
ADVANCED IMAGE CAPTURE,
ACQUISITION, AND PROCESSING

MACHINE VISION

SENSORS
CAMERAS
FRAME GRABBERS
PROCESSORS
SOFTWARE
VISION SYSTEMS





IMAGINE THE POSSIBILITIES



We are dedicated to helping our customers to both imagine new applications and engineer practical solutions for them. Check out stories from innovators and experts that show what's possible with machine vision.

possibility.teledynedalsa.com



IMAGING INNOVATIONS

Welcome to our product overview. This year's publication showcases our newest and best-in-class imaging sensors, cameras and software. Check out the Piranha™ XL, 16k camera, with our new CMOS TDI sensor (page 9). Also featured is our new Linea™ line scan camera, designed for low cost deployment with no compromise in performance (page 4). Plus meet our fastest BOA™ smart camera ever, the BOA2 (page 23). With such an immense portfolio we could not possibly cover everything so we invite you to learn about the products showcased here, and to explore all our imaging solutions at teledynedalsa.com/imaging

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PRECISION MANUFACTURING AND RIGOROUS QUALITY CONTROL

Hass / Halt Testing: All camera models undergo HALT testing as part of the design process and HASS testing during manufacturing to screen for early life failure and to further improve camera design and development.

Optical Testing: All cameras are optically tested in our class-100 clean room, then vacuum-sealed before shipment.

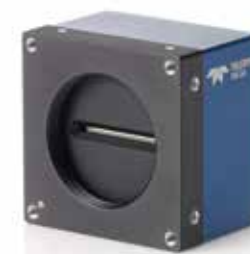
LINE SCAN IMAGING

Our vision is sharp. Teledyne DALSA offers powerful, innovative CCD and CMOS cameras combining industry-leading performance with cutting-edge feature sets and value. No matter your application, Teledyne DALSA line scan cameras can help you. With standard resolutions from 512 to 16384 pixels, TDI, monochrome, color, or multispectral models, industry-leading line rates and responsivity, and unique image capture and processing, you will find the perfect solution for your vision system.

www.teledynedalsa.com/LineScan

MAXIMUM THROUGHPUT WITH CMOS

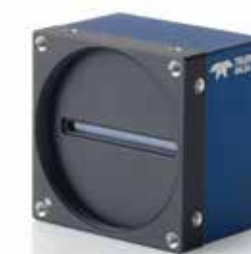
Our wide selection of multi-featured line scan cameras offer high speed, high responsivity, programmable pixel-to-pixel correction, reduced integration time, and a host of other features along with a choice of interfaces to deliver high speed and high throughput inspections.



LINEA™

A new standard for value, with high performance and excellent image quality at a surprisingly low price.

- Resolutions from 2k to 16K
- Line rates up to 80 kHz
- Monochrome
- Camera Link® and GigE Vision®



PIRANHA™ 4

A versatile multi-line camera family built on advanced features and an incredible legacy of performance.

- Resolutions from 1k to 8k
- Line rates up to 110 kHz
- Mono / Color / Multispectral
- Camera Link



PIRANHA™ ES/HS/XL

Advanced line scan imaging using CMOS and CCD Time Delay Integration (TDI) for the highest line rates in the industry.

- Resolutions from 1k to 16k
- Line rates up to 100/200 kHz
- Bi, Tri, and Quad-linear sensor configurations
- Camera Link and Camera HS Link®

LINEA™ HIGH PERFORMANCE, MAXIMUM VALUE CMOS CAMERAS

The Linea line scan camera series sets a new pace in the race to deliver a low cost camera that does not compromise image quality or responsivity. The Linea series combines the best of our advanced CMOS line scan sensor technology in a compact form factor. These small, affordable, low power cameras are designed for applications such as materials grading and inspection, transportation safety, automated optical inspection, and general-purpose machine vision.



KEY FEATURES

- Multiple user coefficient sets and multiple FFC sets
- Programmable triggering with wide tolerance (5-24V)
- Binning 1x1, 2x1, 2x2
- AOI calibration: independent calibration for each AOI region, ensures best image quality for dissimilar areas
- Windowing feature: Up to four regions of interest, data reduction and line rate increase
- High sensitivity, High QE, low noise and high NIR responsivity



A GAME-CHANGING APPROACH TO GigE LINE SCAN

Linea GigE cameras offer breakthrough data transfer technology, unparalleled image quality, unprecedented features and flexibility, all at an extremely affordable price point.

- TurboDrive accelerates data transfer rates beyond standard GigE Vision speeds with advanced data modelling – with no loss of image quality.
- Cycling Mode allows you to preset camera parameters, gain, exposure time, I/O outputs and FFC coefficients for each line.
- GPIO offers programmable signalling, synchronization, and I/O ports.
- Burst Mode maximizes your system data throughput, acquiring images at full speed and transferring them during idle times.

PART NO.	RESOLUTION	MAX LINE RATE	SIZE	INTERFACE	FOR ALL
LA-CM-02K08A	2048	80 kHz	62 x 62 x 37 mm	Camera Link	PIXEL SIZE 7.04 µm BIT DEPTH 8/12 bit MASS <190g RESPONSIVITY 320 DN/(nJ/cm²), 12 bit, 1x gain
LA-CM-04K08A	4096	80 kHz	62 x 62 x 37 mm	Camera Link	
LA-CM-08K08A	8192	80 kHz	76 x 76 x 37 mm	Camera Link	
LA-GM-02K08A	2048	52 kHz	62 x 62 x 48 mm	GigE Vision	
LA-GM-04K08A	4096	26 kHz	62 x 62 x 48 mm	GigE Vision	

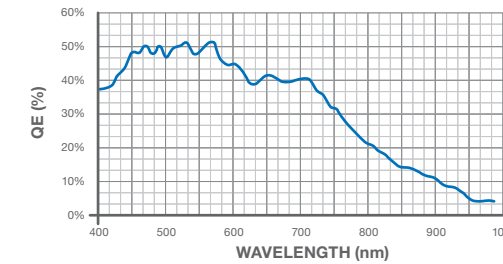
MULTIPLE ROI

Windowing with up to four regions of interest allows you to output only the part of the image you need. This can reduce costs, as less data needs to be transferred, processed and stored. By reducing data and increasing line rates on constrained GigE networks, Linea opens up new levels of performance.



IMAGE QUALITY

Linea's next-generation CMOS line scan sensor offers High QE, enhanced NIR sensitivity to 850 nm, low noise, and artifact-free images.



MULTIPLE REGION CALIBRATION

Linea allows independent calibration for any number of separate regions of interest.



WITHOUT INDEPENDENT CALIBRATION



WITH INDEPENDENT CALIBRATION



PIRANHA™ 4

VERY FAST, VERY RESPONSIVE CMOS CAMERAS

High speed and high responsivity imaging from 1k to 8k, with the fastest line rates in the industry. Based on Teledyne DALSA's proprietary CMOS line scan sensor architecture, the Piranha4 cameras provide outstanding signal-to-noise ratio for high-speed imaging.



KEY FEATURES

- Small form factor
- Horizontal parallax correction
- Multiple AOI/ROIs for output and calibration
- Subpixel spatial correction for precise color registration in any sampling scenario
- Programmable exposure control, flat field correction, and gain settings.
- Multi-line sensors with minimal line spacing for better synchronization and no prism artifacts
- GenICam™ compliant interface for easier setup, control, and integration.



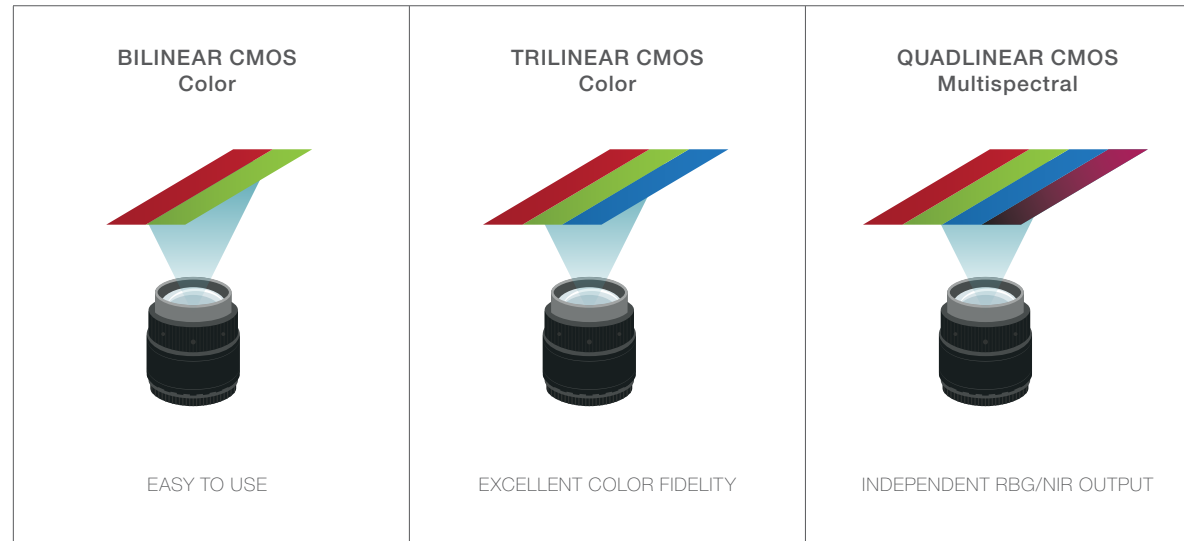
High Performance Color, Advanced Features, and Programmability

The Piranha4 cameras offer advanced features such as sub-pixel spatial correction, areas of interest (up to 4 at a time) to reduce data processing and simplify cabling, as well as dual-line area mode to double line rate, HDR mode, shading and lens correction. The Piranha4 is built for the real world with

features to ease system integration. The advanced GenICam compliant user interface makes it easy to set up and control camera parameters such as exposure control, FFC, white balance, gain, test patterns, diagnostics and more.

PART NO.	RESOLUTION	MAX LINE RATE	PIXEL SIZE	BIT DEPTH	FOR ALL
P4-CM-08k070-00-R	8kx2	100 kHz/70 kHz	7.04 μm	8/10/12 bit	INTERFACE Camera Link MEASUREMENT 80 x 80 x 57 mm (2k/4k/ 8k) COMPLIANCE CE, FCC, and RoHS DYNAMIC RANGE 60 dB OPERATING TEMP 0 ~ 65 °C
P4-CM-04k10D-00-R	4kx2	200 kHz/100 kHz	10.56 μm	8/10/12 bit	
P4-CM-04k05D-00-R	4kx2	100 kHz/50 kHz	10.56 μm	8/10/12 bit	
P4-CM-02k10D-00-R	2kx2	200 kHz/100 kHz	10.56 μm	8/10/12 bit	
P4-CM-02k05D-00-R	2kx2	100 kHz/50 kHz	10.56 μm	8/10/12 bit	
P4-CC-08k050-00-R	8kx2	50kHz	7.04 μm	8 bit	
P4-CC-04k07T-00-R	4kx3	70kHz	10.56 μm	8/10/12 bit	
P4-CC-04k04T-00-R	4kx3	40kHz	10.56 μm	8/10/12 bit	
P4-CC-02k07T-00-R	2kx3	70kHz	14.08 μm	8/10/12 bit	
P4-CC-02k04T-00-R	2kx3	40kHz	14.08 μm	8/10/12 bit	
P4-CC-02k07Q-00-R	2kx4	70kHz	14.08 μm	8/10/12 bit	
P4-CC-02k07N-00-R	2kx4	70kHz	14.08 μm	8/10/12 bit	

LINE SCAN IMAGING TECHNOLOGY



INTRODUCING PIRANHA 4 QUADLINEAR: MULTISPECTRAL RGB+NIR

The Piranha4 2k quadlinear line scan camera features red, green, and blue (RGB) outputs plus a Near Infrared (NIR) channel for multispectral imaging. Built around Teledyne DALSA's advanced CMOS image sensor design, its wafer-level dichroic filters enable spectrally independent RGB and NIR outputs. This makes it ideal for enhanced detection capability across a wide range of machine vision applications, including 100% print, bank note inspection, electronics manufacturing, food and material sorting.

INTRODUCING PIRANHA™ XL 16K

NEW CMOS TDI LINE SCAN FOR UNMATCHED SPEED, RESOLUTION AND SENSITIVITY

The award-winning Piranha XL 16k camera offers the latest breakthrough in multi-line CMOS technology, delivering unprecedented speed and responsivity in a compact form factor. Employing Teledyne DALSA's advanced CMOS sensor architecture, the camera delivers incredible responsivity with stage selections, while maintaining low noise. Exposure control allows seamless operation from stop condition to max speed. The Piranha XL combined with the Xtium Camera Link HS frame grabber, offers a complete solution for the next generation Flat Panel Display and Printed Circuit Board Automatic Optical Inspection Systems.



KEY FEATURES

- High responsivity CMOS TDI
- 16k/5um at 125kHz max line rate
- Exposure control for seamless operation down to stop
- High Dynamic Range mode
- Field-proven solution with CLHS interface to Xtium frame grabbers

TDI: STEP BEYOND TRADITIONAL LINE SCAN

The Piranha TDI family makes it easy and cost effective to switch from line scan to TDI.

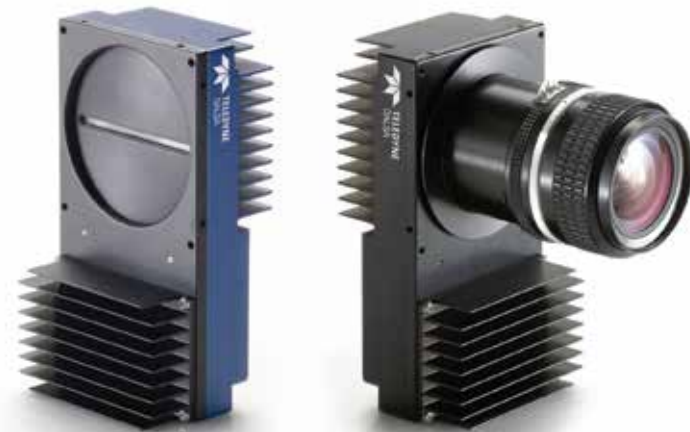
Based on the concept of accumulating multiple exposures of the same (moving) object, TDI effectively increases the integration time available to collect incident light. The object motion is synchronized with the exposures to ensure a crisp image. TDI cameras enable you to meet the line rates and responsivity necessary for your high performance applications and allow you to reduce the number of cameras in your system.

More speed: With more effective integration time, you can increase the speed of the target object or inspection web.

Less light, lower costs: Instead of high-powered, high-cost, high-temperature halogen lighting with DC power, you can use high-frequency AC or even LED lighting, profoundly lowering your system maintenance costs. TDI operation effectively averages out fluctuations in light intensity to represent a DC light source. This factor alone can justify the increased cost of a TDI sensor. Learn more about TDI www.teledynedalsa.com/tdi



	PART NO.	RESOLUTION	LINE RATE	PIXEL SIZE	BIT DEPTH	INTERFACE	DIMENSIONS	COMPLIANCE	DYNAMIC RANGE	OPERATING TEMP
ES	ES-80-04K40-00-R	4096 x 32 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-82-04K80-00-R	4096 x 32 pixels	110 kHz	14 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-80-08K80-00-R	8192 x 32 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-80-08K40-00-R	8192 x 32 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-S0-12K40-00-R	12000 x 64 pixels	90 kHz	5.2 µm	8, 10, 12 bit selectable	HS Link	180 x 90 x 92 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
HS	HS-4x-02K30-00-R	2048 x 64 pixels	52 kHz	13 µm	8, 12 bit selectable	Camera Link	85 x 85 x 55 mm	CE	> 54 dB	0 ~ 50 °C
	HS-40-04K40-00-R	4096 x 96 pixels	36 kHz	7 µm	8, 12 bit selectable	Camera Link	85 x 85 x 55 mm	CE	> 63 dB	0 ~ 50 °C
	HS-80-04K40-00-R	4096 x 96 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-82-04K80-00-R	4096 x 96 pixels	110 kHz	14 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-80-08K80-00-R	8192 x 96 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-80-08K40-00-R	8192 x 96 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-S0-12K40-00-R	12000 x 256 pixels	90 kHz	5.2 µm	8, 10, 12 bit selectable	HS Link	90 x 180 x 92.5 mm	CE and RoHS	> 54 dB	0 ~ 50 °C
HS NIR	HN-80-08K40-00-R	8192 x 256 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 62 dB	0 ~ 50 °C
XL	PX-HM-16K12A-00-R	16384 pixels	125 kHz	5 µm	8, 12 bit	Camera Link HS	100 x 100 x 61 mm	CE and RoHS	> 69 DB	0 ~ 60 °C



PIRANHA ES/HS

Teledyne DALSA's high sensitivity line scan products use TDI (time delay and integration) technology. TDI permits much greater scanning speeds in low light, or allows reduced lighting levels (and costs) at conventional speeds. From wafer, PCB, and flat panel display inspection to high-end document scanning, Teledyne DALSA's advanced, high sensitivity line scan delivers an unmatched mix of sensitivity and speed.

KEY FEATURES

- Multi-line sensors with minimal line spacing for better synchronization and no prism artifacts
- Up to 100x more responsivity than traditional line scan cameras
- Forward and reverse scanning
- Individual gain and offset control for each color channel
- FPN and PRNU correction
- Single power supply



www.teledynedalsa.com/PiranhaTDI

AREA IMAGING

The versatility, breadth and depth of our area imaging portfolio ensure that you can solve any vision challenge. From cost-efficient, lower resolution cameras to feature-rich, high performance models, we offer an area camera for every inspection need.

www.teledynedalsa.com/Arealmaging

MULTI-MEGAPIXEL, HIGH SPEED IMAGING

Our cameras are built around the industry's most innovative image sensor technology—our own proprietary CMOS architectures as well as other recognized and proven advanced technologies.



FALCON2

Large resolutions and faster frame rates enable high speed image capture with superb spatial resolution.

- Resolutions from 4M to 12M
- Frame rates up to 168 fps
- Camera Link



GENIE TS

Versatile GigE Vision camera provides remarkable dynamic range to ensure optimized image capture.

- Resolutions from VGA up to 12M
- Frame rates up to 300 fps
- GigE Vision and Power over Ethernet (PoE)

FALCON2™ HIGH SPEED GLOBAL SHUTTER CMOS CAMERAS

Falcon2 cameras deliver high quality images of fast-moving objects without smear or distortion. Falcon2 models feature our latest CMOS image sensor technology for high speed and high-resolution imaging. Wrapped in a compact, rugged, thermally efficient body optimized for industrial applications, Falcon2 cameras deliver outstanding performance and value.



KEY FEATURES

- Reduced dark noise levels and improved dark offset
- Improved sensitivity
- In-camera image pre-processing (flat field, pixel correction)
- Customizable user settings
- Programmable exposure time via Camera Link or external hardware signals
- Selectable aspect ratios (4:3 and 1:1)

HIGH PERFORMANCE CMOS SENSORS

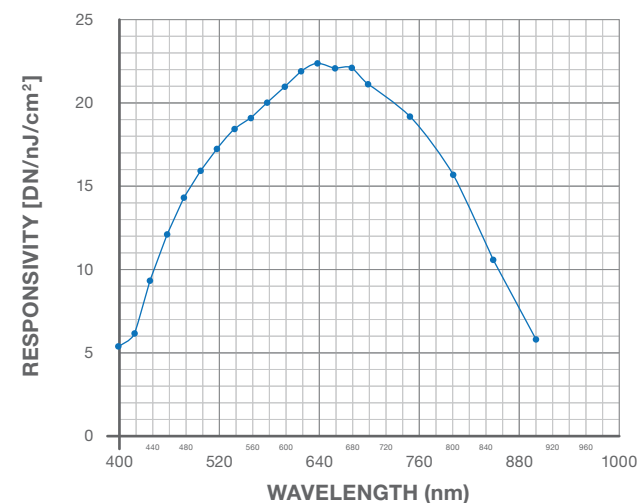
Inside the Falcon2 12M, 8M and 4M cameras are our latest generation of color and monochrome CMOS sensors. They deliver high resolutions and faster frame rates, enabling high speed image capture with superb spatial resolution and improved image quality. Global shuttering removes the unwanted smear and time displacement artifacts related to rolling shutter CMOS devices. These advanced sensors also offer reduced dark noise levels and improved dark offset, FPN (fixed pattern noise), and PRNU (Pixel Response Non-Uniformity) levels.

Together, these features make the Falcon2 cameras the best choice for applications where throughput, resolution and high pixel capacity matter most.

- Monochrome and color versions
- Global shutter CMOS
- 12M, 58 fps
- 8M, 90 fps
- 4M, 168 fps

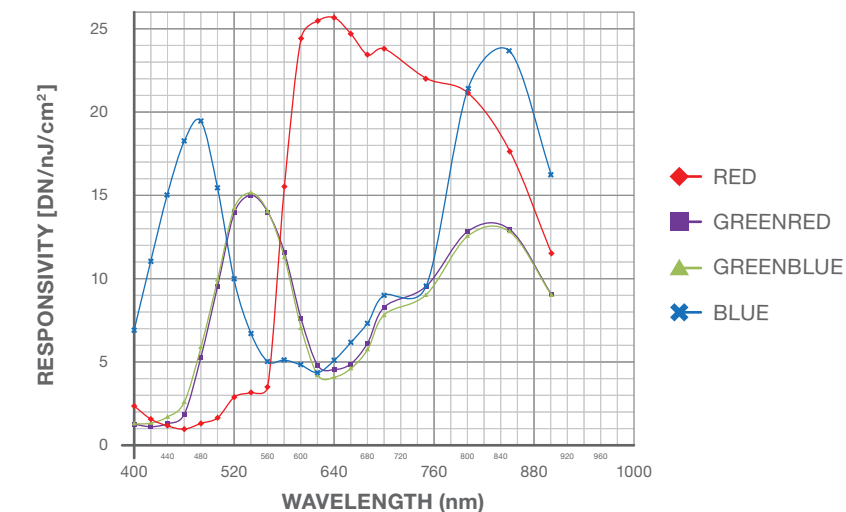
PART NO.	RESOLUTION	MAX LINE/FRAME RATE	FOR ALL
FA-80-4M180	1:1: 2048 x 2048	168 fps	PIXEL SIZE 6 μm BIT DEPTH 8, 10 bit INTERFACE Camera Link DIMENSIONS 60 x 60 x 80.5 mm COMPLIANCE RoHS, CE DYNAMIC RANGE 58 dB OPERATING TEMP 0 ~ 50 °C
	4:3: 2432 x 1728		
	FA-80-8M100	1:1: 2816 x 2816	
	4:3: 3328 x 2502		
FA-80-12M1H	4096 x 3072	58 fps	
FA-81-4M180	1:1: 2048 x 2048	168 fps	
	4:3: 2432 x 1728		
	FA-81-8M100	1:1: 2816 x 2816	90 fps
	4:3: 3328 x 2502		
FA-81-12M1H	4096 x 3072	58 fps	

Monochrome 8M Spectral Responsivity



Note: 8 Taps, 10 bits Camera LFinFkC, on, 24 fps (except 400 nm, measured at 10 fps), ND 0.3 filtered light

Color 12M Spectral Responsivity



Note: 8 taps / 10-bit / Camera Link / 9-Bit sensor digitization, FFC on / color-corrected / 4 fps (except for color red, which used a different frame rate at wavelength 560nm and below: 400-480nm was done at 1.8 fps, 500nm was done at 4 fps and 520-560), BG 38 filtered light



GENIE™ TS

THE WORLD'S MOST VERSATILE GigE VISION CMOS CAMERA

Combining more than 40 image optimization and processing features, Genie TS offers a capability set unmatched in the industry wrapped in a next-generation camera platform. The latest image sensors power the entire camera family, including Teledyne DALSA's own CMOS sensors.

Genie TS is engineered to meet the critical performance and environmental requirements of challenging applications such as Intelligent Traffic and Transportation Systems, where its remarkable dynamic range ensures optimized image capture from sun-to-shade.



KEY FEATURES

- Multiple exposure times / multiple gains
- Moving ROI / Cycling feature mode
- Class-leading quantum efficiency
- True Global Shutter
- User-Programmable or Externally-controlled exposure
- Auto-brightness
- Multiple exposure and gain
- Moving ROI
- Multiple flat field correction with pixel correction
- Pixel and color correction
- Color space conversion
- Image filtering and JPEG compression
- Image-on-demand
- Image multicasting

PART NO.	PART NO.	RESOLUTION	FRAME RATE	PIXEL SIZE	SENSOR	POWER SUPPLY	LENS MOUNT OPTION
TS-M1920	G2-GM10-T1921	2048 x 1088	70 fps	5.5 x 5.5 μm	CMOSIS CMV2000 (6EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-M1920-NIR	G2-GM12-T1921	2048 x 1088	70 fps	5.5 x 5.5 μm	CMOSIS CMV2000 (12EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-M2048	G2-GM10-T2041	2048 x 2048	35 fps	5.5 x 5.5 μm	CMOSIS CMV4000 (6EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-M2048-NIR	G2-GM12-T2041	2048 x 2048	35 fps	5.5 x 5.5 μm	CMOSIS CMV4000 (12EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-M2500	G2-GM10-T2505	2560 x 2048	29 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
TS-M2560	G2-GM10-T2561	2560 x 2048	51 fps	5 x 5 μm	ANAFOCUS LINCÉ 5M	12 - 24 Volt DC with PoE	CS-Mount STD
TS-M3500	G2-GM10-T3505	3520 x 2200	19 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
TS-M4096	G2-GM10-T4095	4096 x 3072	12 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
TS-C1920	G2-GC10-T1921	2048 x 1088	70 fps	5.5 x 5.5 μm	CMOSIS CMV2000 (6EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-C2048	G2-GC10-T2041	2048 x 2048	35 fps	5.5 x 5.5 μm	CMOSIS CMV4000 (6EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
TS-C2500	G2-GC10-T2505	2560 x 2048	29 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
TS-C3500	G2-GC10-T3505	3520 x 2200	19 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
TS-C4096	G2-GC10-T4095	4096 x 3072	12 fps	6 x 6 μm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread

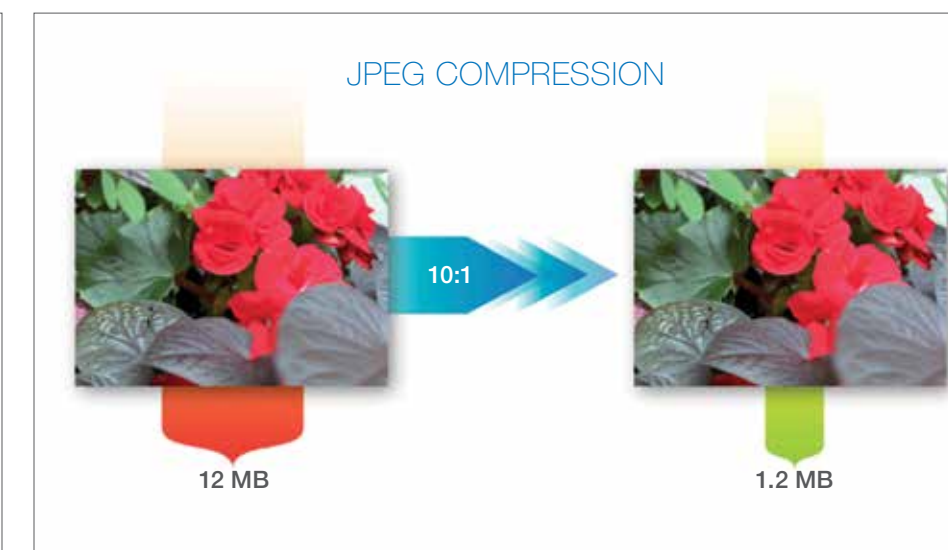
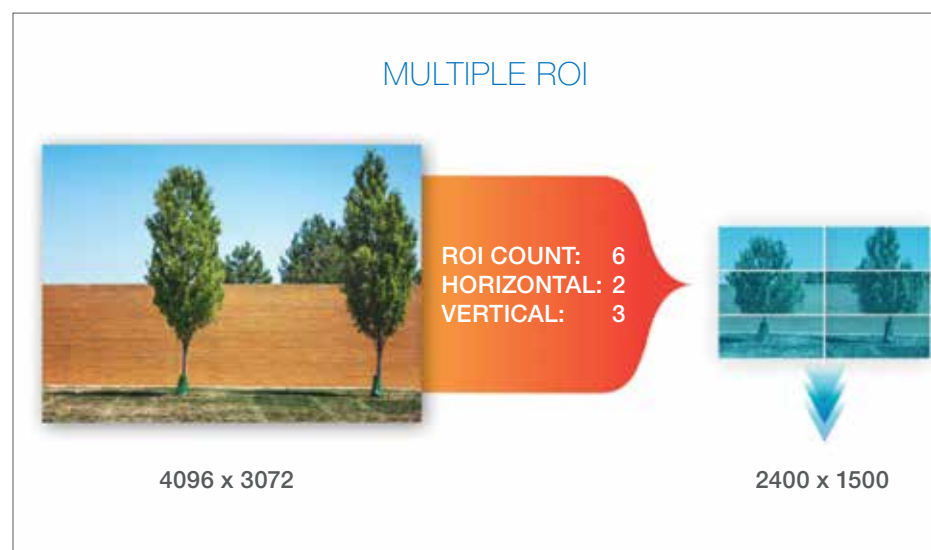


IMAGE ACQUISITION / PROCESSING

The workhorses of our high performance imaging systems, Teledyne DALSA image processors and frame grabbers are designed to optimize the camera interface, accelerate host bus transfers, and operate in diverse development environments.

www.teledynedalsa.com/Framegrabbers

FRAME GRABBERS

Frame grabbers have evolved from relatively simple analog-to-digital converters to very sophisticated platforms for both acquisition and processing. Today they offer performance and versatility, combining reliable acquisition at nanosecond intervals with powerful on-board processing and programmability.



Xtium™

The Xtium series is engineered to meet the ever-increasing image resolution and faster frame rates of today's camera technology.

- Half-length PCI Express Gen 2.0 x4 board
- Camera Link and Camera Link HS
- Extended cable distance at max data rate



Xcelera™

Xcelera Series leverages the PCI Express (PCIe) platform to bring traditional image acquisition and processing technology to new levels of performance and flexibility.

- Acquires images from one Base, Medium or Full Camera Link camera
- Acquisition rates up to 1GB/s and image transfer to host memory at 1GB/s
- Supports Camera Link operations up to 85MHz

XTIUM™ AND XCELERA™

PCIE GEN2, PCIE, AND PCI IMAGE ACQUISITION AND PROCESSING

We deliver the industry's most reliable and versatile family of frame grabbers, combining unparalleled performance with innovative feature sets, great value and extensive camera support.



XTIUM SERIES

The Xtium-CL MX4 is the latest addition to the Xtium-CL family of frame grabbers. Based on the PCI Express Rev 2.0 host interface, the Xtium-CL MX4 boards are field configurable to acquire images from either two Camera Link Base cameras or one Camera Link Medium, Full and 80-bit camera. First of its kind, the Xtium-CL MX4 offers universal Camera Link compatibility by offering Power-Over-CameraLink (PoCL) and delivers images at 1.7 GB/s in the host memory. Able to acquire images at 850 MB/s, the Xtium-CL series is fully supported by Teledyne DALSA's Sopera LT SDK and complies with Trigger-To-Image Reliability framework.



XCELERA SERIES

Xcelera Series leverages the PCI Express Rev 1.0 platform to bring traditional image acquisition and processing technology to new levels of performance and flexibility. The PCIe point-to-point host interface allows simultaneous image acquisition and transfers without loading the system bus and involves little intervention from the host CPU. The Xcelera-CL is a highly versatile series of frame grabbers that support PCIe x1, x4 and x8 platforms and scalable solution for entry level single Camera Link Base to high-performance vision processors boards.



T2IR

All Teledyne DALSA frame grabbers are fully supported by Sopera LT software development toolkit and comply with its field proven Trigger-To-Image Reliability (T2IR) framework. T2IR is a collection of hardware and software features offered as programmable functions, non-intrusive tools and utilities specifically designed to help machine vision OEMs and system's integrators acquire, track and trace images from the moment a part in place signal is received till a decision is rendered.

Acquisition & Control

- Deterministic
- Ensures data integrity
- Portable

Monitor & Supervise

- Offline and inline monitoring
- Event-driven, non-intrusive
- Detect false trigger, trigger loss, missed lines / frames

Traceability

- Tag image buffers with event, time, count, and external signals

	PRODUCT	CAMERA INTERFACE	CAMERA INPUT	PIXEL CLOCK	BITS/PIXEL	HOST INTERFACE	IMAGE PROCESSING	OS SUPPORT	GPIO
PCIE GEN2	Xtium-CL MX4	Camera Link	2 Base CL or One 1 Medium, Full or 80-bit camera. PoCL	20 to 85MHz	8, 10, 12, 14, 16 Mono 8, 10, 12 RGB	PCle x4 Gen2	Bayer, ILUTs	32/64-bit: Windows 7 and Windows 8	On-board 4-in/4-out (Shared, Reconfigurable)
	Xtium-CLHS	Camera Link HS	1 CX4	20 to 85MHz	8, 10, 12, 14, 16 Mono 8, 10, 12 RGB	PCle x4 Gen2	ILUTS	32/64-bit: Windows 7 and Windows 8	On-board 4-in/4-out (Shared, Reconfigurable)
PCIE	Xcelera-CL LX1 Base	Camera Link	MDR26: One Base - PoCL	20 to 85 MHz	8, 10, 12, 14, 16 Mono 8-bit RGB	PCle x1 Gen1	Image Flip	32/64-bit: Windows XP & Windows 7, Windows 8	N/A
	Xcelera-HS PX8	HS Link	1 CX4	20 to 85 MHz	8, 10 & 12 Mono	PCle x8 Gen1	ILUTs	32/64-bit: Windows XP, Windows 7, Windows 8, and Linux	On-board 4-in/4-out
	Xcelera-CL PX4 Series	Camera Link	Dual: 2 Base PoCL or 1 Med. Full: 1 Base, Med. or Full	up to 85 MHz	8, 10, 12, 14, 16 Mono 8, 10, 12 RGB	PCle x4	ILUTS, Flat Field, Flat Line, Dead Pixel Replacment, Bayer	32/64-bit: Windows XP Pro, Windows 7, and Windows 8.0/8.1	On-board 4-in/4-out
	Xcelera-CL + PX8 Series	Camera Link	Dual: 2 Base PoCL or 1 Med. Full: 1 Base, Med. or Full	20 to 85 MHz	8, 10, 12, 14, 16 Mono 8, 10, 12 RGB	PCle x8	ILUTS, Flat Field, Flat Line, Dead Pixel Replacment, Bayer	32/64-bit: Windows XP Pro, Windows 7, and Windows 8.0/8.1 ()	On-board 4-in/4-out
VISION PROCESSORS	Xcelera-CL VX4 Full	Camera Link	1 Base, Med. or Full	up to 85 MHz	up to 16-bit	PCle x4	FPGA hardware processing platform	32/64-bit: Windows XP Pro, Windows 7	On-board 4-in/4-out



INTRODUCING XTIUM-CL MX4: HIGHER BANDWIDTH AND GREATER PRODUCT SUPPORT

Building on the field proven capability of Teledyne DALSA's Xcelera frame grabber series, the Xtium-CL MX4 is based on the industry standard PCI Express™ Gen 2.0 expansion bus to deliver high speed access to host memory. The new Xtium series offers higher bandwidth to sustain higher bit-rate modes over longer cable distances and

supports a wide variety of area and line scan color/monochrome cameras, all in a compact, half-length, single slot solution.

- Supports PCI Express Rev 2.0 x4 or higher, backwards compatible
- Camera Link Rev 2.0 (one Base PoCL, Medium or Full PoCL cameras)

- Delivers 2x performance on host transfers
- Single slot solution with reconfigurable I/O
- Supported by Sopera Vision SDK and Sopera CamExpert



VISION SYSTEMS

Designed for factory floor deployment, our innovative multi-camera vision systems and smart cameras offer scalable solutions to satisfy a wide range of application needs, from positioning robotic handlers to complete assembly verification. We offer a wide range of cost-effective solutions for automated optical inspection solutions, from smart cameras to high performance multi-camera controllers that support both area and line scan applications.

01. POSITIONING

Guide robotic handlers or adjust vision tools for part movement

02. IDENTIFYING

Identify product for verification or traceability

03. VERIFYING

Verify parts for correctness, assembly, or packaging

04. MEASURING

Measure parts for dimensional accuracy

05. FLAW DETECTING

Check part surfaces for scratches and other defects

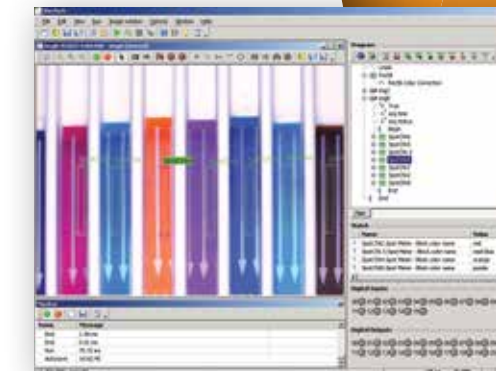
www.teledynedalsa.com/VisionSystems

SHERLOCK™ THE VISION SOFTWARE CHOICE AMONG INTEGRATORS

Sherlock is advanced machine vision software that can be applied to a wide variety of automated inspection tasks. This graphical design environment provides a rich suite of proven tools and capabilities that have been deployed in thousands of installations worldwide. Recognized throughout the machine vision industry, Sherlock offers the flexibility to satisfy the full spectrum of vision applications in industry. Sherlock is supported on 32-bit and 64-bit Windows machines as well as BOA smart cameras.

KEY FEATURES

- Flexible region of interest selection
- Extensive set of conditioning functions
- Advance pattern finding tools for object alignment and robot guidance
- Precise tools for computing the dimensions



iNspect™ MACHINE VISION SOFTWARE MADE SIMPLE

iNspect Express is a vision application specifically designed to simplify the design and deployment of automated inspection on the factory floor. iNspect Express offers both new and experienced users a practical tool for delivering uncompromised functionality that can be readily applied to a wide range of manufacturing tasks.

KEY FEATURES

- Multiple cameras and image sizes
- Emulator for offline development
- Same interface for set up and runtime
- Support for custom local interfaces
- Access control: direct connect to 3rd-party interfaces
- Solution switching via I/O or network
- Image logging and playback
- FREE updates

INTRODUCING iNspect EXPRESS 1.9

iNspect Express 1.9 offers many new features and tools, including multi-point calibration, match tool masking and edge control, a trainable tool (verify) for defect detection, a measurement tool for thread inspection and tool cloning.

BOA™ SMART CAMERAS, COMPLETE VISION SYSTEMS FOR AUTOMATION

Easy to setup and deploy, Teledyne DALSA's BOA products are highly integrated vision systems in a tiny smart camera package specifically designed for industrial use. Complete with choice of embedded application software, BOA offers a robust and flexible automated inspection system that is easy to integrate and deploy on the factory floor.



ALL OF THE ELEMENTS OF AN INDUSTRIAL MACHINE VISION SOLUTION:

- Sensor
- Light Control
- Multiple Processors
- I/O
- Factory Communications
- Developer and Operator interfaces

BOA INS

The standard product is offered with our iNspect Express software. Ideal for both new and experienced users, iNspect Express can be quickly set-up to satisfy a multitude of common inspection tasks

BOA IDR

The IDR version is offered with a subset of iNspect Express tools that apply only to identification, tracking and associated verification applications. BOA IDR is a good choice for manufacturers who need to identify product markings for correctness or traceability.

BOA PRO

The PRO version is offered with our coveted Sherlock application software. Ideal for vision integrators, Sherlock provides the flexibility and tools to tackle the diverse range of applications across all industrial segments.

SENSOR	640 x 480						1024 x 768						1280 x 960						1600 x 1200					
	BOA		BOA50		BOA200		BOA		BOA50		BOA200		BOA		BOA50		BOA200		BOA		BOA50		BOA200	
PERFORMANCE																								
MONO/COLOR	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
BOA INS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
BOA IDR	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
BOA PRO			✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓		✓		✓	✓	✓



INTRODUCING BOA2: THE NEWEST, FASTEST, AND MOST VERSATILE MEMBER TO OUR BOA FAMILY

The BOA2 takes our traditional BOA platform to a new level of performance and flexibility. Its five megapixel 1" sensor ensures higher precision measurements, smaller defect detection, and increased inspection area. The BOA2 delivers all of the features and capabilities of our standard BOA platform with a number of key enhancements, including:

- I/O interfaces positioned to allow for top, front, or back mounting
- Both internal and external (white ring light assembly) lamp / lighting options
- 10/100/1000 BaseT Ethernet including Passive Power over Ethernet (PPoE)
- Multiple I/O: 2 inputs / 3 outputs

GEVA™ MULTI-CAMERA VISION SYSTEMS

Teledyne DALSA's GEVA vision platform provides the performance and flexibility to meet the challenging requirements of multi-camera applications. GEVA offers a centralized processing model that supports low cost camera expansion.



		GV-300	GV-312T	GV-1000	GV-3000	GV-3000CL
PROCESSING SCALE	Relative	1X	1X	3-4X	6-8X	6-8X
	Program	2 GB	2 GB	2 GB	8 GB	8 GB
	Storage	40 GB SS	32 GB CFAST	40 GB SS	60 GB SS	60 GB SS
IMAGE	Sensor Type	GigE	GigE	GigE	GigE	Camera Link
	Max. # Sensors	Expandable	Expandable	Expandable	Expandable	2
COMMUNICATION	Sensor Format	Area	Area	Area	Area/Line	Line/Area
	Color Support	Yes	Yes	Yes	Yes	Yes
	Sensor Size Min.	640 x 480	640 x 480	640 x 480	640 x 480	1024 x 1
	USB	3 (2.0)	5 (2.0)	2 (2.0)	6 (2.0)	6 (2.0)
	Ethernet (Mbps)	6 x 1000	2 x 1000	3 x 1000	6 x 1000	2 x 1000
	Serial (RS232)	1	4	1	2	2
DISPLAY OPTIONS	Visual (LEDs)	3	1	3	2	2
	Display	External	Embedded Touch	External	External	External
	Setup GUI	Local	Local	Local	Local	Local
I/O	Operator	Local	Local	Local	Local	Local
	Access	Breakout	Breakout	Local	Breakout	Breakout
	Type	24V Opto	24V Opto	24V Opto	24V Opto	24V Opto
SOFTWARE POWER	# Inputs (configurable)	8	8	8 + 2 triggers	8	4 + 2 triggers
	# Outputs (configurable)	12	12	8 + 2 strobes	12	4 + 2 strobes

iNspect Express, Sherlock
24V @ 2.5A

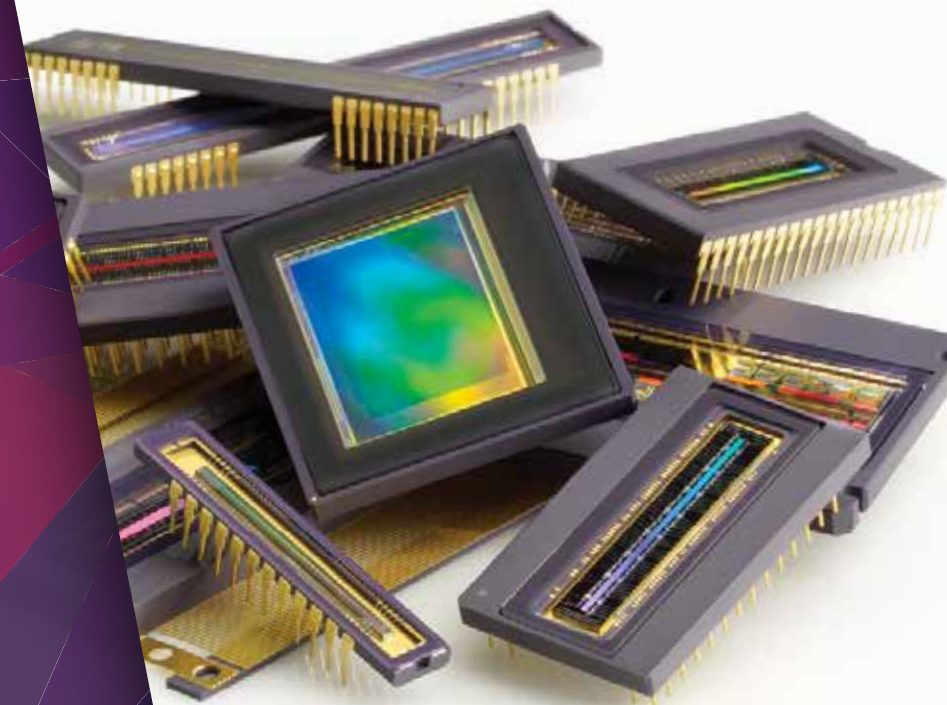
CUSTOM AND SEMI-CUSTOM SOLUTIONS

To satisfy your most innovative, demanding customers, you may need an unique competitive advantage. Custom solutions can vary from completely new devices to minor tweak to hardware or firmware that enable specialized applications, make integration easier, or simply reduce costs. If you have wondered if it were possible to reduce image data before transferring to the host computer, needed a camera in a smaller footprint, or wanted a more efficient algorithm, a custom or semi-custom solution could be the answer.

www.teledynedalsa.com/Custom

IMAGING SOLUTIONS TO MEET YOUR EXACTING REQUIREMENTS FROM MINOR TWEAKS TO MAJOR ENGINEERING

Our wide selection of multi-featured line scan cameras offer high speed, high responsivity, programmable pixel-to-pixel correction, reduced integration time, and a host of other features along with a choice of interfaces to deliver high speed and high throughput inspections.



CAPABILITIES

- CMOS, CCD, and TDI image sensors and cameras
- Custom multispectral filters
- High speed, high resolution designs
- Back-side thinning
- UV hardening on sensors
- High speed fiber optic interfaces
- Active sensor cooling

MANUFACTURING CAPABILITIES

- Color CCD manufacturing
- Custom window attachment and sensor packaging for challenging environments
- Backside thinning
- Radiation tolerance
- Fiber optic attachments
- Extended environmental testing, including basic MIL-STD, ESA

IMAGE SENSOR DESIGN

- NIR and IR sensors, including Microbolometers
- Color and multispectral filters
- Spectrum coverage from X-ray through deep UV, visible, NIR, SWIR, MWIR, and LWIR
- Ultra high speed (100M fps)
- Ultra high resolution (100+ megapixels)
- Wafer scale devices
- Radiation hardness

CAMERA ARCHITECTURE DESIGNS

- 1000-output TDI cameras with greater than 10 GP/s throughput
- 256-output TDI cameras with 4 GP/s throughput
- Ultra-high speed with on-chip multi-frame storage, 100,000,000 fps burst rate
- Remote head, stackable and single board camera designs
- High speed serialized data interfaces up to 10 Gb/s
- Cooling options for low noise and long exposure

PRIORITY VISION SYSTEM ENGINEERING SUPPORT

Our customers benefit from priority technical support, and are ensured of a quick response and access to an experienced technical/ applications team who understand that every machine vision application is unique.

FAST REPAIR AND COMPONENT REPLACEMENT

A downed inspection system can cost thousands of dollars in production yield and lost business. We work with you to ensure back-up components are ready and waiting when you need them. We've developed a priority delivery and order tracking program to give you 100% visibility on order fulfillment. We can also build in flexibility to modify delivery schedules, hold back or accelerate shipments to meet your needs.

TECHNOLOGY, SERVICE AND SUPPORT

With rapidly evolving technology, design engineers are rightfully concerned that components they've specified for their vision system may be discontinued or supplanted by newer technology leaving them scrambling to redesign and retrofit. We are committed to supporting legacy products and providing an efficient migration path when products are discontinued.

LOGISTICAL SUPPORT AND TRAINING

Our partners have 24/7 access to on-line, web-based tools for order tracking, account management, and technical support. These tools offer unprecedented visibility and control over the supply chain, allowing them a quick response to changing production demands. We offer comprehensive training to support your front line staff. Customers can take advantage of both hardware and software training programs that can be conducted in our training facility or easily suitcased to a location of your choice.

www.teledynedalsa.com

AMERICAS

700 Technology Park Drive
Billerica, MA 01821
USA

Tel: 978.670.2000
Fax: 978.670.2015

605 McMurray Road
Waterloo, Ontario N2V 2E9
Canada

Tel: 519.886.6000
Fax: 519.886.8023

sales.americas@teledynedalsa.com

ASIA PACIFIC

Ikebukuro East 13F
3-4-3 Higashi Ikebukuro,
Toshima-ku, Tokyo, Japan

Tel: +81.3.5960.6353
Fax: +81.3.5960.6354

Shanghai Industrial Investment Building
Room G, 20F, 18 North Cao Xi Road
Shanghai 200030
China

Tel: +86.21.64279081
Fax: +86.21.64699430

sales.asia@teledynedalsa.com

EUROPE

Lise-Meitner-Str. 7
82152 Krailling,
Germany

Tel: +49.8989.545730
Fax: +49.8989.5457346

sales.europe@teledynedalsa.com