

DATASHEET

LDX 90 SERIES

**Superb Image Quality
in HD or UHD**



LDX 90 SERIES

Hard-working cameras designed for the daily realities of live media production

Adapting to new circumstances is a constant in live production. In addition to the pace of the action in the event, the camera must rapidly adjust to shooting positions, lighting and weather. Just as critical is the ability quickly reconfigure production formats, picture resolution and frame rates with a minimum of effort and downtime. Designed specifically for these demanding conditions, Grass Valley LDX cameras set the standard for combining picture quality with ease of use in capturing live images.

To ensure highest quality image capture, Grass Valley develops camera imagers that specifically meet the requirements of live events. All of the LDX 90 series cameras capture fast-paced action without image smear. The cameras adapt easily to a wide range of lighting conditions across all of the different acquisition speeds. Even for 3X and 6X speed slow-motion under artificial lighting, the LDX 90 series ensures pristine images with the AnyLightXtreme live flicker reduction system.

In addition to the LDX 90 series' high sensitivity for image detail and contrast, many of today's live productions require image capture in High Dynamic Range. Audiences readily appreciate the uniquely differentiated picture when watching in HDR with much greater brightness, contrast, and better color accuracy than was possible in the past. To simplify matching production formats, the LDX 90 series cameras support all three main formats of HDR: HLG, PQ and S-Log3.

Operational excellence

Featuring both standard and compact size camera heads, the LDX 90 camera series includes six models. Their base feature set may be augmented with software options that add just the features you need either perpetually or just for one day by selecting *à la carte* options from a secure web portal.

The LDX 90 series has both standard and compact models to fit a wide variety of applications. In the standard models, the signal transmission between the camera head and the camera base station is realized via the fully IP-based XF Fiber transmission solution. In this configuration, the camera systems offer extensive analog and digital audio connectivity with embedded audio. Compact models offer an identical image performance and a comparable feature set but in a smaller mechanical package that is ideally suited to remote operation and camera positions that are inaccessible or unsafe for an operator at the camera head.



DirectIP

In addition to fiber connections with base stations that remember previous settings, LDX 90 series cameras also support DirectIP, a direct interface of the complete transmission protocol between the cameras and XCUs over IP networks.

Easily recognized and managed by network orchestration software, DirectIP is an ideal solution for the most demanding remote camera applications. By connecting the cameras and the XCUs through COTS switches with 10 GbE ports to a high-bandwidth IP network, any camera can be assigned to any XCU via the GV Connect Gateway. In this

way, one central command/control center can be used to manage several different production facilities. When a production is finished, the cameras and the XCUs can easily be re-routed for the next production. This saves production costs as control room staff do not have to be on location while still maintaining a high-quality production.

Flexibility across the series

Because the LDX 90 series camera systems use the same high-performance transmission solutions, you can mix and match all the different cameras inside one production environment. The unique and patented cradle concept of the XCU lets you

relocate camera base stations quickly and safely. The built-in cradle memory ensures that all camera/XCU settings and configurations will be automatically updated for the correct production environment.

All other camera accessories for the LDX 90 series fit any camera in the series. The cameras are also compatible with the LDX 80, 82, 86 and 86^N cameras. This broad compatibility includes full support with the C2IP for the best possible integration into external control systems.

Creative Grading

In a camera system, what happens behind the scenes is just as important as what happens at the camera head. Grass Valley's Creative Grading camera control provides a camera control panel that can be easily adapted to the production requirements with multiple user-definable controls and offers a graphical interface that makes it easy to visualize and share the results of artistic decision-making across multiple cameras. Standardizing the look of a show across multiple cameras using a traditional control system typically takes many hours of configuration time. Creative Grading reduces this setup to minutes, freeing camera shaders to experiment with different looks or store multiple setups so that the same equipment can be rapidly repurposed for pre- and post-event programming.





LDX 90 Series Benefits

- Superb image quality in either HD or UHD
- *À la carte* options optimize utilization with “pay per use”
- High sensitivity and image performance across all of the different acquisition speeds
- AnyLightXtreme flicker reduction system
- Native HDR for PQ/HLG/S-Log3
- Wide Color Gamut supporting the ITU-R BT.2020 standard
- DirectIP complete transmission protocol over IP networks
- Creative Grading
- Extensive (analog/digital) audio connectivity with embedded audio
- Unique cradle connectivity to support dockable XCU (eXchangeable Control Unit)
- XCU cradle stores settings in built-in memory
- Full integration with LDX 80, 82, 86 series cameras allows use of the same camera accessories and control system, including full support with the C2IP for the best possible integration into external control systems memory for easy exchange
- All accessories fit the whole range

LDX 92 or LDX C92

The LDX 92 is the entry-level model for the LDX 90 series. Supporting the features you need for shooting under challenging live conditions, LDX 92 also offers upgrade options for 4K UHD and HDR which allow the camera to add new formats and easily mix with other cameras in the LDX 90 series.

Key features

- 4K upgradable (XF transmission only – not for Compact)

LDX 96 or LDX C96

The LDX 96 offers two software-enabled feature sets: high frame-rate HD/3G cameras or single-speed HD/3G/4K UHD acquisition. This advanced multiformat (HD/3G/4K UHD) and multispeed (1X/3X/6X) content acquisition system is combined with outstanding image performance, excellent light sensitivity and the ability to use standard HD lenses.

Key features

- Native HD and 4K upgradable (XF transmission only – not for Compact)
- 3X and 6X speed option for Super Slo-motion operation
- Standard Native HDR and Wide Color Gamut supporting the ITU-R BT.2020 standard

LDX 98 or LDX C98

The LDX 98 supports even greater image clarity with native support of 4K UHD as well as native 3G/HD image capture. Whether it's HD or 3X super slow-motion today, 3G or 6X super slow-motion tomorrow, or 4K UHD down the road, you'll be ready for whatever your productions demand.

Key features

- Native 4K
- Standard Native HDR and Wide Color Gamut supporting the ITU-R BT.2020 standard
- 3X and 6X speed option for Super Slo-motion operation
- 1X standard-speed live output in addition to the high-speed output

Note: For high-speed UHD capture and native UHD without a rolling shutter, see Grass Valley's [LDX 100 series](#).

	LDX 90 Series		
	LDX 92 / LDX C92	LDX 96 / LDX C96	LDX 98 / LDX C98
Standard Format Support	720p, 1080i (50 or 59.94 Hz)	720p, 1080i, 1080p (50 or 59.94 Hz)	720p, 1080i, 1080p (50 or 59.94 Hz)
HD Options	1080p (50 or 59.94 Hz), 1080PsF (23.98, 24, 25, 29.97)	1080PsF (23.98, 24, 25, 29.97)	1080PsF (23.98, 24, 25, 29.97)
UHD Options	2160p (upconverted in base station)*	2160p (upconverted in base station)*	2160p Native
Pixel Count	6,220,800	6,220,800	24,883,200 + Dynamic Pixel Management for HD
HDR Standard		HLG, PQ and S-Log3	HLG, PQ and S-Log3
HDR Option	HLG, PQ and S-Log3		
High-speed Options	No	3X 720p, 3X 1080i, 3X 1080p – or – 6X 720p, 6X 1080i, 6X 1080p (UXF Transmission only)	3X 720p, 3X 1080i, 3X 1080p – or – 6X 720p, 6X 1080i, 6X 1080p (UXF Transmission only)
Shutter	Global	Global	Global or Rolling (when UHD)
Imager	3X Xensium ^{FT}	3X Xensium ^{FT}	3X Xensium ^{HAWK} DPM Ultra and Dynamic Pixel Mgt
Sensitivity @2000 lux (59.94 Hz)	F12 @ 62 dB S/N ratio (in 1080p50)	F12 @ 62 dB S/N ratio (in 1080p50)	F7.1 @ 60 dB S/N ratio (in 2160p50)
Connectivity	SDI	SDI	SDI
Support of BT.2020 wide color gamut	✓	✓	✓
Perfect picture matching across the complete LDX Series	✓	✓	✓
Easy access to control buttons, including PickMe button	✓	✓	✓
Zoom control in handgrip	✓	✓	✓
CLASS: advanced electronic lens error correction	✓	✓	✓
Advanced secondary color corrector (up to six sets for color hue, saturation and luminance adjustment)	✓	✓	✓
Fully compatible with 3G fiber/triax transmission systems**	✓	✓	✓
Fully compatible with XF fiber transmission systems	✓	✓	✓
Compatible with C2IP control systems and RefleX SuperXpander	✓	✓	✓
Second motorized optical filter wheel with 4P-star and soft focus	✓	✓	✓

* Not available in compact model

** Note: 3G transmission systems can no longer be purchased



Software Options

À la carte Temporary Software Options

The LDX 90 series allows you to upgrade feature by feature, perpetually or just for one day using an *à la carte* model. Daily (or multiple day) options can be created in the customer's secured B.O.W.L. web portal. A section dedicated to the LDX 90 series are available from the portal.

Any available option can be easily activated in the LDX 90 section of the B.O.W.L. web portal using Option Credit Points as described in the table below:

Model			LDX 92 & LDX C92	LDX 96 & LDX C96	LDX 98 & LDX C98	Options			
Requirement	Details	Shutter				Item Number	Commercial Reference	Points	
720p	50, 59.94	Global	✓	✓	✓				
1080i	50, 59.94		✓	✓	✓				
1080PsF	23.98, 24, 24, 29.97		○	○	○	9-0210000120-9	Opt-PsF-LDX 90 Series	1	
1080p	50, 59.94		○	✓	✓	9-0210000121-9	Opt-3G-4-LDX 92	2	
3x Speed	720p, 1080i, 1080p		✗	○	○	9-0210000123-9	Opt-3X-4-LDX 90 Series	4	Sports Bundle 7
6x Speed	720p, 1080i, 1080p		✗	○*1	○*1	9-0210000124-9	Opt-6x-4-LDX 90 Series	6	
4K UHD	Upconverted	Rolling	○*2	○*2	✗	9-0210000125-9	Opt-UHD-4-LDX 90 Series	4	
4K UHD	Native		✗	✗	○				
HDR	PQ, HLG, S-Log3	–	○	✓	✓	9-0210000122-9	Opt-HDR-4-LDX 92	1	
WCG	BT.2020	–	✓	✓	✓				
			✓ Standard	○ Optional	✗ Not supported				

*1 Compact cameras support 6x speed in 720p and 1080i

*2 Compact cameras don't support 4K/UHD upconversion

Transmission Options

All LDX 90 series cameras support fully IP-based XF Fiber transmission to an XCU via the XF Fiber Adapter. In addition, third-party transmission adapters are also available for wireless signal transmission.

Adapters

XF Transmission Adapters

XF Fiber adapters are ready for your evolving business needs with a high utility power outlet, an ergonomic button layout, clear setting indications, low weight, extensive communication possibilities for jib configurations and much more. They support the high bandwidth required by high-speed and 4K cameras with an additional Ethernet trunk channel with up to 1 Gb bandwidth.

XCU Base Stations

The XCU (eXchangeable Control Unit) base stations are like no other in the world. The XCU's unique cradle can be pre-mounted and pre-wired in the rack, making a secure mechanical and electrical connection, permitting the XCU base station to easily slide in and out whenever needed. Each XCU comes with one cradle, but additional cradles may be purchased to extend usability across different locations, allowing you to quickly and easily transfer XCUs between OB vans, studios or any place.

XCU Xpress UXF: HD/3G/4K UHD single-speed/high-speed via base-band and optional IP connectivity.

The XCU Xpress UXF base stations support all single-speed and high-speed formats supported by the LDX 90 series cameras with base-band and optional IP connectivity, including DirectIP.

The DirectIP interface enables a complete transmission protocol between the cameras and XCUs over IP networks.

The XCU Xpress UXF comes with a UXF cradle with four SFP+ slots for 12G-SDI and optional IP connectivity. For additional information, see the [XCU Xpress UXF webpage](#).

XCU Xpress UXF Key Features

- Unique dockable cradle concept
- Built-in memory in XCU cradle for production-set storage
- Universe XF transmission supports the high bandwidth required by high-speed and 4K cameras
- Full support for all speeds and HD formats:
 - 1X to 6X speed (dependent on camera and format)
 - 720p/1080i/1080p/1080PsF/3840x2160p (4K)
- Video outputs:
 - 2x 4K* and 2x 1.5G or 3G video outputs (in 4K mode)
 - 6x 3G* and 2x 1.5G or 8x 1.5G* video outputs (in 1X speed)
 - 6x 3G BNCs supporting 3X/6X speed; 720p, 1080i, 1080p

- Extensive (analog/digital) audio connectivity
- Embedded audio
- 3x selectable return inputs:
 - 3G, HD or SD
- 1 Gb IP trunk
- Universal 3G power supply
- Compact (2 RU), robust base station

XCU UXFs with 4x SFP+ connections

- SFP slots available for:
 - Redundant 10 GbE IP connections
 - 12G SDI outputs
- IP connections:
 - SMPTE ST 2022-6 compliant
 - SMPTE ST 2110 compliant
 - NMOS compliant
- Supports high speed operation

* During HDR operation, some of the signals will be with SDR mapping and some of the signals will be with HDR mapping



		XCU Xpress UXF	XCU Xpress UXF + IP option
Full Baseband connectivity		Y	Y
Full IP connectivity		N	Y
12G SDI support		Y	Y
HD/3G/4K UHD support in single speed		Y	Y
High speed support	3X HD, 6X HD, 3X 3G	Y	Y
	6X 3G	Y	Y*
DirectIP(+) support		Y	Y
HDR support	in single speed	Y	Y
	in high speed	Y	Y
Simultaneous outputs in: 4K HDR, 3G/HD HDR, 3G/HD SDR		Y	Y
LDX 100 series support		Y	Y
Delivered with UXF cradle with 4x SFP+ slots		Y	Y

* 6x 3G not supported over IP

Ordering

XF Transmission 10 GbE (XCU + Adapters)*

XCU Xpress UXF

SMPTE Fiber Lemo – Includes XCU Cradle (4x SFP+ cages)

Universe Adapter

XF Universe Fiber Adapter – SMPTE Fiber Lemo

* XF Transmission supports DirectIP

12G SDI SFP Module Providing 2x 12G SDI Outputs

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12G SDI module (for XCU Xpress UXF)

Viewfinders and Other Accessories

XCU Xpress IP option

IP option for XCU Xpress UXF base station

(Additional) UXF Cradle

Full Hybrid XCU Cradle including 12G SDI and IP support (4x SFP+ cages)

Note: Each XCU is supplied with a UXF cradle as standard.

For additional information on viewfinders, power converters and other accessories, [see website](#).

This product may be protected by one or more patents. For further information, please visit: www.grassvalley.com/patents

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