

# K2 Dyno

## REPLAY SYSTEM

The K2 Dyno Replay System is a comprehensive set of live production replay tools that are seamlessly integrated for use in file-based production environments. With its operational simplicity and IT-friendly implementation, the K2 Dyno Replay System dramatically expands the possibilities for live production. With hundreds of systems in use, the K2 Dyno Replay System has been established as a leading production solution for operators covering all types of live events.

The Grass Valley™ K2 Dyno™ Replay System is the first replay system to be optimized for complete file-based production with networking, file wrapping, file transfer bandwidth, and metadata integration as standard features. Grass Valley technology integration enables production tasks to be done in parallel rather than sequentially, for greater efficiencies. The use of modern technologies also provides easy end-to-end integration with other systems such as editing and archiving.

### Streamlined Ease-of-Use and Operations

K2 Dyno Replay System is designed to be an easy-to-use instant replay and highlight generation system for HD and SD productions. It has been developed with extensive operator input. While the K2 Dyno Replay System is superb for

sports and other traditional live events, it is also being used in studios, stadiums, and other applications as a direct replacement for videotape operations. K2 Dyno enables creative professionals to easily maximize their productivity without requiring extensive training.

Speed and ease of operation are critical for a live event. The full-featured and easy-to-learn ergonomic K2 Dyno Replay Controller is tuned for the on-air operator to perform instant replays, input switching, fast playlist creation, shot box operation, and previewing. Operator errors are minimized with a workspace that includes a full-color touchscreen interface, multi-color buttons, thumbnail icons for clips, as well as channel status displays in a VGA multiviewer and on SDI monitor outputs. Expanded operation is enabled by adding a standard VGA screen to the K2 Dyno Controller.

## FEATURING CHANNELFLEX™



This “power screen” gives enhanced and dynamic control over operations such as playlist creation, and content management before, during, and after events.

All these tools provide the operator with easy ways to quickly mark key actions, and generate on-the fly highlights. Extensive content management functions such as search, browse, and move make it easy to play out selected clips directly, or create sophisticated playlist packages. Playlists can include effects which will each play out on either of the two layout channels.

### The Power of the K2 Infrastructure

K2 is a flexible and robust platform for ingest, editing, clip store, replay, and play out. Systems can easily scale up for capacity, channels, and guaranteed bandwidth.

## KEY FEATURES

- Affordable HD/SD replay system for file-based live production
- Integrated with the K2 Summit™ / K2 Solo™ media server platforms:
  - Standard networking and storage connectivity for import/export
  - Built-in VGA multiviewer and SDI video monitoring
  - Up to 6 or 7 channels in a 2 RU K2 Summit server
- Intuitive, easy-to-use controller:
  - Color touchscreen display and multi-color buttons
  - Instant replay with slow-motion and super slow-motion
  - Precision control jog/shuttle knob
- Highlight and marks creation
- Integrated metadata through all production phases
- Playlists with mix effect transitions per playout channel
- Fast, real-time editing of playlists
- Build to music or voiceovers using auxiliary audio tracks
- Playback speed, effects, and pause per clip
- Audio level controls for clips and record/play channels
- Simple editor integration with edit-in-place or file transfer of content
- K2 Dyno Replay System content management provided by K2 Dyno Production Assistant (PA)
- Easy to order K2 Dyno Replay System packages are available
- Multiple K2 Dyno Replay Controllers can be used with Shared Area Network configurations

## PRODUCT DATA SHEET

Formats and resolutions can all be changed on a channel-by-channel basis without a system reboot. Standard industry-wide formats such as DVCPRO, AVC-Intra, and XDCAM are supported. All formats and resolutions can be played back-to-back on a single channel with automatic up/down/cross and aspect ratio conversion. A standard system supports up to four channels in any combination of recording or playback. The ChannelFlex™ software option provides additional flexibility to be used in configurations such as 4 record/2 play, or 6 record/1 play. All input angles are immediately accessible for use in replay and highlight creation. With ChannelFlex, input or output video streams can also be synchronized for left-eye/right-eye 3D production—all in a single channel.

### File-based Integration

In file-based production, being able to manage material and enhance it for re-use is increasingly important. With the K2 Dyno Replay System, operators can create metadata layouts off-line in advance of an event to tag information such as names and 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 is saved along with the clips and used from session to session or system to system. Content can be searched for and aggregated into different bins to be sent to removable storage or network destinations.

Some productions require that content be shared across multiple replay systems. For such applications, Grass Valley can offer K2 Dyno Production Assistant, which is a content management toolset to manage the records, metadata, highlights, and playlists for multiple K2 Dyno Replay Systems.

### Editing System Integration

Editing systems can be easily integrated with the K2 Dyno Replay System. Editors can be either network connected and content can be moved via simple file transfers, or an editor can be directly connected for editing in place. In this way, live feeds can be edited while they are still being recorded, and packages quickly made ready for play out. Transferred files can be wrapped with MXF or MOV, so the content can easily be shared with editors, archives, and other storage systems with no special equipment or processes.

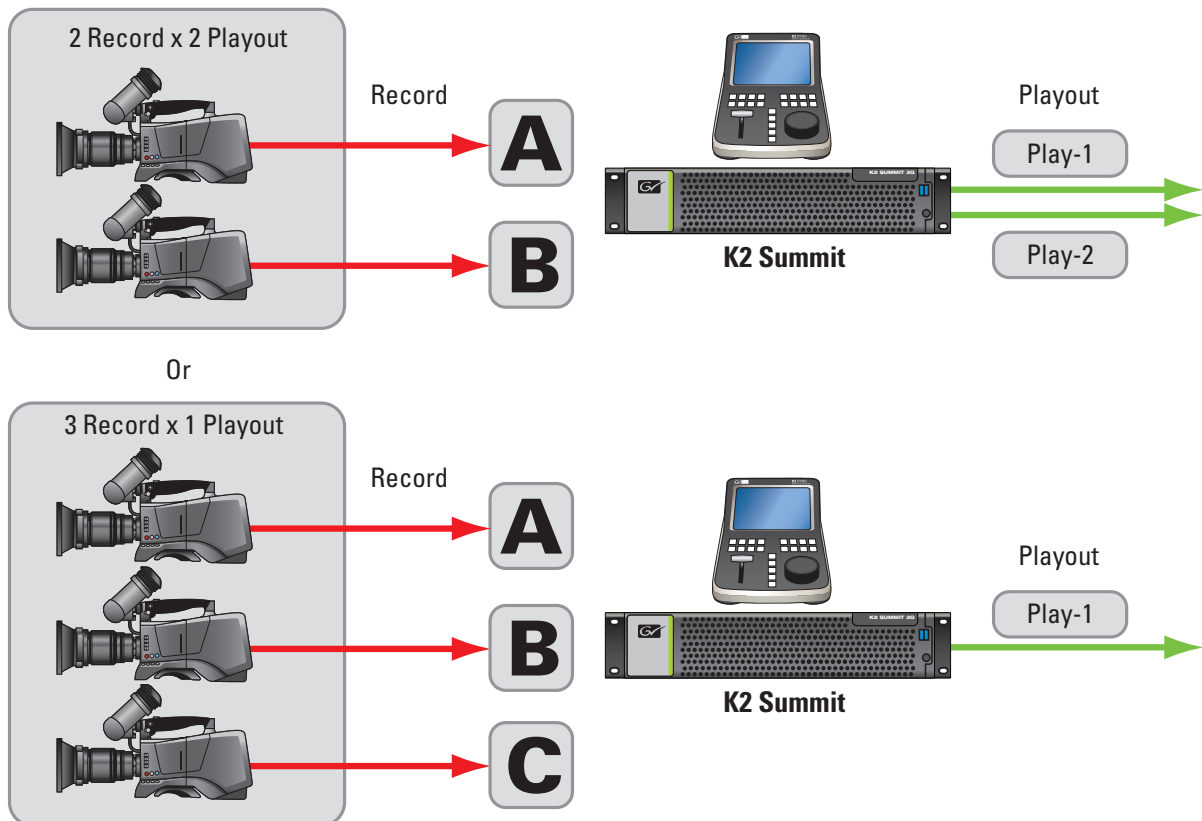
### K2 Server Foundation

The K2 Dyno Replay System is tightly integrated with the K2 Summit and K2 Solo server platforms. These are proven solutions in compact 2 RU form factors also used for ingest, transmission, live production clip playout, and news operations. It uses a modern architecture uniquely suited to fulfill the needs of file-based production.

With K2 Summit and K2 Solo as a foundation, an extensive feature set is available that greatly enhances the K2 Dyno Replay System. A core aspect of system connectivity is provided by four Gigabit Ethernet ports. This high-speed connectivity can be used for streaming or file transfers of recording channels and clips to be shared not only by other replay systems, but by connected storage devices.

The K2 Dyno Replay System is optimized for a variety of live event productions. Its core offering consists of instant replay and high-quality slow-motion. With the ChannelFlex software option, 3X and 2X super slow-motion HD cameras (such as the Grass Valley LDK 8300 Super SloMo HD camera) can be used as inputs. Single systems can support one or two HD channels of super slow-motion.

## STANDARD CONFIGURATIONS FOR K2 DYNO WITH K2 SUMMIT



K2 Summit and K2 Solo not only integrate the latest high-performance storage, but removable storage solutions can be as simple as USB drives and off-the-shelf NAS systems mapped as network drives.

K2 Summit, K2 Solo, and the K2 Dyno Replay Controller all operate with an embedded operating system for high reliability. There is an integrated multiviewer for efficient monitoring of all channels.

The K2 Dyno Replay Controller can be used with K2 Solo for systems with smaller channel counts. All the same capabilities and options are available but with fewer channels and an even smaller form factor, which also provides outstanding HD affordability.

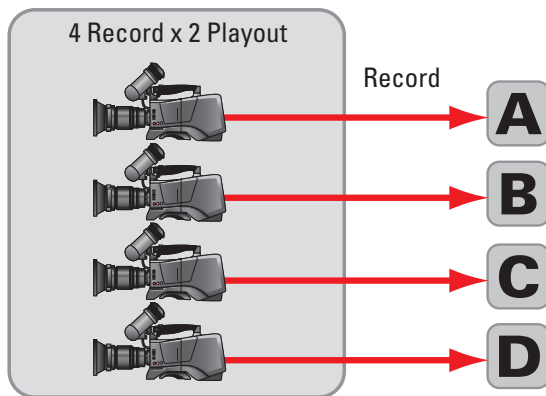
The ChannelFlex option for K2 Summit and K2 Solo brings expanded functionality to the K2 Dyno Replay System. This is a software option that is enabled through a version of the K2 control application named AppCenter Elite. All capabilities are enabled with a single software license. All the necessary hardware connections and controls are already in place.

Further K2 Dyno Replay System configurations can be made with K2 Dyno Replay Controllers on a K2 SAN. This provides operators with a true shared environment for collaboration of highlight bins, playlists, and record trains along with channel control.

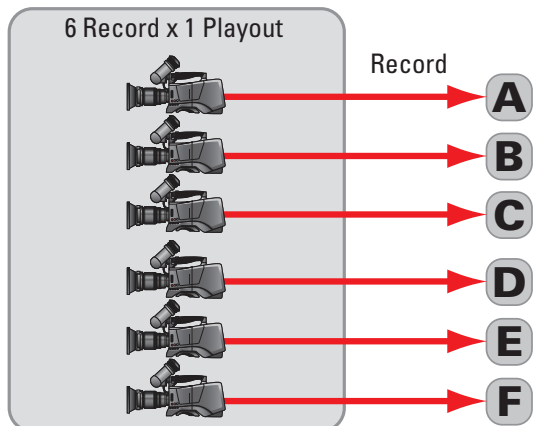
There are three primary additional operational modes that ChannelFlex provides:

- Operation with increased I/O counts:
  - 4 record and 2 playout configuration with K2 Summit
  - 6 record and 1 playout configuration with K2 Summit
  - 2 record and 1 playout configuration with K2 Solo
- Operation with super slow-motion sources:
  - 3X and 2X super slow-motion inputs
  - 1 super slow-motion input, with 1 standard input, and 2 outputs with K2 Summit
  - 2 super slow-motion inputs and 2 outputs with K2 Summit
  - 1 super slow-motion input, and 1 output with K2 Solo
- Operation for 3D:
  - Synchronized left eye/right eye in a single channel
  - 3 3D input and 1 3D output with K2 Summit
  - 2 3D input and 2 3D output with K2 Summit
  - 1 3D input and 1 3D output with K2 Solo

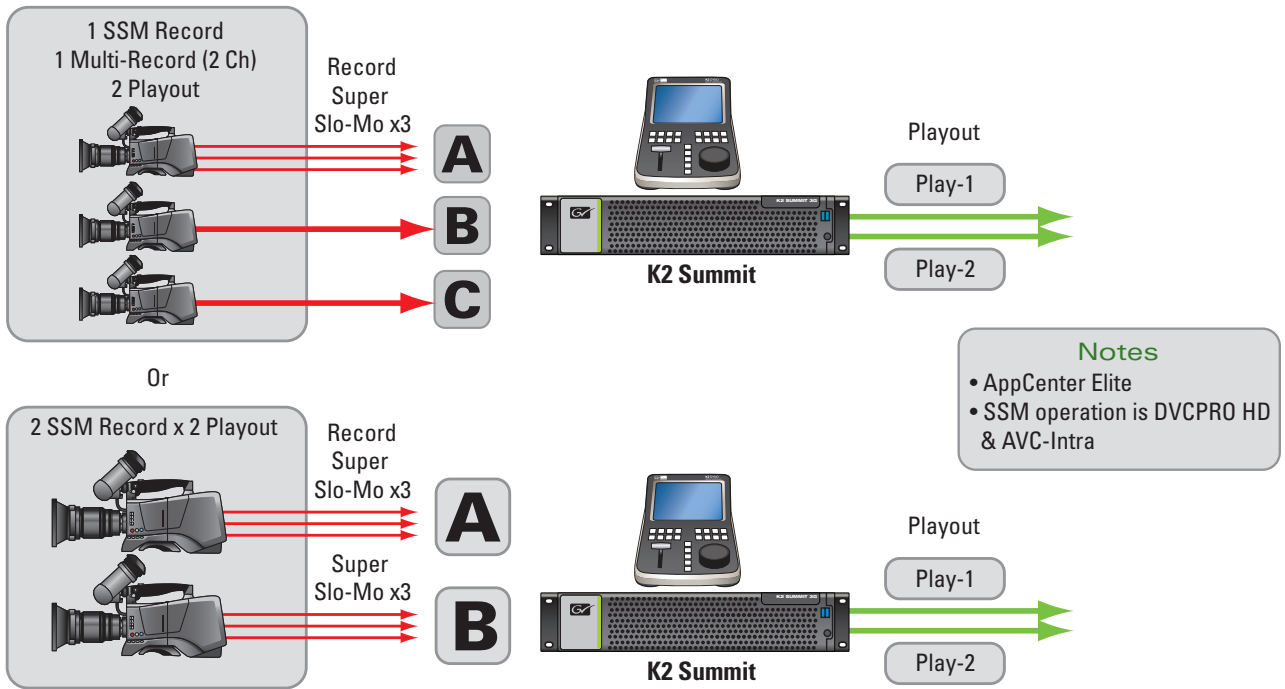
**K2 DYNO MULTI-INPUT CONFIGURATIONS WITH CHANNELFLEX AND K2 SUMMIT**



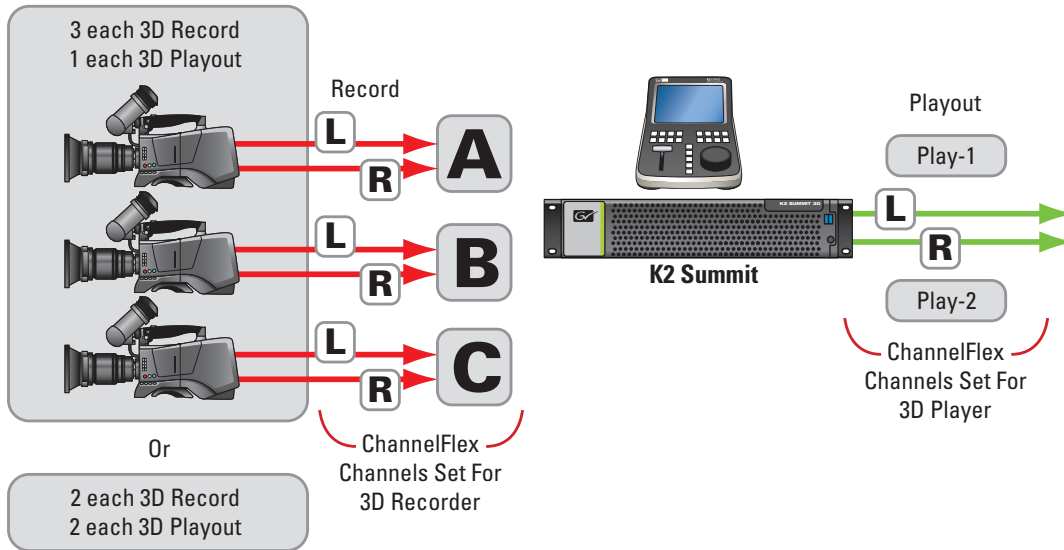
Or



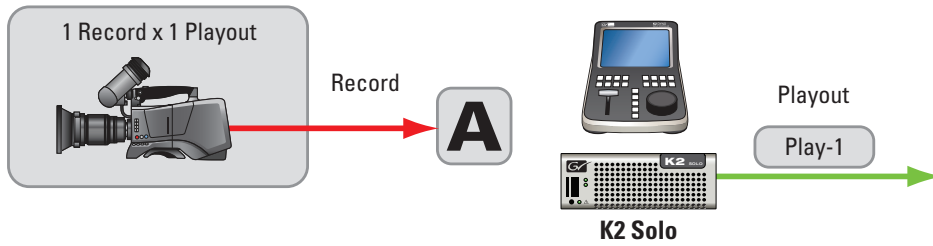
**SUPER SLOW-MOTION K2 DYNO CONFIGURATIONS WITH CHANNELFLEX AND K2 SUMMIT**



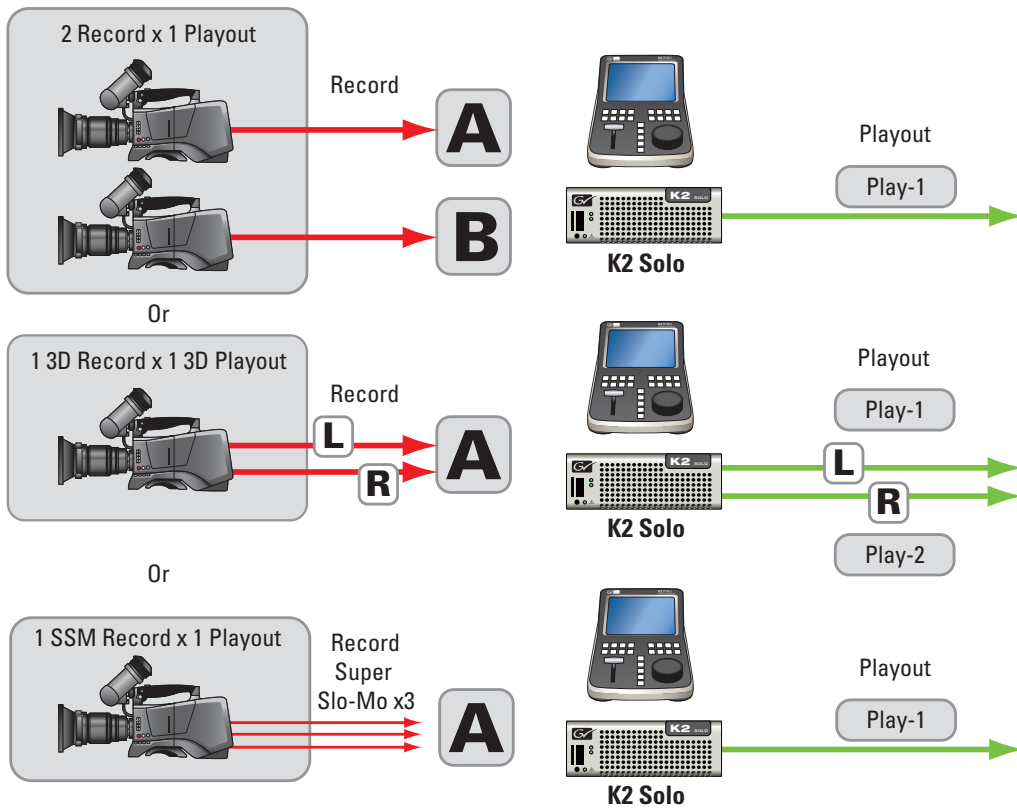
**3D K2 DYNO CONFIGURATIONS WITH CHANNELFLEX AND K2 SUMMIT**



**STANDARD CONFIGURATIONS FOR K2 DYNO WITH K2 SOLO**



**ADDITIONAL K2 DYNO CONFIGURATIONS WITH CHANNELFLEX AND K2 SOLO**



## K2 DYNO CONTROLLER SPECIFICATIONS

### General

**Power:**

- AC universal power supply: 100-130 VAC, 200-240 VAC, 50 or 60 Hz
- Typical power consumption: 100 Watts

**Dimensions:** length = 12.6 in. (316 mm); width = 8.25 in. (210 mm); height = 7.4 in. (187 mm) (All approx.)

**Weight:** 5 kg (11 lbs.)

**Temperature range:**

- Operating: 0°C to 40°C ( 32°F to 104°F)
- Storage: -20°C to 60°C (-4°F to 140°F)

**Humidity range:** 10% to 90% (relative humidity)

### Application

**Highlight clips:** highlight clips are easily created from marked points

**Playlists:** highlight clips placed into playlist can be dynamically moved while playing

**Playlists with transitions, mixed effects:** M/E transitions are dissolves or fade to matte between highlight clips. Transitions are executed using only one channel of layout

**Metadata and keywords:** metadata and keywords can be input with each highlight or marked clip. This information can be both text and iconic and is searchable

### Front Panel

**Buttons:** 21 tactile, tri-color – 38 functions with shift

**Slow motion lever:** Grass Valley design, 0-100% variable speed

**Jog, control knob:** 60 mm, custom design, rubber encased with tactile relief, fast jog mode up to 50X

**LCD touch panel:** 178 mm (7 in.) screen, 800x480 resolution, resistive touch surface

**USB 2.0 connectors:** 2 each, type A connectors (under front molding)

### Rear Panel

**Power button:** momentary/standby type with protective cover

**Network:** 2 each, Gigabit Ethernet ports – system control with K2 Summit production client

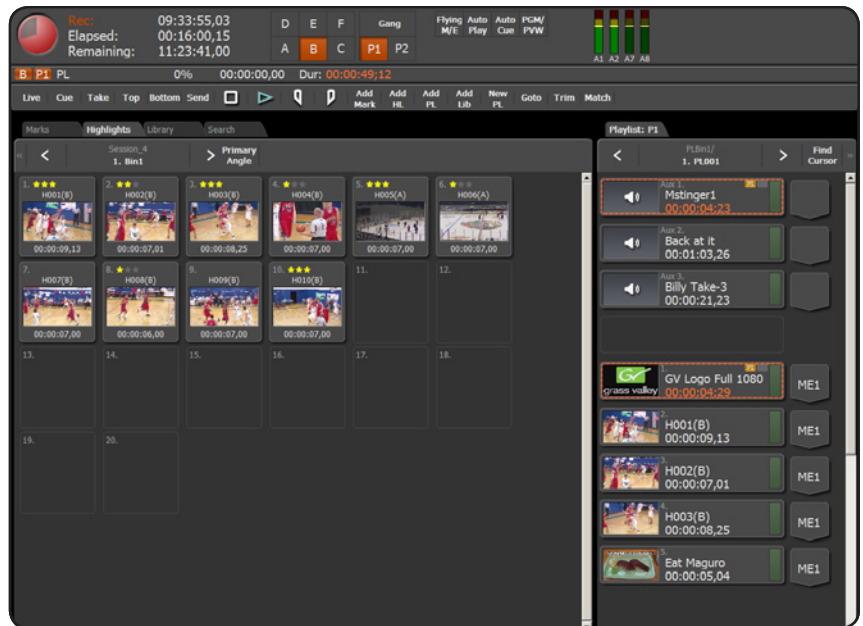
**USB 2.0 connectors:** 4 each, type A connectors

**VGA output:** 15-pin (D-conn) – application status monitor

**CompactFlash slot:** standard CF type – operating system



Sample K2 Dyno Replay Controller touchscreen



Sample K2 Dyno Replay Controller VGA output screen – the “power screen”

**K2 DYNO CONTROLLER SPECIFICATIONS (CONT.)**

**K2 Dyno Systems using K2 Summit 3G Clients with Internal Storage (in hours\*)**

Format Data Drives	DCVPRO	DVCPRO 50	DVCPRO HD	IMX 30	XDCAM HD	XDCAM HD
600 GB RAID-1 (6/6)	240	120	60	207	183	132
600 GB RAID-0 (12/0)	480	240	120	414	366	264

RAID-1 = 6 data drives and 6 parity drives. RAID-0 = 12 data drives

\*Time for video with four 16-bit audio channels, no ancillary data. Times are estimated and can vary up to ±10%.

**ORDERING INFORMATION**

**K2-DYNO-ELITE-PK3**

K2 Dyno Replay Elite Package version 3. Includes K2 Summit 3G 4-channel HD/SD server with DV, MPEG-2, and AVC-Intra codecs, 12 x 600 GB drives in a RAID-10 configuration for storage of up to 120 hours of AVC-Intra 50 content, K2 AppCenter Elite with ChannelFlex, and K2 Dyno Replay Controller with application software. It also includes hardware and software to permit ChannelFlex operations with MPEG-2 formats such as XDCAM and XDCAM HD. Supports replay configurations of up to 6 camera iso-records and 1 replay out or 4 camera iso-records and 2 replay outputs (program and preview or 2 independent programs). Also supports up to 2-3X speed camera iso-records or 3-2X speed camera iso-records (DV and AVCI-Intra codecs only).

**K2-DYNO-ELITE-PK2**

K2 Dyno Replay Elite Package version 2. Includes K2 Summit 3G 4-channel HD/SD server with DV, MPEG-2, and AVC-Intra codecs, 12 x 600 GB drives in a RAID-10 configuration for storage of up to 120 hours of AVC-Intra 50 content, K2 AppCenter Elite with ChannelFlex, and K2 Dyno Replay Controller with application software. Supports replay configurations of up to 6 camera iso-records and 1 replay out or 4 camera iso-records and 2 replay outputs (program and preview or 2 independent programs). Also supports up to 2 -3X speed camera iso-records or 3-2X speed camera iso-records. (DV and AVCI-Intra codecs only).

**K2-DYNO-PRO-PK2**

K2 Dyno Replay Pro Package version 2. Includes K2 Summit 3G 4-channel HD/SD server with DV, AVC-Intra, and MPEG-2 codecs, 12 x 600 GB drives in a RAID-10 configuration for storage of up to 120 hours of AVC-Intra 50 content, K2 AppCenter Pro, and K2 Dyno Replay Controller with application software. Supports replay configurations up to 3 camera iso-records and 1 replay out or 2 camera iso-records and 2 replay outputs (program and preview or 2 independent programs).

**K2-DYNO-EXPRESS-PK**

K2 Dyno Replay Express Package. Includes K2 Solo 2-channel HD/SD media server with DV and AVC-Intra codecs, internal storage for up to 20 hours of AVC-Intra 50 content, K2 AppCenter Elite with ChannelFlex, and K2 Dyno Replay Controller with application software. Supports replay configurations up to 2 record and 1 replay output. Also supports one 3X/2X-speed camera record and playback. (DV codec only)

**K2-DYNO**

K2 Dyno Replay Controller for use with K2 Summit/K2 Solo media server--includes application software.



For more information about the K2 Dyno Replay System, including videos, brochures, case studies, and application notes, please visit our website at [www.grassvalley.com/k2\\_dyno](http://www.grassvalley.com/k2_dyno).

**K2 DYNO**  
REPLAY SYSTEM

Leadership powered by innovation.™

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grass valley

**ORF**

Moving to tapeless, file-based workflows with K2 servers for all of its in-house productions.

**CUSTOMER:**  
ORF (Österreichischer Rundfunk, the Austrian national public broadcaster)

**APPLICATION:**  
ORF produces a lot of in-house content, with seven large production studios in Vienna as well as its ten regional broadcast studio facilities. It has been a continuing project to streamline production costs through the use of new technologies, which includes moving as quickly as possible to tapeless production and file-based workflows for its entire operation.

**EQUIPMENT:**  
Grass Valley™ K2 Summit™ Production Clients  
Grass Valley K2 Dyno™ Replay System

Werner Hohl – Operator, Media Server

grass valley

**APPLICATION NOTE**

**TAPELESS**

Initial K2 installation by that spring had redundant K2 systems up and to 2008 system was in. ORF has gradually moved to high definition. K2 SAN systems are backbone for all and a large number are being used daily magazines and show

The K2 Summit is designed to be flexible in operation, with open interfaces and Grass Valley's AppCenter SDK toolkit, enabling users like ORF to develop their own control systems. It can also be driven by other hardware, and a dedicated controller, the K2 Dyno Replay Controller, is also available. The combined system is known as the K2 Dyno Replay System.

One of the world's first K2 Dyno Replay Systems was used in early 2009 for the full season of the Austrian version of the ballroom dancing competition show, Dancing with the Stars. The K2 Dyno Replay System was used to build shot lists and replay clips of the dancers' performances straight to air, without the need for an editor.

"With Grass Valley's AppCenterPro and standard interface protocols like BVW and VDCP, we are able to automate much of our recordings and playouts."

Wolfgang Gärtner,  
Broadcast Planning and Design Engineer,  
ORF

**Dorna Sports**

Dorna Sports' Use of the Grass Valley™ K2 Dyno™ Replay System and K2 Dyno Production Assistant (PA) for Coverage of the FIM MotoGP World Championship

Matthew Allard  
September 2010

**DORNA**

[www.grassvalley.com](http://www.grassvalley.com)

**GLOBAL SERVICES**



Grass Valley Global Services specializes in the defining of, deployment of, and support of today's dynamic file-based workflows, based on Grass Valley and third-party solutions. With Grass Valley Global Services, you can achieve your operational goals in the most efficient and cost-effective way possible with a partner you can trust.

[www.grassvalley.com/support](http://www.grassvalley.com/support)

**Define:** We help you to define your business and technology requirements and then design solutions to meet them.

**Deploy:** Our professional service organization, backed up with proven project management methodologies, can take you from design through deployment, commissioning, and training.

**Support:** We offer a complete Support Agreement portfolio to keep your systems running and help plan for your long-term maintenance needs.

Join the Conversation at **GrassValleyLive** on Facebook, Twitter, and YouTube.

