To: **Worldwide Partners**
cc: Teledyne Imaging - Digital Imaging offices
From: Manny Romero
Date: October 7, 2020
RE: Lt Series Board Level Cameras: Sony Pregius Gen3 Models - Product Roll-out Package

# Lt Series Board Level Cameras: Sony Pregius Gen3 Models Roll-out Package

Versatile High Resolution USB3 Board Level Cameras targeted at Embedded Vision systems

Description

Teledyne Lumenera is pleased to introduce our next six Lt Series Board Level Cameras USB3 models spearheaded by the latest sensors from the Sony® Pregius™ Gen3 CMOS family, starting with the IMX432 - 1.7 megapixel, 9.0 µm pixel size, and with a 12-bit output. This new sensor also offers a very good dynamic range with a 100K e- full well capacity.

Other Sony Pregius Gen3 sensors available are the IMX430 (2.0M), 1632(H) x 1248 (V) and IMX428 (7.1M), 3216 (H) x 2208 (V) with both 4.5 µm pixel.

Lt Series Board Level Cameras uses the industry's latest leading sensors such as the Sony Starvis™ rolling shutter, Pregius Gen2 and Pregius Gen3 series of global shutter active pixel-type CMOS image sensors. Additional leading sensors are targeted like the Teledyne e2v Emerald series.
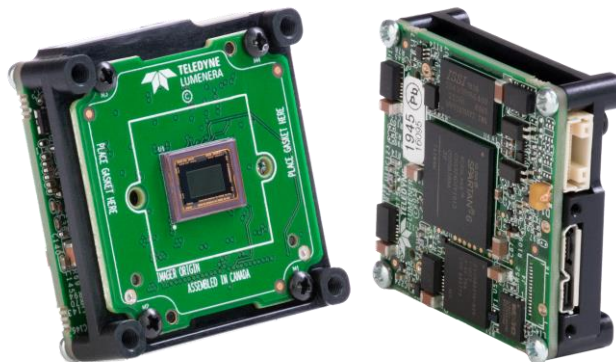
www.teledynelumenera.com

Americas
Ottawa, Canada
+1 613-736-4077
lumenera.sales@teledyne.com

Europe
Krailling, Germany
+49 89-89-54-57-3-80
lumenera.sales@teledyne.com

Asia Pacific
Tokyo, Japan
+81 3-5960-6353
lumenera.sales@teledyne.com

Shanghai, China
+86 21-6427-9081
lumenera.sales@teledyne.com

Compact and versatile with USB3 capability

The next six models based on the Sony Pregius are presented in this roll-out package.

Lt-M1610B
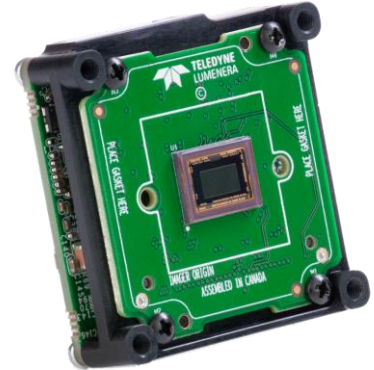1608 (H) x 1104 (V) @ 96fps

9.0 x 9.0 µm pixel
Using the Sony IMX432 Monochrome

Lt-C1610B
1608 (H) x 1104 (V) @ 96 fps
9.0 x 9.0 µm pixel
Using the Sony IMX432 Color

Lt-M1630B
1632 (H) x 1248 (V) @ 86 fps
4.5 x 4.5 µm pixel
Using the Sony IMX430 Monochrome

Lt-C1630B

1632 (H) x 1248 (V) @ 86 fps
4.5 x 4.5 µm pixel
Using the Sony IMX430 Color

Lt-M3200B
3216 (H) x 2208 (V) @ 50 fps
4.5 x 4.5 µm pixel
Using the Sony IMX428 Monochrome

Lt-C3200B
3216 (H) x 2208 (V) @ 50 fps
4.5 x 4.5 µm pixel
Using the Sony IMX428 Color

TABLE OF CONTENTS

Markets and Applications

It is expected that the Lt Series Board Level Cameras will do exceedingly well in the following applications due to their wide range of resolutions, relatively fast frame rates for USB3 Vision board-level cameras, and competitive pricing.

Aerial Imaging
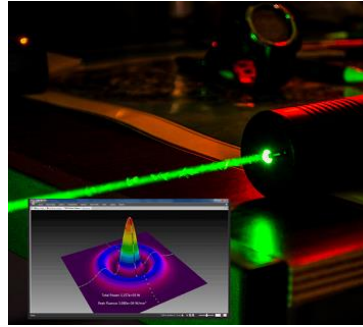
Laser Beam Profiling

Automatic Quality Control

ITS / Traffic Enforcement

Agriculture

Electronics Manufacturing

Example of Applications for USB3 Cameras

Aerial Imaging
The fundamental concerns for imaging systems for aerial imaging is size, weight, and power restrictions (also known as SWaP). These limit the choice of cameras for vision system applications such as precision agriculture, aerial surveillance, photogrammetry, geospatial imaging, and aerial inspection.

ITS Imaging
The Lt Series Board Level Cameras have a high dynamic range without losing the detail required for outdoor applications like toll management, speed and red light enforcement, HOT lane enforcement, and parking validation access control.

Life Science Imaging
Teledyne Lumenera designed the cameras with feedback from the medical industry. One of the biggest challenges with implementing an imaging component to a medical device is that there are often limiting size requirements. Many medical companies need to choose the dimensions of their product in the planning phase which eliminates any camera that does not fit that criteria.

www.teledynelumenera.com

Americas	Europe	Asia Pacific	
Ottawa, Canada	Krailling, Germany	Tokyo, Japan	Shanghai, China
+1 613-736-4077	+49 89-89-54-57-3-80	+81 3-5960-6353	+86 21-6427-9081
lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com

Software support

The Teledyne Lumenera Lt Series Board Level Cameras are compatible with the following software packages.

All the part numbers starting with LT-**L**xxx-xxxxNBL are compatible with the Teledyne Lumenera SDK below:

Operating System	Teledyne LUMENERA SDK	
ubuntu Linux	Lumenera Linux SOFTWARE DEVELOPMENT KIT	[Lumenera Camera Software Development Kit (LINUX) **v2.5**](#)
Windows	LuCam LUMENERA SOFTWARE	[LuCam Software and Software Development Kit **v6.8.4**](#)

A download link can be found below:

https://www.lumenera.com/support/industrial-usb-ethernet/drivers-downloads.html

The Teledyne Lumenera Lt Series BoardLevel Cameras with part numbers starting with LT-**U**xxx-xxxxNBL are compatible with a USB3 Vision compliant SDK:

USB3™ VISION

Teledyne Imaging has USB3 Vision support within its popular Sapera Lt SDK (compatible to v 8.60) Contact your sales representative for information.

www.teledynelumenera.com

Americas	**Europe**	**Asia Pacific**	
Ottawa, Canada	Krailling, Germany	Tokyo, Japan	Shanghai, China
+1 613-736-4077	+49 89-89-54-57-3-80	+81 3-5960-6353	+86 21-6427-9081
lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com

Features and Details

Models Specific Details

Supported Features	Board-level Camera Models		
	LT-M/C1630B	LT-M/C3200B	LT-M/C1610B
Maximum Frame Rate (full resolution)	86 fps	50 fps	96 fps
Resolution	1632 x 1248 (2.0M)	3216 x 2208 (7.1M)	1608 x 1104 (1.7M)
Sensor	IMX430	IMX428	IMX432
Pixel Size	4.5 µm x 4.5 µm		9.0 µm x 9.0 µm
Full Well charge	25k e- (max)		100k e- (max)
Shutter	Full frame electronic global shutter function		
Exposure Control	Internal - Programmable via the camera API External – based on trigger width		
Pixel Data Formats	Monochrome 8-bit / 12-bit (for Mono models) Bayer 8-bit / 12-bit (for Color models)		
Gain Control	In-Sensor Gain: 48dB range up to 24dB as analog gain in 0.1 dB steps (1x to 15x) from 24dB to 48dB as digital gain in 0.1 dB steps (from 16x to 250x)		
Black Offset Control	Yes (0 to 511 dn)		
Synchronization	Via External Trigger Signal		
Output Dynamic Range † ‡	73 dB		
Responsivity	see graphic below		

Spectral Response

Monochrome Models
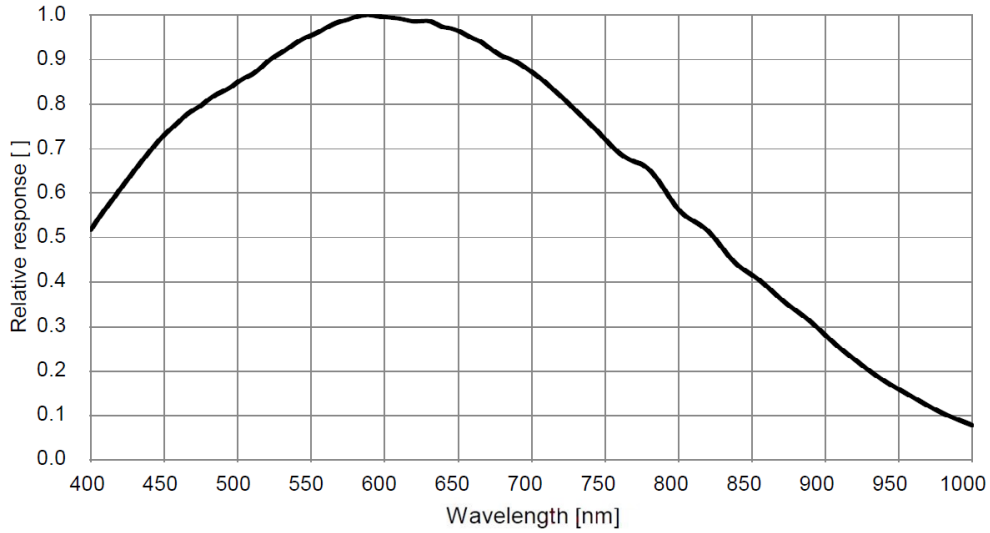
Color Models
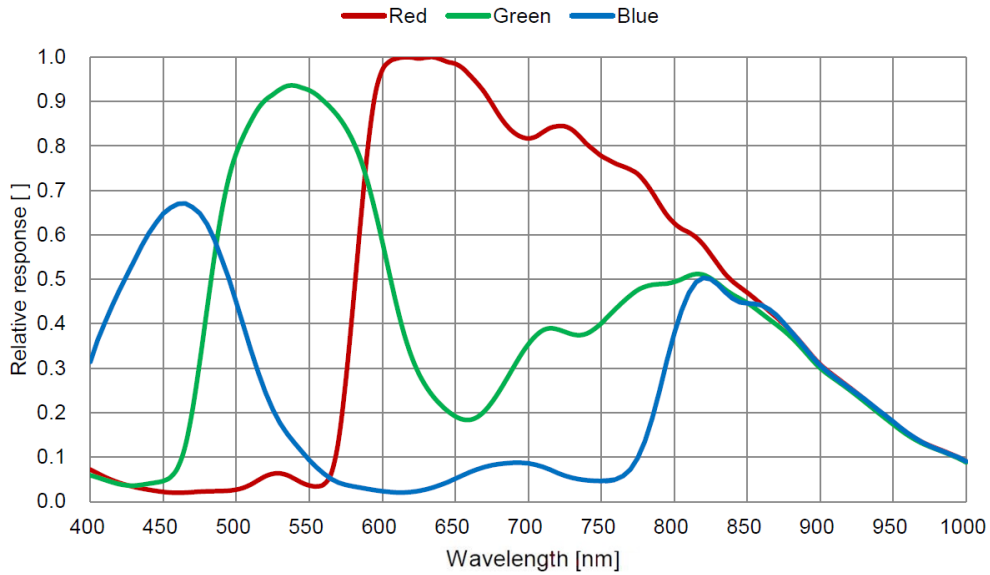
Common Details

Camera Controls	
Exposure Modes	Programmable in increments of 1µs minimum (in µs) is 14 µs maximum is 76 Minutes Pulse controlled via Trigger pulse width.
Trigger Inputs	Opto-isolated, 33V to 24V typical, 20mA. Trigger delay supported
Strobe Outputs	Output opto-isolated

Features	
Image Buffer	128 MB of on-board memory
Color Enhancement support	Brightness, Contrast and Gamma features on Color models
Defective pixel replacement	Yes
I/O signals	1 Input Opto-isolated, 1 Output Opto-isolated and 2 TTL bidirectional I/O

Software Interface	
Software Compatibility	Lt-Uxxx-xxxxx P/N for the UBS3 Vision v1.0 compliant Lt-Lxxx-xxxxx P/N for the Lumenera SDK compliant

Mechanical Interface	
Camera (L x H x W)	17.1 mm x 40.4 mm x 40.4 mm (with no lens mount)
Mass	28 g (with no lens)
Input Power	via 9-pin connector, or Data connector through USB
Data connector	USB3 Micro-B
I/O connector	JST# SM09B-NSHSS-TB (mating part:JST # NSHR-09V-S)

Electrical Interface	
Input Voltage	+5 to +12 Volts DC (+/-10%) on Auxiliary connector Supports the Power Over USB standard.
Power Dissipation	~3.6W
USB Speed	USB 3.1 Gen 1 (5 Gbps)
Data and Control	USB 3.1 Gen 1

Environmental Conditions	
Operating Temperature	0°C to 50°C (Housing Temperature)
Operating Relative Humidity	10% to 70% non-condensing
Storage Temperature	-40°C to +80°C
Storage Relative Humidity	20% to 80% non-condensing

9-pin I/O Connector Details

- A single 9-pin connector (JST# SM09B-NSHSS-TB) for all Lt Board-level Camera Series models functions as both I/O and an auxiliary DC power source. The following figure shows the pin number assignment.

c

9	8	7	6	5	4	3	2	1
Opto In	Opto Out	Opto Ground	Ground	GPIO3	GPIO2	3.3VDC Out	Ground	5VDC In
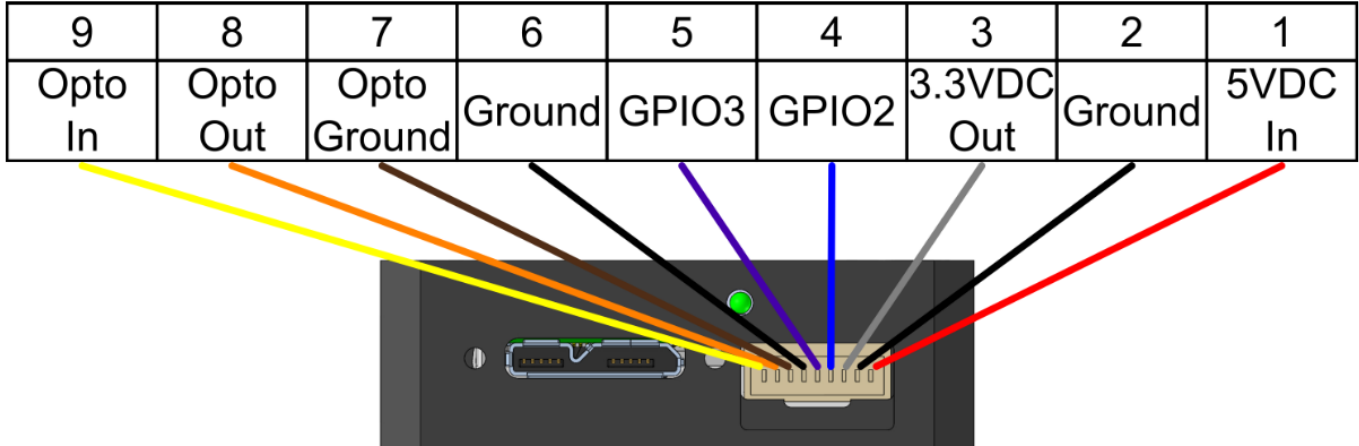
I/O Mating Connector Sources

Teledyne Lumenera offer a cable assembly for the Lt Board-level Camera Series. Refer to the cable pn: La4000PAFL in the accessory list.

For users wishing to build their own custom I/O cabling, the following product information is provided to expedite your cable solutions.

MFG	Part #	Description	Data Sheet
JST	NSHR-09V-S	Discrete connector	http://www.jst-mfg.com/product/pdf/eng/eNSH.pdf
JST	SSHL-003T-P0.2	contact	https://www.digikey.com/product-detail/en/jst-sales-america-inc/SSHL-003T-P0.2/455-2792-1-ND/3313668

JST # NSHR-09V-S Connector availability online

For North America (specific countries can be selected)

https://www.digikey.com/product-detail/en/jst-sales-america-inc/NSHR-09V-S/455-2785-ND/3313624

www.teledynelumenera.com

Americas	**Europe**	**Asia Pacific**	
Ottawa, Canada	Krailling, Germany	Tokyo, Japan	Shanghai, China
+1 613-736-4077	+49 89-89-54-57-3-80	+81 3-5960-6353	+86 21-6427-9081
lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com

Website Product page

Teledyne Lumenera's website (www.lumenera.com) is your best resource for product information on the Lt Series Board Level Cameras. The newer models will be added soon. Please direct your customers to the website as well. Feedback on the website should be forwarded to lumenera.postmaster@teledyne.com.

Electronic Images

Images of Lt Series Board Level Cameras can be found at the following link on the Teledyne Lumenera website on launch date:

https://www.lumenera.com/media/wysiwyg/images/products/industrial/products/Lt_Series-Board-Level.png

Family Datasheet

Here is a direct link to the family datasheet for the Lt Series Board Level Cameras without going through the product web page.
The links will remain valid even if we must update / change the files.

https://www.lumenera.com/media/wysiwyg/resources/documents/datasheets/industrial/Board_Level_Cameras_Data_Sheet.pdf
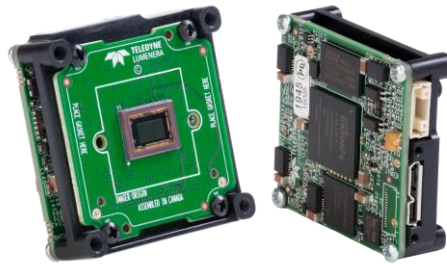
Availability

Eng. Sample units available starting in October 2020 (with the BB added at the end of the P/N).

For **full Production** p/n, another SIU will soon be release with availability and pricing.
Note: the CS-mount version will be available when reaching the Full production status.

Pricing and Ordering Options

The list prices for the camera models based on the Pregius Gen3 are provided in the table below. Current lead time for cameras is 3 to 5 weeks.

Contact your sales representative for volumes greater than 5 units.

www.teledynelumenera.com

Americas	**Europe**	**Asia Pacific**	
Ottawa, Canada	Krailling, Germany	Tokyo, Japan	Shanghai, China
+1 613-736-4077	+49 89-89-54-57-3-80	+81 3-5960-6353	+86 21-6427-9081
lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com	lumenera.sales@teledyne.com

TELEDYNE LUMENERA
Everywhere**you**look™

Lt Series - Small casing (45mm x 45mm)

Model	Resolution	Input Voltage	Eng. Sample Part Number	List Price
Lt-M1610B	1608 x 1104 @ 96fps **Sony** IMX432 Mono (1.7M)	5 Volt DC and Power over USB	LT-**x**M11-M161NBL**BB**	$1085
Lt-C1610B	1608 x 1104 @ 96fps **Sony** IMX432 Color (1.7M)	5 Volt DC and Power over USB	LT-**x**C11-C161NBL**BB**	$1085
Lt-M1630B	1632 x 1248 @ 86fps **Sony** IMX430 Mono (2.0M)	5 Volt DC and Power over USB	LT-**x**M11-M163NBL**BB**	$580
Lt-C1630B	1632 x 1248 @ 86fps **Sony** IMX430 Color (2.0M)	5 Volt DC and Power over USB	LT-**x**C11-C163NBL**BB**	$580

All above Part number supported in LuCam Software SDK are identify as LT-**L**xxx-xxxxNBL
All above Part number supported for USB3 Vision compliant device are identify as LT-**U**xxx-xxxxNBL

Lt Series - Small casing (45mm x 45mm)

Model	Resolution	Input Voltage	Eng. Sample Part Number	List Price
Lt-M3200B	3216 x 2208 @ 50fps Sony IMX428 Mono (7.1M)	5 Volt DC and Power over USB	LT-**x**M11-M320NBL**BB**	$1775

www.teledynelumenera.com

Americas
Ottawa, Canada
+1 613-736-4077
lumenera.sales@teledyne.com

Europe
Krailling, Germany
+49 89-89-54-57-3-80
lumenera.sales@teledyne.com

Asia Pacific
Tokyo, Japan
+81 3-5960-6353
lumenera.sales@teledyne.com

Shanghai, China
+86 21-6427-9081
lumenera.sales@teledyne.com

Lt-C3200B	3216 x 2208 @ 50fps Sony IMX428 Color (7.1M)	5 Volt DC and Power over USB	LT-xC11-C320NBLBB	$1775

All above Part number supported in LuCam Software SDK are identify as LT-Lxxx-xxxxNBL
All above Part number supported for USB3 Vision compliant device are identify as LT-Uxxx-xxxxNBL

Accessories

Part Number	Description		List Price
La303ML	USB 3.1 Cable A-Male to Micro-B male Locking (3m / 9.75ft)		$20
La4000PAFL	GPIO Sync cable, 9-Pin with IO lead (power & lead cable) (applicable to PN: LT-xx1x-xxxxxx)		$30

Best Regards,

Manny Romero

Senior Product Manager
Email: manuel.romero@teledyne.com
Tel: +1-514-333-3297 x4268

www.teledynelumenera.com

Americas
Ottawa, Canada
+1 613-736-4077
lumenera.sales@teledyne.com

Europe
Krailling, Germany
+49 89-89-54-57-3-80
lumenera.sales@teledyne.com

Asia Pacific
Tokyo, Japan
+81 3-5960-6353
lumenera.sales@teledyne.com

Shanghai, China
+86 21-6427-9081
lumenera.sales@teledyne.com