



Introduction

K2 Dyno is winning directly against the competition — today!

With the release of K2 Dyno 1.6 and K2 Summit/K2 Solo with ChannelFlex, the replay system from Grass Valley, a Belden Brand, can go head-to-head with the competition for most customer opportunities and can beat the competition based on both price and performance.

There is also a larger market into which K2 Dyno can be sold. As most customers know what our leading competitors can do, they will ask questions about K2 Dyno based on that pool of knowledge.

The following information will provide some comparisons to show why K2 Dyno is the best solution.

System Implementation Considerations

There is a profound shift occurring in live production as a whole. This shift is away from tape-based operations and to file-based ones. This plays directly to the strengths of the K2 product line. With K2, Grass Valley has been at the forefront of this transition in other segments such as transmission and news. K2 architecture and infrastructure integrate into file-based environments better than that of any media server from any competitor.

File-based integration is a significant weakness for other systems, and live production companies are very frustrated by this. The lack of progress and the need to add more components is not being well received and word is getting around not only about poor integration, but that “you should check out what those folks at Grass Valley are doing.”

A key reason for the ease of integration is that K2 is very open. Proprietary means expensive, limited, hard/expensive to expand and being tied to one supplier for everything. The limitations of this approach will be clear from the information in this document. K2’s adherence to standards and openness is a positive attribute.

Professionals require the integration of a total replay system, not just a box. K2 Dyno represents a solution of replay tools for file-based live production. The requirements for live production are changing and it is no longer sufficient to merely demonstrate what a single button push can do. Like many software applications today (Word, Excel, etc.) *the vast majority of customers use the product for common, repeatable tasks (which is what K2 Dyno was optimized to do)*. With that in mind, the architecture, ease-of-use, basic operation and all the points listed in this document should be considered for a replay system.

Replay is also not just about sports in OB vans. The real change is across the entire replay spectrum. Aging videotape machines are swiftly approaching obsolescence and will need to be replaced. What most professionals are still using are Sony and Panasonic tape machines, not server-based systems. While OB/event activities are significant, there is an even greater potential in studios where Grass Valley will focus increased attention going forward.

K2 DYNO REPLAY SYSTEM COMPETITIVE COMPARISON GUIDE

Topic	K2 Dyno	Others	Notes
System Design	Open	Proprietary	Proprietary = expensive and limited
Platform	General-purpose	Special-purpose	It is not easy to redeploy or integrate across various applications purpose-built systems
Size	2 RU	4-6 RU	Space is critical in a OB van
System Technology	Embedded Windows on CF & real-time OS for video/audio Standard Gigabit Ethernet networking FPGA technology for easy updates	MS-DOS on spinning disks SDTI networking Dedicated hardware – difficult to upgrade	K2 Summit can be upgraded to 1080p support with just a new codec module
Price	Generally much less than the price of others, plus use of off-the-shelf removable storage, standard Gigabit Ethernet, FTP, etc.	Many standard features in K2 Summit are costly options for others	No other manufacturer's system can compare to K2 Solo packages. K2 Dyno systems are less even after aggressive discounting
Ease Of Use	Modern technology with color touchscreen, VGA auxiliary screen, mouse, keyboard	Limited monochrome display, all dedicated buttons for functionality	Other systems have a steep learning curve, and highly panel-focused whereas K2 Dyno functions can be executed on the user-friendly panel, or with keyboard and mouse
Service	Modules easily replaceable from within the rack	Difficult to service	Entire sub-systems must be removed for basic replacement
Compression Formats	DV, DV25, DV50, DVCPRO HD AVC-Intra 50/100	Motion JPEG DNxHD Apple ProRes DV	Proprietary codecs lack flexibility. Implementation of DV from others is not reliable, and there is no AVC-Intra support
Audio	16 channels per channel (64 ch per system)	16 channels per system Manual audio adjustments	K2 Summit/Solo also offers many powerful audio tools and formats
SAN Systems	A SAN can simplify and support systems with many channels and other bandwidth needs	Other systems cannot offer a SAN architecture	K2 SAN support available Q3 2010
Content Management	Manage metadata offline, easy to add, search and import/export metadata	Difficult to add and search metadata, and to share with third-party applications	K2 Summit/Dyno is a true file-based system built to be open and easy to share data
Editor Integration	FCP, EDIUS, Avid file transfers FCP, EDIUS direct edit	Editor integration usually requires additional hardware of software options	K2 Summit can offer true edit-in-place editing including growing files
Networking	Gigabit Ethernet QOS for networked bandwidth management	SDTI legacy No bandwidth management Systems that do have Gigabit Ethernet offer less bandwidth 15-20 MB/s	K2 Summit offers greater file transfer bandwidth (40 MB/s, 30 MB/s) and uses standard FTP/CIFS protocols
File I/O	Easy to interface to third-party systems such as editors, archive and portable storage	All third-party integration involves expensive hardware. Software options...?	K2 Summit/Solo support for industry-standard connectivity, formats and wrappers.
Storage	8 X 600 GB 15K SAS drives SSD option	Older technology, lower capacity drives	K2 Summit/Solo will continue to integrate the latest drive technology
Removable Storage	Inexpensive USB/NAS disk systems to store content in industry-standard formats	Expensive, proprietary options limited to that vendor's systems	K2 Summit/Solo content is easy to share with other applications as standard part of all systems
Agile Playback	Play HD/SD/DV/AVC-Intra files back-to-back in a playlist	No other system offers this flexibility	K2 Summit/Solo makes it easy to change configurations and use other content
Mix Effects	Mix/Effects only take one output channel	Requires two output channels for doing Mix/Effects	More effects types are being considered for K2 Summit/Solo

K2 DYNO REPLAY SYSTEM COMPETITIVE COMPARISON GUIDE

Topic	K2 Dyno	Others	Notes
Multi-Cam	Multipurpose channels for configurations of: 2x2, 3x1, 4x2, 6x1	Single purpose channels	Simple re-configuration with a single AppCenter Elite license with ChannelFlex option
Super Slo-Mo	3X/2X SSM only takes one channel 2 HD SSM per system	SSM takes up more channels and so less capability can be offered per system	2X and 3X support with ChannelFlex K2 Solo-based system can do one channel of HD SSM
Monitoring	Built-in multiviewer Each channel has configurable OSD for VGA and SDI	External monitors only or SDI based multiviewer	Select and position on-screen displays for VGA multiviewer and SDI outputs in AppCenter
3D Operation	3D left-right only takes one channel 3x1 or 2x2 per system	3D takes up more channels so less capability can be offered per system	ChannelFlex feature on K2 Summit and Solo. K2 Solo package can support 2x1 operation

Price

While price is generally not the first thing you should discuss with customers, it is often a gating item to get in the door. K2 Dyno is well known to be much less expensive than other systems so price can be used to easily increase a customer's interest.

Because there has been little competition in the market, the most well-known system charges a premium price for every aspect of its product offering. K2 Dyno has changed that — with economical *K2 Summit and Dyno packages, pricing can easily be less than what others charge*. A key element of success is to make sure the people in the organization who actually sign off on purchases clearly understand this.

Some users will invariably make comparisons to other replay systems. However, another advantage for K2 Summit and K2 Dyno is that it offers something new. There are many more opportunities for OB vans, stadiums, studios, split feeds and sports team support where other systems are either not used at all, or K2 Dyno can be added in a supplemental role. K2 Dyno can satisfy the needs of many more replay and tape operators who have different requirements. K2 Dyno offers its own unique feature set at half the price. *K2 Dyno is the most cost-effective solution for the typical, common tasks performed in file-based live production.*

Platform Approach

Other systems were designed only as a point product to handle one task. While they have evolved to do that task well, they cannot be used easily in other applications. Conversely, the K2 media server was created from the beginning to be a platform that could be made to perform a wide range of tasks. K2 servers can be used as clip player for a production switcher. It can be the backbone for ingest and playout systems. This includes SAN infrastructure, some-

thing which others cannot provide. K2 servers can also provide the means for shared production editing and for news production. Being a true platform also means creating versatile, robust APIs that enable a diverse group of third-party developers to create unique solutions. *Not only have other companies not developed such APIs, they discourage developers from providing extensions to their product.*

System Architecture

K2 Dyno incorporates a number of newer technologies. Other products have not kept up with pertinent technology trends. K2 Summit and K2 Dyno utilize embedded Windows and real-time operating systems, system software on Compact Flash, multiple USB and Gigabit Ethernet connections, the latest Intel processors, RISC processors and the latest FPGA components. *With K2 Dyno users have a clear choice of which architecture will support their future needs, such as 1080p formats.*

Ease of Use

Reliance on outdated interface implementations only appeals to dedicated technicians who have invested extensive time and training to master a product. K2 Dyno provides colored buttons, a Windows UI using colors and a touchscreen on the control panel. The panel can be augmented with a keyboard, a mouse and a separate VGA output of the interface. User data includes text for items like clips rather than just a series of numbers. *The K2 Dyno replay system is purposely designed to appeal to a greater range of users who may not be technicians but who understand the nuances of a particular event and can more easily use their creative abilities to enhance a production.*

Content Management

As customers move more to a file-based workflow, being able to manage material and enhance it for reuse is increasingly important. With K2 Dyno, users can create metadata frameworks offline in advance to tag information such as names and relevant event action types. This metadata can be easily distributed and imported as XML data on a USB drive. Clips can be given text names and text metadata can be added during the event along with ratings and icons. All metadata created can be saved with the associated content and used from session to session or system to system. Content can be aggregated into different bins and sent to removable storage or network destinations. On other systems, the entire function of content management is both weak and cumbersome as they were developed prior to producers' changing needs and have not kept up with the times. For customers needing advanced content management for live production, please refer to K2 Dyno Production Assistant.

Networking

Networking on other systems can be expensive and not IT-friendly. With older architectures, other systems do not offer the QOS-managed, guaranteed-bandwidth networking of the K2 platform. K2 Summit comes standard with four connectors for Gigabit Ethernet with separate networks for control and IP file transfers and higher bandwidth specifications than other systems.

Storage

K2 Summit client as a standalone device uses eight of the latest technology, high-performance 450 and 600 GB 15K SAS drives, striped and mirrored for redundancy. Other systems use low-

er-performance, lower-capacity drives with less redundancy. *K2 Summit and K2 Solo also have the option for solid state drives — others do not.*

All the drives in K2 Summit are individually hot-swappable from the front of the unit unlike systems from other manufacturers, which require taking out the entire disk tray to perform any service or to replace even a single drive.

SAN Systems

K2 Summit can also be used in a true SAN configuration, a capability others cannot provide. A small SAN that can provide not only up to 14 HD record and play channels, but bandwidth for editing in place and bandwidth for simultaneous file transfers, fits in the same rack space as a single unit of other systems.

Full SAN support with K2 Dyno will be available Q3 2010. This can be a solution for customers wanting to shift control of channels to different controllers. Another solution even without a SAN can be K2 Dyno Director.

Removable Storage

Other systems use expensive options to take away material to be used across units. These proprietary implementations only work with their own devices. *K2 Dyno has both USB and Gigabit Ethernet connectivity so that standard, off-the-shelf IT storage devices can be used.*

Compression Formats

Other systems can use non-mainstream codecs. These codec choices make it more difficult to exchange content for use by a range of other systems. *In addition to DV, K2 replay systems support AVC-Intra, both of which are more ubiquitous compression types.*

File Import/Export

Insofar as format support and removable storage may be limited, files from other systems are not easy to use with systems from other vendors. Often extra hardware and software components must be purchased to exchange material. *K2 uses common formats and has standard unwrapping and wrapping of essence as .MXF or .MOV for easy integration with other systems.*

Editor Integration

Editing systems such as Final Cut Pro, EDIUS and Aurora can be configured to directly edit-in-place with growing files on K2 Summit. As the K2 platform provides file wrapping of .MXF and .MOV files, the content can easily be shared with systems such as editors and archives, with no special equipment or processes. Transferring files for editors with other systems usually requires additional software and devices to provide wrapper and transcode services.

Agile Playback

A primary feature of the K2 family is the ability to play back-to-back clips of different resolutions, aspect ratios and compression formats. This is important because even though an event is recorded in a single format, the production may need to include archival material or content from other sources. There may not be time for transcodes or conversions. Other systems do not offer the diversity of conversion capabilities for such things as aspect ratio management on a clip-by-clip basis. *K2 is easily re-configurable on a channel by channel basis using AppCenter.* Other systems must change the entire system from one format to another, and these changes require a reboot of the system.

Mix/Effects

Channel counts on systems are not always what they first appear. *When playing out with effects such as dissolves and fades, two channels are used on other systems.* Using K2 Summit, K2 Dyno can handle these in a single channel on all output channels. For example, a replay on one channel and a playlist on another channel can both include effects.

Channel Count

Because many existing systems are 4-in and 2-out, users have been looking for the same numbers whether they actually need them or not. The ChannelFlex software option increases the input count to configurations such as 4-in and 2-out when used with K2 Dyno. *This option also provides a 6-in and 1-out configuration with effects, something other systems cannot support.*

Super Slow-Motion

The same ChannelFlex software option upgrade for increased input channel also provides 2X and 3X super slow-motion. One K2 Dyno system with K2 Summit can provide two channels of super

slow-motion in HD. *Other systems can only support only a single channel of HD super slow-motion.* K2 Solo-based systems can provide a single HD super slow-motion channel. The K2 Dyno T-Bar is programmable for range and position of slow-motion, super slow-motion, fast motion and reverse motion.

Form Factor

Depending on the model, other systems are 4, 5, or 6 RU in size. As many mobile operators share resources, it is a challenge to move these systems from one OB van to another. They also take up more space where it is at a premium in many situations. *K2 Summit and K2 Solo are an economical 2 RU each.* K2 Summit has easy serviceability with thumbscrews and slide in and out of the major components. Other systems require a great deal of disassembling to replace failed parts out of the rack.

Audio

The K2 replay system can support up to 16 audio tracks per video channel. Other systems typically support 16 audio tracks across all channels. Some customers have been forced to purchase an additional system just to get enough audio support. K2 has additional audio tools not found on other systems including delays for Dolby, audio click filter and audio gain adjustment that is savable with the clip.

Monitoring

K2 Summit and K2 Solo provide a nicely integrated multiviewer while others may have an SDI-based multiviewer if at all. With K2 Dyno, no SDI monitors are required, but through AppCenter, a variety of on-screen data can be selected and positioned for the multiviewer VGA as well as the secondary SDI video output.

3D Operation

Using K2 Summit or K2 Solo, K2 Dyno can combine left-right data in a single channel. A K2 Summit-based system can operate with 3x1 or 2x2 configurations. This operation requires both of the outputs on a playout channel so there can be no SDI super or effects in this mode. A K2 Solo-based system can operate with a 2x1 configuration. Other systems can perform synchronized 3D operations, however they require the use of two channels so that a high-end system from another provider has no more capability than a low-cost K2 Solo-based system.