



LDX/K2 Dyno Universe

LDX 86^N/LDX 86 Universe System Camera

Universal format support system camera with switchable 1X/3X/6X HD, 1X/3X 3G and 1X 4K

K2 Dyno Universe Replay System

HD, 6X and 4K switchable replay systems with pan & zoom



DynoZoom allows replay controllers to pan and zoom into a section of the picture, using HD, 6X, 3X or 4K content



At NAB 2015, Grass Valley, a Belden Brand, launched the LDX 86 Universe “universal format” system camera — capable of 1X 4K/3G/HD, 3X 3G/HD and 6X HD — and two K2 Dyno Universe replay system packages; one optimized for 6X super slow-motion (SSM) but fully 4K-capable and one optimized for 4K but fully 6X SMM capable.



This was followed up at NAB 2016 with the LDX 86^N Series, including the LDX 86^N Universe which provides the same “universal format” flexibility as the LDX 86 Universe, but with both native 4K (3840x2160) and native HD (1920x1080) image capture.

With the combined LDX/K2 Dyno Universe, all 4K and all 6X workflows are now possible, with no reduction in the number of cameras and no requirement for more operators (in comparison to HD). A simple menu change switches both K2 Dyno Universe replay systems between 6X SSM and 4K operation. These systems also offer shared sessions with 4K/6X replay to offer multiple angles to operators.



Business and Workflow Benefits of the LDX/K2 Dyno Universe Combination

4K and 6X HD SSM is as easy as HD

- Grass Valley is making 6X or 4K much more accessible for mainstream live production. Now you no longer need dedicated capture and replay systems for each of these formats.
- The LDX 86^N/LDX 86 Universe and K2 Dyno Universe are the first capture and replay systems to offer a selection between higher resolution (4K) or higher frame rates (6X HD). This means they're ready to handle any type of live event exceptionally well, whatever the format.
- With the LDX 86^N/LDX 86 Universe, you can make every camera HD, 4K or 6X (completely switchable). With K2 Dyno Universe, every replay position can support HD, 4K or 6X recording, with the same channel counts and number of operator positions used in your current HD production
- K2 Dyno Universe replay systems are highly affordable and practical, and require half the rack space and operator count compared with competitive systems, even with double the number of channels.

Produce more engaging and compelling content

- Producers can get much closer to sporting and entertainment action, using Grass Valley's LDX 86^N/LDX 86 Universe camera and K2 Dyno Universe replay system, which offer 6X replay plus pan & zoom effects.
- By combining the incredible sharpness of the 6X acquisition and K2 Dyno Universe's AnySpeed totally variable speed replay, producers can reveal what the human eye cannot see at very low speed playback.
- With AnySpeed, you can quickly and smoothly move to the action replay, and then slow down to highlight the details, while avoiding excessively long replay times.
- To get even closer to the action, DynoZoom allows replay controllers to pan and zoom into a portion of the picture where the story is unfolding — especially useful when capturing in 4K.
- Better action shots are also driven by K2 Dyno Universe's ability to offer each operator four to six video angles to choose from, instead of just one or two angles with traditional replay systems.

Incredible 6X or 4K picture quality, even in difficult real world lighting conditions

- The LDX 86^N/LDX 86 Universe camera delivers incredible 6X HD or 4K picture quality, even in difficult real world lighting conditions, all while using familiar HD lenses and workflows. The camera's high sensitivity is essential with 4K acquisition to enable the lens iris to be used in its optimum range.
- The LDX 86^N/LDX 86 Universe camera provides exceptional picture quality due to its unique Xensium FT imagers, which deliver 200% of the dynamic range of CCDs, while also offering global shutter behavior.
- Even 6X acquisition can be performed under artificial lighting with outstanding results due to AnyLightXtreme flicker reduction processing.



DynoZoom allows replay controllers to pan and zoom into a section of the picture, using HD, 6X, 3X or 4K content

LDX 86 Universe

Capture

Until now, producers seeking highly engaging sports and live event action have had to choose between cameras with a higher resolution, like 4K, or cameras with a higher frame rate, such as 3X or 6X. The specialist nature of these cameras has restricted creativity, added costs and held back the wider adoption of both 6X SSM and 4K. However, this situation has changed with the LDX 86^N/LDX 86 Universe. With either Universe camera, you can capture 6X HD or single speed 4K with just one camera, making 6X and 4K production more accessible than ever.

When used in combination with the new K2 Dyno Universe 6X/4K switchable replay systems, the combination delivers unique, more powerful acquisition and replay capabilities than any competitive system available.

The LDX 86^N Series is the latest addition to the LDX Series, delivering native HD, 3G and 4K images for the highest possible resolution and image clarity. The key to providing native resolution in the LDX 86^N Series is a new generation of native 4K Xensium-FT CMOS imagers that support full native 4K resolution as well as native HD resolution. This new 3840x2160p Xensium-FT CMOS imager offers a unique pixel technology called DPM^{Ultra} (dynamic pixel management) functionality. With DPM^{Ultra}, the camera provides native 1920x1080 HD acquisition (by combining two horizontal and two vertical adjacent pixels) without the intrinsic downsides of 4K acquisition, such as rolling-shutter and decreased sensitivity, while delivering native 4K crispness when needed.

Every camera in the LDX 86 Series uses three Xensium-FT 2/3" imagers, and this offers the highest sensitivity and dynamic range on the market. At F12, there's a 60 dB signal-to-noise ratio, which is the same sensitivity as the best HD camera available. That means that no additional lighting is needed to produce beautiful 4K images (with a unique closed-system process for 3840x2160 UHD where all of the processing takes place within the camera system), and they provide excellent sensitivity even in high-speed operation.



Broadcasters can also move to high-speed and 4K acquisition without having to replace their existing stock of B4 lenses. This lowers format migration costs and ensures the same great depth of field as any regular HD camera, as well as no rolling shutter behavior for better live event production. Taken together, all these features represent an unmatched real-world story-telling capability.

www.grassvalley.com/products/ldx_86_universe
www.grassvalley.com/products/ldx_86N_universe

KEY FEATURES (4K/3G/HD)

- The LDX 86^N/LDX 86 Universe is specifically designed for live broadcast UHD/4K, especially sports productions, where the use of traditional B4 mount HD lenses instead of PL lenses enhances the producer's and director's ability to tell compelling and engaging stories, without any loss of sensitivity
- The LDX 86^N/LDX 86 Universe offers the highest sensitivity and dynamic range performance of all currently available 4K cameras
- A standard HD output — in addition to the 4K output — is always available
- LDX 86^N/LDX 86 Universe cameras are fully integrated with all the LDX 80 Series and LDX 86 Series of cameras, so they share most of the same camera accessories and use the same camera control system, including full support with the Connect Gateway for the best possible integration into external control systems

KEY FEATURES (HIGH-SPEED)

- The LDX 86^N/LDX 86 Universe uses a workflow with instant time-to-air without a cumbersome double-action memory buffer in the camera — so that not a single moment of the action will be missed or lost
- A live 1X standard-speed output — in addition to the high-speed output — is always available
- The unique AnyLightXtreme flicker reduction system assure that no more irritating light flickering occurs in the replays

KEY FEATURES (PHYSICAL)

- Unique cradle connectivity to support dockable XCU (eXchangeable control unit)
- Built-in memory in XCU cradle stores settings
- Standard HD outputs for monitoring or any full performance live usage
- Extensive (analog/digital) audio connectivity
- Embedded audio
- Compact (2 RU), robust base station

K2 Dyno Universe

Replay

6X and 4K Optimized Systems

Most sports production environments have centered around 4x2 or 6x2 configuration for input/output channels, and it's highly desirable to retain this when moving to 4K or 6X. Grass Valley delivers these configurations with its two 6X/4K switchable K2 Dyno Universe replay systems.

The 6X optimized system is 4 RU, and is based on two K2 Summit 3G client media servers with solid-state storage for exceptional performance. The 4K optimized system is 6 RU, and is based on three K2 Summit 3G client servers with solid-state storage.

Both of these replay offerings operate as integrated systems, which are controlled as a single server. Full scalability is delivered by connecting multiple servers and system "pods" together over blazing fast 10 GigE ShareFlex connectivity.

www.grassvalley.com/products/k2_dyno_universe

Possible 6X SSM 4 RU Configurations

| | | | |
|-----------------|---|---|---|
| Inputs | 6 | 4 | 2 |
| Outputs | 2 | 4 | 6 |
| K2 Dyno S Units | 1 | 2 | 3 |

Possible 6X SSM 6 RU Configurations

| | | | |
|-----------------|----|---|---|
| Inputs | 10 | 8 | 4 |
| Outputs | 2 | 4 | 6 |
| K2 Dyno S Units | 1 | 2 | 3 |

Possible 4K 4 RU Configurations

| | | |
|-----------------|---|---|
| Inputs | 2 | 0 |
| Outputs | 2 | 4 |
| K2 Dyno S Units | 1 | 2 |

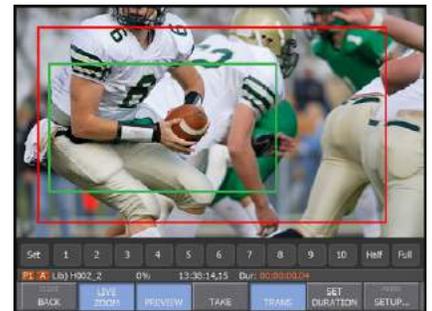
Possible 4K 6 RU Configurations

| | | | |
|-----------------|---|---|---|
| Inputs | 4 | 2 | 0 |
| Outputs | 2 | 4 | 6 |
| K2 Dyno S Units | 1 | 2 | 3 |

Get Even Closer to the Action With Pan & Zoom

Better storytelling is achieved by having ultimate control over the most critical details during an event. Production teams require the speed of K2 Dyno Universe to cue up super slow-motion content — while not missing any additional action.

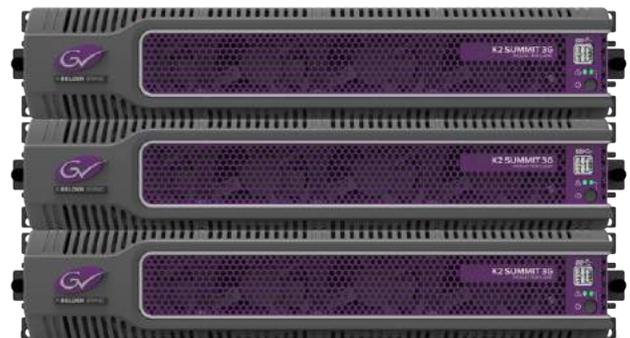
Now, any 6X or 4K recorded moments can be accessed by any K2 Dyno replay controller and used with replay, playlist, or DynoZoom functions. The amazing DynoZoom capability allows replay controllers to pan and zoom into a portion of the picture where the story is unfolding to get even closer to the action.



DynoZoom allows replay controllers to pan and zoom into a section of the picture, using HD, 6X, 3X or 4K content

Do Even More HD Recording with 6 RU Optimized Systems

A typical scenario for a stadium's "in-house" production is that it tends to be a small operation with 5-6 cameras. But when outside broadcast production trucks roll in, the camera count skyrockets to around 20. Now the in-house production staff can be prepared to deliver a better in-stadium fan experience by recording all of the extra angles. Two operators can share the replay production roles and instantly choose from any of the recorded content. They can work independently or collaborate on creating clips or playlists. A single operator has the additional ability to create one clip that has 24 angles — that can be changed (matched-frame) at the touch of a button.



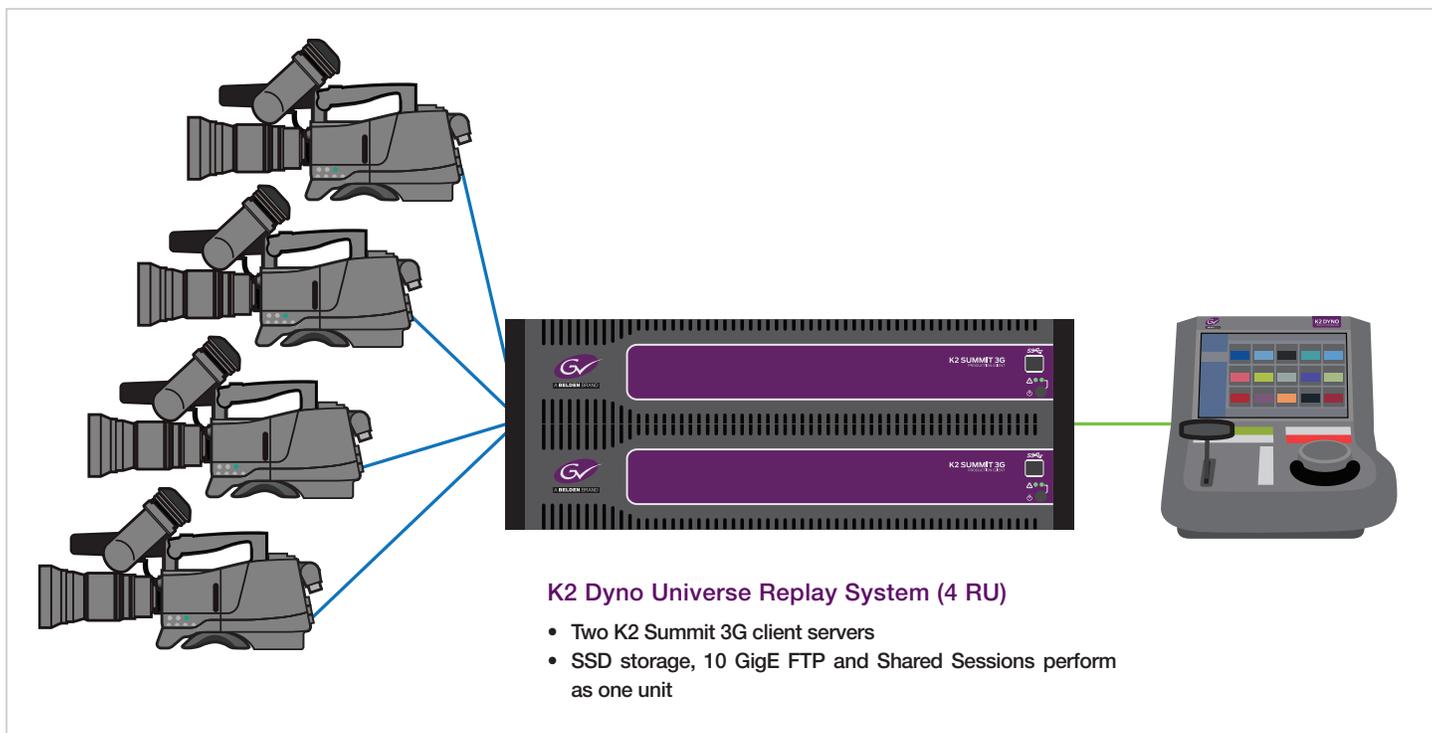
K2 Dyno Universe HD, 6X and 4K Switchable Replay Systems with Pan & Zoom

KEY FEATURES

- Choice of two K2 Dyno Universe replay systems — optimized for 6X (4 RU) and 4K (6 RU)
 - 4 RU system offers 16 channels
 - 6 RU system offers 24 channels
- Each operator can have 4 to 6 video angles to choose from, instead of just one or two angles with traditional replay systems
- K2 Dyno Universe systems are highly affordable and practical, requiring only half the rack space and operator count of other replay devices
- With AnySpeed, broadcasters can quickly and smoothly move to the action replay, and then slow down to highlight the details, while avoiding excessively long replay times
- AnySpeed technology dynamically provides the smoothest playback at any speed from 0% to 200%
- DynoZoom allows pan and zoom functions to be applied to high frame-rate capture, including 3X 1080p, 6X and 4K
- Super-fast 10 GigE FTP connectivity between system pods allows for the same ShareFlex workflows that K2 Dyno users have come to love. This lets you share clips, playlists, bins and libraries, and even lets two operators collaborate on the same project at the same time
- A Favorites Bar offers quicker access to other K2 Dyno Universe replay system recordings, clips, playlists and bins
- Your choice of video transport:
 - SDI
 - IP SMPTE ST 2022-6
 - TICO compression for 4K 1-Wire (scheduled for summer 2016)

Typical 6X Replay Configuration

The new 4 RU K2 Dyno Universe replay system is optimized for 6X replay, and it delivers more than double the channel capacity of a typical 6X replay system, while using the same number of operators as an HD system. Better action shots are also driven by the system's ability to offer each operator four to six video angles to choose from, instead of just one or two angles with traditional replay systems.



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