware, contact your Grass Valley or Editware dealer, or Bob Lefcovich at +1 (530) 477 4300 or bobl@editware.com.

Also visit our websites at www.editware.com and Grass Valley at www.grassvalley.com.

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Local and regional sales contacts can be found by visiting www.grassvalley.com/sales

SUPPORT

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