



LUXBEAM[®] RAPID SYSTEM – LRS-4KA p/c

The LUXBEAM[®] Rapid System LRS-4KA is specifically designed for static implementations in 3D Printing and additive manufacturing systems. It offers a superior resolution DLP[®] based stereolithography sub-system with more than 8 million addressable pixel positions for production of highest resolution parts. Different lens options offer flexible build area and an efficient optical system generates superior power output for high building speed. Two product variants are offered:

- LRS-4KA_p (p=performance) for **high performance** implementations
- LRS-4KA_c (c=commodity) with lower optical power for more **costsensitive** markets in the 3D Print industry, such desktop machines.

Superior resolution static configuration

The system comprises an UV-optimized optical system and configuration with different LEDBEAM[™] UV LED light sources. The LC4KA-EKT Controller provides a dedicated 3D Printing operation mode, the **Full Pixel Sequence Control (FPSC) Mode**, offering full and pixel accurate control, both over projected pixel content and the time sequence of projected subframes.

Recommended implementation

- High resolution static configuration

Available operation modes

- 3840 x 2160 FPSC mode
 - Pixel-Pure-Images (2 x WQXGA)
 - Pure 8-bit grey-scale (No scaling, resampling or gamma/video processing)
 - Precise actuator timing control
- 2716 x 1528 native pixel mode

LED Wavelengths

- 465 nm / 405 nm / 380 nm / 365 nm

Optical Power Output

- Performance (LRS-4KA_p): Up to 4,5 W
- Commodity (LRS-4KA_c): Up to 2,5 W

Projection Lens Options

- Performance
 - LRS-4KA 14X
 - LRS-4KA 17X
- Commodity:
 - LRS-WQm 13X
- More options under development

Electronics

- Advanced LC4KA-EKT Controller from Keynote Photonics

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Properties	
DMD Type	DLP660TE (2716 x 1528 px)
Resolution	8,3 million addressable pixels (UHD-4k images with optical actuator)
Projector Output Power	Performance version: Up to 4,5 W (depending on LED configuration) Commodity version: Up to 2,5 W (depending on LED configuration)
LED Options	Monochrome 465 nm, 405 nm, 380 nm, 365 nm
LED Driver	Constant flux with Optical Feedback or Fixed Current
Power Uniformity	> 90% native
Dimensions w/o lens	190 mm (L) x 150 mm (W) x 228 mm (H)
Total weight w/o PSU	4 kg
Power consumption	200 W
Cooling System	Air cooling (fan)
Software	Complete API (Windows, Linux) and GUI

Electrical connections	
Power supply	12 V DC
Data	HDMI or DP
Communication	USB
LED Safety Switch	LED Enable/disable
Electrical Sync I/O	External frame synchronization
Optical Sync I/O	External frame synchronization

Lens Options	Working Distance [mm]	Pixel Pitch in Image [µm]	Feature Size in FPSC / XPR™ mode [µm]	Native Image Size W x H [mm²]
Performance version				
LRS-4KA 14x	434	65.0	32.5	177 x 100
	500	75.0 (nominal)	37.5 (nominal)	204 x 115
	566	85.0	42.5	231 x 130
LRS-4KA 17x	446	80.0	40.0	217 x 123
	524	90.0 (nominal)	45.0 (nominal)	255 x 138
	559	100.0	50.0	272 x 153
Commodity version				
LRS-WQm 13x	310	60.0	n.a.	163 x 192
	350	70.0 (nominal)		190 x 107
	370	80.0		217 x 122

All specifications and features subject to change (v1.0).

FULL PIXEL SEQUENCE CONTROL (FPSC)

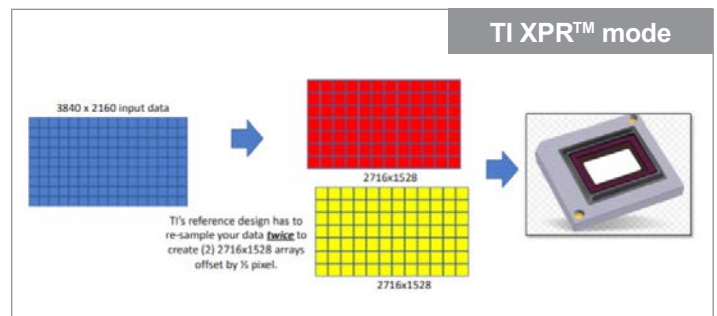
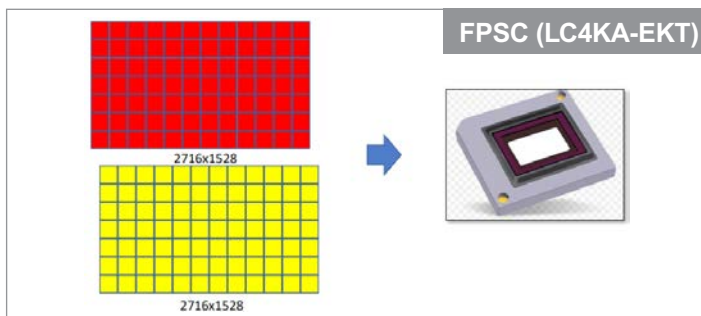


The LRS-4KA Light Engine is an advanced and extremely competitive plug-and-play system/module that will enable customers to design, build and brand a 3D Printing or an Additive Manufacturing machine with a very short time to market and at very low technical risk. The LRS-4KA Light Engine comprises Keynote Photonics' advanced LC4KA-EKT Controller. This controller provides full control of the data content in projected subframes.

Equipped with the Keynote's Photonics LRS4KA Electronics gives 3 majors and flexible advantages to the customer:

1. Avoiding re-sampling errors

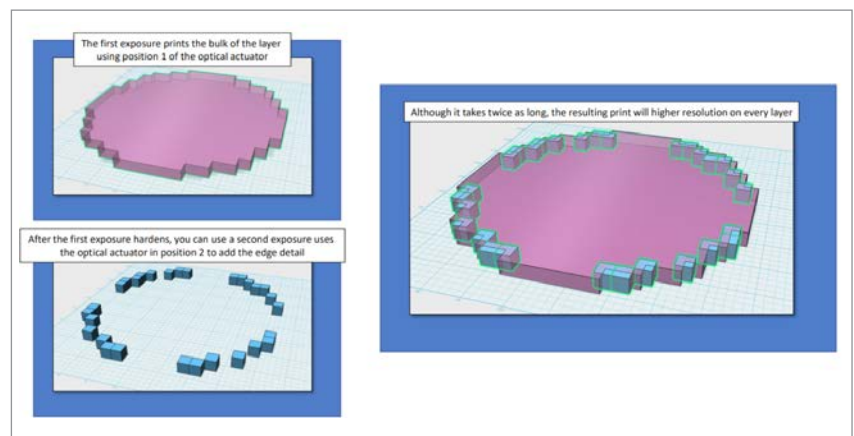
Keynote Photonics' custom electronics design eliminates re-sampling errors by using the exact native resolution of the DLP660TE, allowed for pixel-pure exposures. The original DMD reference controller board was designed for UHD video inputs and it works great for that application. However, this reference controller board requires a 3840x2160 input which DOES NOT MATCH the native resolution of the DMD (2716x1528). So projectors based on this reference controller board HAVE to re-sample the data. This causes pixel errors.



2. Complete control of the optical actuator

The customer can use both actuator positions on every layer to have the best possible resolution as shown on the picture to the right.

3. Flexible architecture for simple and easy integration with customer design.



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