ADVANCED IMAGE CAPTURE, ACQUISITION, AND PROCESSING

MACHINE VISION OVERVIEW
Overview

Teledyne DALSA is an international leader in high performance digital imaging and semiconductors with approximately 1000 employees worldwide. We design, develop, manufacture, and market digital imaging components and solutions in addition to providing semiconductor products and services. Our core competencies are in specialized integrated circuit and electronics technology, software, and highly engineered semiconductor wafer processing.

A HISTORY OF SUCCESS - AN IMMENSE TECHNOLOGY PORTFOLIO

With core competencies in CCD and CMOS imagers, high-performance cameras, image processing hardware and software, we are committed to enabling industry and exploration through innovative technology.

After more than 30 years of designing the world’s highest performance digital imaging and semiconductor solutions, we continue to bring innovation to the industries that choose our technology above all others. By focusing on R&D development and drawing on the capabilities available to us as part of the larger Teledyne family of companies, our customers benefit from both enabling technology and our growing capability to bring them success in their markets.
Teledyne DALSA has a long history of delivering innovative and industry-leading line scan imaging. We offer standard resolutions from 512 to 16384 pixels, TDI, single or multiple lines, monochrome or color models, antiblooming, exposure control, 100% fill factor, and many other features that high-performance inspections demand.

SETTING THE BAR FOR LINE SCAN
We deliver industry leading resolution, speed, sensitivity, and dynamic range in line scan imagers. And we back up our performance with advanced features including programmable pixel-to-pixel correction, reduced integration time, and a host of other features along with a choice of Camera Link®, Camera Link HS™ or GigE Vision® interfaces to deliver high speed and high throughput inspections.

ADVANTAGES OF LINE SCAN IMAGING
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 Camera Link®, Camera Link HS™ or GigE Vision® interfaces to deliver high speed and high throughput inspections.

TECHNOLOGY FEEDS

LINE SCAN IMAGING

CMOS FOR LINE SCAN
We are committed to the further development of CMOS imaging for 1-Dimensional imaging. Here’s why:

- **SPEED**
  - Net higher throughput (parallelism in analog)
- **NOISE**
  - Net lower noise (slow speed analog)
- **POWER**
  - Net lower power (slow speed analog, low V)
- **SIZE**
  - Small body improves integration in tighter spaces

Spyder™
- Resolutions from 512 to 4k
- Line rates to 68 kHz
- Camera Link and GigE Vision
- Piranha™, Piranha™ 3, and Piranha™ 4
- Resolutions from 1k to 16k
- Line rates to 140 kHz
- Camera Link, HS Link
- Piranha™ HS
- Resolutions to 12k
- Time Delay & Integration (TDI)
- Low-light imaging

THE RUNDOWN

Spyder™
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- Camera Link, HS Link
- Piranha™ HS
- Resolutions to 12k
- Time Delay & Integration (TDI)
- Low-light imaging
High speed and high responsivity imaging in a range of resolutions — from 1k to 8k, with the fastest line rates in the industry.

**PIRANHA™4 CMOS LINE SCAN – COLOR & MONOCHROME IMAGING**

Based on Teledyne DALSA’s optimized CMOS line scan sensor architecture, the Piranha4 cameras provide outstanding signal-to-noise ratio for high speed imaging. The P4-4k delivers 4k resolution with a 10.5 x 10.5 µm or 7 x 7 µm pixel size for optimized optical design and delivers a maximum line rate of 100 kHz in TDI mode and 200 kHz in area mode. The Piranha-4k’s trilinear CMOS sensor provides native red, green and blue color output at 70 kHz line rate with minimum spatial separation for the maximum in color accuracy and performance.

Subpixel spatial correction allows precise color registration for any sampling scenario. An advanced GenICam™ compliant interface makes the camera easier to setup, control, and integrate. Programmability includes exposure control, flat field correction, and gain settings.

A complete listing of products is available from our website, www.teledynedalsa.com/mv

**PIRANHA4 FEATURE PAGE**

**PART NO.**

**RESOLUTION**

**LINE RATE**

**PIXEL SIZE**

**BIT DEPTH**

**INTERFACE**

**MEASUREMENT**

**COMPLIANCE**

**DYNAMIC RANGE**

**OPERATING TEMP**

<table>
<thead>
<tr>
<th>P4-CC-02K07T-00-R</th>
<th>2048 x 3 pixels</th>
<th>70 kHz</th>
<th>14.09 x 14.09 µm</th>
<th>8, 10, 12 bit selectable</th>
<th>Camera Link</th>
<th>62 x 62 x 48 mm</th>
<th>CE, FCC, and RoHS</th>
<th>&gt; 60 dB</th>
<th>0 ~ 65 °C</th>
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<tbody>
<tr>
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<td>50 kHz</td>
<td>10.56 x 10.56 µm</td>
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<td>Camera Link</td>
<td>80 x 60 x 57 mm</td>
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<tr>
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<td>7.04 x 7.04 µm</td>
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<table>
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<tr>
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<th>140 kHz (280 kHz)*</th>
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<th>&gt; 60 dB</th>
<th>0 ~ 65 °C</th>
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</thead>
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<tr>
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<td>CE, FCC, and RoHS</td>
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<td>P4-CM-02K14D-00-R</td>
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<td>8, 12 bit selectable</td>
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<td>Camera Link</td>
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<tr>
<td>P4-CM-04K07E-00-R</td>
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<td>P4-CM-08K070-00-R</td>
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<td>80 x 60 x 57 mm</td>
<td>CE, FCC, and RoHS</td>
<td>&gt; 60 dB</td>
<td>0 ~ 50 °C</td>
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**NEW!**

High speed and high responsivity imaging in a range of resolutions — from 1k to 8k, with the fastest line rates in the industry.

**COLOR LINE SCAN IMAGING TECHNOLOGY**

**TRILINEAR CMOS**

**BILINEAR CMOS**

**ABSORPTION FILTER EASY TO USE**

**A COMPLETE LISTING OF PRODUCTS IS AVAILABLE FROM OUR WEBSITE.**

www.teledynedalsa.com/mv

**TELEDYNE DALSA**

Everywhere you look
### LINE SCAN DEFINED

Line scan imaging uses a single line of pixels to build a two-dimensional image. The second dimension results from the motion of the object being imaged.

### ADVANTAGES OF LINE SCAN IMAGING:

- **Price/pixel**: more cost-effective implementations of very high spatial resolution image capture
- **High speed**: High responsibility with Time Delay & Integration
- **High pixel fill-factor (typically 100%) to maximize sensitivity**
- **Smear-free image capture** of fast moving objects without expensive or cumbersome shuttering
- **Processing efficiency**: Line scan delivers a seamless image without frame overlap which means no redundant data to eat up precious processing bandwidth

### LINE SCAN IMAGING BASICS

www.teledynedalsa.com/mv

### LINE SCAN FOR WEB INSPECTION

2K X 2K AREA SCAN X 4

### TD TECHNOLOGY

**PIRANHA ES**

<table>
<thead>
<tr>
<th>PART NO.</th>
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<th>PIXEL SIZE</th>
<th>BIT DEPTH</th>
<th>INTERFACE</th>
<th>DIMENSIONS</th>
<th>COMPLIANCE</th>
<th>DYNAMIC RANGE</th>
<th>OPERATING TEMP</th>
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<tbody>
<tr>
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<td>8, 12 bit selectable</td>
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<td>150 x 150 x 65 mm</td>
<td>CE and RoHS</td>
<td>&gt; 64 dB</td>
<td>0 ~ 65 °C</td>
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<tr>
<td>ES-60-08X00-R</td>
<td>4096 x 16 pixels</td>
<td>110 kHz</td>
<td>3 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>150 x 150 x 65 mm</td>
<td>CE and RoHS</td>
<td>&gt; 64 dB</td>
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</tr>
<tr>
<td>ES-60-08X00-R</td>
<td>4096 x 16 pixels</td>
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<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>150 x 150 x 65 mm</td>
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</tr>
<tr>
<td>ES-60-12X00-R</td>
<td>4096 x 64 pixels</td>
<td>110 kHz</td>
<td>15 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>150 x 150 x 65 mm</td>
<td>CE and RoHS</td>
<td>&gt; 64 dB</td>
<td>0 ~ 65 °C</td>
</tr>
<tr>
<td>ES-60-12X00-R</td>
<td>1200 x 304 pixels</td>
<td>90 kHz</td>
<td>5.2 µm</td>
<td>8, 10, 12 bit selectable</td>
<td>HS Link</td>
<td>160 x 300 x 62 mm</td>
<td>CE and RoHS</td>
<td>&gt; 64 dB</td>
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**PIRANHA HS**

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<tr>
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<th>PIXEL SIZE</th>
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<th>INTERFACE</th>
<th>DIMENSIONS</th>
<th>COMPLIANCE</th>
<th>DYNAMIC RANGE</th>
<th>OPERATING TEMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-4x-02X00-R</td>
<td>2048 x 64 pixels</td>
<td>52 kHz</td>
<td>13 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>65 x 85 x 55 mm</td>
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<tr>
<td>HS-40-04X00-R</td>
<td>4096 x 32 pixels</td>
<td>38 kHz</td>
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<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>85 x 85 x 55 mm</td>
<td>CE</td>
<td>&gt; 64 dB</td>
<td>0 ~ 50 °C</td>
</tr>
<tr>
<td>HS-80-04X00-R</td>
<td>4096 x 32 pixels</td>
<td>38 kHz</td>
<td>7 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>85 x 85 x 55 mm</td>
<td>CE</td>
<td>&gt; 64 dB</td>
<td>0 ~ 50 °C</td>
</tr>
<tr>
<td>HS-80-08X00-R</td>
<td>4096 x 16 pixels</td>
<td>70 kHz</td>
<td>15 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>85 x 85 x 55 mm</td>
<td>CE</td>
<td>&gt; 64 dB</td>
<td>0 ~ 50 °C</td>
</tr>
<tr>
<td>HS-80-12X00-R</td>
<td>1200 x 256 pixels</td>
<td>90 kHz</td>
<td>5.2 µm</td>
<td>8, 10, 12 bit selectable</td>
<td>HS Link</td>
<td>160 x 360 x 52 mm</td>
<td>CE and RoHS</td>
<td>&gt; 64 dB</td>
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**PIRANHA HS NIR**

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<tr>
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<th>INTERFACE</th>
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<th>COMPLIANCE</th>
<th>DYNAMIC RANGE</th>
<th>OPERATING TEMP</th>
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<tbody>
<tr>
<td>HS-4x-02X00-R</td>
<td>2048 x 64 pixels</td>
<td>34 kHz</td>
<td>7 µm</td>
<td>8, 12 bit selectable</td>
<td>Camera Link</td>
<td>60 x 150 x 65 mm</td>
<td>CE and RoHS</td>
<td>&gt; 62 dB</td>
<td>0 ~ 50 °C</td>
</tr>
</tbody>
</table>

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A complete listing of products is available from our website: www.teledynedalsa.com/mv

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Line scan imaging uses a single line of pixels to build a two-dimensional image. The second dimension results from the motion of the object being imaged. Line scan imaging is typically used for applications requiring high speed and density of data capture, such as web inspection, machine vision, and quality control. The high pixel fill-factor (typically 100%) allows for maximum sensitivity, while the smear-free image capture ensures that fast moving objects are captured without blurring or compromise. The processing efficiency of line scan cameras means that there is no redundant data to process, providing a significant reduction in computational load. This makes line scan cameras ideal for applications with strict latency requirements or those that require high throughput. The high-speed capability of line scan cameras is achieved through the use of Time Delay & Integration (TDI) technology, which allows for the capture of high-resolution images at high frame rates. This technology, combined with the compact and lightweight design of line scan cameras, makes them suitable for a wide range of applications, from industrial inspection to medical imaging and beyond.
Teledyne DALSA offers a powerful array of area scan cameras. From cost-efficient, lower resolution GigE Genies to higher resolution and feature-rich Genie TS cameras to multi-megapixel high speed Falcon2 models, we offer an area scan camera for nearly every inspection need.

**QUALITY IN MIND.**

All cameras undergo a rigorous 4 stage manufacturing test: Pre-HASS, HASS, Post HASS functional test, and final optical test.

**ADVANCED DESIGN**

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. Our cameras are optimized to take full advantage of the unique characteristics of the image sensors at their heart.
FALCON’2 4M/8M/12M

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, high resolution imaging and true global shuttering.

Falcon2 cameras deliver an extensive feature set that includes programmable exposure time via Camera Link or by external hardware signals, and selectable aspect ratios (4:3 and 1:1). Wrapped in a compact, rugged, thermally efficient body optimized for industrial applications, Falcon2 cameras deliver outstanding performance and value.

- Reduced dark noise levels and improved dark offset
- Improved sensitivity
- In-camera image pre-processing (flat field, pixel correction)
- Customizable user settings

Combining Teledyne DALSA’s expertise in image sensors, cameras and image processing with off-the-shelf development tools and libraries, Icon allows system integrators and OEMs the ability to create and deliver cost effective, customized embedded vision system applications.

- Fully supported by Embedded Sapera Vision SDK, with unified API across camera models
- Open platform with the flexibility to add custom code and algorithms using C/C++
- Self-contained unit, operates without a PC

ICON® USER PROGRAMMABLE CAMERA

The Icon series offers system developers unprecedented power and flexibility to create their own embedded imaging applications.

Combining Teledyne DALSA’s expertise in image sensors, cameras and image processing with off-the-shelf development tools and libraries, Icon allows system integrators and OEMs the ability to create and deliver cost effective, customized embedded vision system applications.

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A complete listing of products is available from our website.

www.teledynedalsa.com/mv

www.teledynedalsa.com/icon

GLOBAL SHUTTER PRIMER

www.teledynedalsa.com/globalshutter

™

CAMERA LINK HS (CLHS) Next generation Falcon cameras will include CLHS and be supported by our Xtium frame grabber series.

FALCON2

<table>
<thead>
<tr>
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<th>LINE/FRAME RATE</th>
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<td>Camera Link</td>
<td>60 x 60 x 80.5 mm</td>
<td>RoHS, CE</td>
<td>56 dB</td>
</tr>
<tr>
<td></td>
<td>4:3: 2432 x 1728</td>
<td>90 fps</td>
<td>6 µm</td>
<td>10-bit</td>
<td>Camera Link</td>
<td>60 x 60 x 80.5 mm</td>
<td>RoHS, CE</td>
<td>56 dB</td>
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<tr>
<td></td>
<td>4:3: 3328 x 2502</td>
<td>60 fps</td>
<td>6 µm</td>
<td>10-bit</td>
<td>Camera Link</td>
<td>60 x 60 x 80.5 mm</td>
<td>RoHS, CE</td>
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<td>4:3: 2432 x 1728</td>
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<td>10-bit</td>
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<td>6 µm</td>
<td>10-bit</td>
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<td>10-bit</td>
<td>Camera Link</td>
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<td>RoHS, CE</td>
<td>56 dB</td>
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<tr>
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<td>4:3: 2432 x 1728</td>
<td>90 fps</td>
<td>6 µm</td>
<td>10-bit</td>
<td>Camera Link</td>
<td>60 x 60 x 80.5 mm</td>
<td>RoHS, CE</td>
<td>56 dB</td>
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<td></td>
<td>4:3: 3328 x 2502</td>
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<td>6 µm</td>
<td>10-bit</td>
<td>Camera Link</td>
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<td>FCC, CE, RoHS</td>
<td>57 dB</td>
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<tr>
<td></td>
<td>1024 x 768</td>
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<td>8-bit</td>
<td>Ethernet 100-BaseT</td>
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<td>55 dB</td>
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<td>55 dB</td>
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<td>FCC, CE, RoHS</td>
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<th>COMPLIANCE</th>
<th>DYNAMIC RANGE</th>
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<tbody>
<tr>
<td>K1-EC0B-SKT10</td>
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<td>80 fps</td>
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<td>44 x 44 x 44 mm</td>
<td>FCC, CE, RoHS</td>
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<td></td>
<td>1024 x 768</td>
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<td>8-bit</td>
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<td>1280 x 960</td>
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<td>55 dB</td>
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</tbody>
</table>

*Falcon2 cameras feature a flexible aspect ratio, 1:1 or 4:3.
A complete listing of products is available from our website.
[www.teledynedalsa.com/mv]

GENIE™ THE MOST POWERFUL, VERSATILE GIGE CAMERA
An incredible feature set unmatched in the industry.

Our Genie TS series combine the industry’s latest image sensor technology—including our own advanced CMOS devices—with a newly optimized camera platform and Power over Ethernet (PoE) to deliver the most powerful feature set ever in a GigE Vision camera.

Genie HM/HC cameras are a series of affordable, easy-to-use digital cameras specifically engineered for industrial imaging applications requiring high frame rates. HM = Monochrome
HC = Color

All Genie cameras combine gigabit ethernet technology with our Trigger-to-Image Reliability framework to reliably capture and transfer images from camera to host PC. Models are based on high quality image sensors and available in resolutions from VGA to 12 Megapixels, color and monochrome.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PART NO.</th>
<th>RESOLUTION</th>
<th>FRAME RATE</th>
<th>PIXEL SIZE</th>
<th>SENSOR</th>
<th>POWER SUPPLY</th>
<th>LENS MOUNT OPTION</th>
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<tr>
<td>TS-M1920</td>
<td>G2-GM10-T1920</td>
<td>1920 x 1080</td>
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<td>TS-M2500</td>
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<td>2560 x 2048</td>
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<td>M42 x 1 thread</td>
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<td>3520 x 2200</td>
<td>12 fps</td>
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HM SERIES* MONO

<table>
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<tr>
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<th>PIXEL SIZE</th>
<th>SENSOR</th>
<th>POWER SUPPLY</th>
<th>LENS MOUNT OPTION</th>
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</thead>
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<tr>
<td>HM640</td>
<td>G2-GM00-H6400</td>
<td>640 x 480</td>
<td>200 fps</td>
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<td>12 - 24 Volt DC</td>
<td>C-mount STD</td>
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<tr>
<td>HM1024</td>
<td>G2-GM00-H1020</td>
<td>1024 x 768</td>
<td>117 fps</td>
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<td>HM1400</td>
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HC SERIES* COLOR

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<td>HC640</td>
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<td>64 fps</td>
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</tbody>
</table>

*90 degree lens mount version available
**Extended Dynamic Range version available

A complete listing of products is available from our website.
[www.teledynedalsa.com/mv]
The Teledyne DALSA family of frame grabbers combines industry leading performance and reliability with powerful feature sets, great value and extensive camera support. Board-level innovations deliver Trigger-to-Image Reliability, significantly increasing system performance and ultimately helping to increase yield.
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 PX4 is the first in a new series of frame grabbers based on the latest PCI Express™ Rev 2.0 host interface, to deliver bandwidth greater than 1.7 GB/s. The XTium frame grabber series is backwards compatible with a PCIe Rev 1.0 slot to deliver 850 MB/s and designed to support Camera Link, Camera Link HS and other emerging interface standards. The newly re-engineered, on-board, Data Transfer Engine (DTE) produces maximum bandwidth without the need for specialized motherboards or chipsets. By enabling maximum sustained throughput and ready-to-use image data, the XTium-CL PX4 minimizes CPU usage and improves processing times for host applications. In addition, the XTium-CL PX4 has been engineered with enhanced memory architecture allowing it to handle different sensor tap topologies while sustaining color decoding at the maximum frame/line rate.

**Xcelera Series**
Xcelera Series leverages the PCI Express (PCIe) 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 transfer without loading the system bus and involves little intervention from the host CPU. The X64 Xcelera-CL LX1 Base is a highly versatile PCIe frame grabber capable of acquiring images from two independent Camera Link Base cameras and performing image transfers at rates up to 1024MB/s.

**X64 Series**
Compatible with a Basic, Medium or Full Camera Link camera, the X64-CL Full frame grabber is universal PCIe slot compliant and supports a wide variety of multiple tap area and linescan color and monochrome cameras. For greater versatility, the X64-CL Full board can also interface with camera pixel depths and tap configurations not covered by the Camera Link standard.

---

**PRODUCT** | **CAMERA INTERFACE** | **CAMERA INPUT** | **PIXEL CLOCK** | **BITS/PIXEL** | **HOST INTERFACE** | **IMAGE PROCESSING** | **OS SUPPORT** | **GPIO**
---|---|---|---|---|---|---|---|---
XTium-CL PX4 | Camera Link | SDR-26: One Base PoCL, Full, Medium PoC-LX1, or Base PoC-LX1 | 20 to 50 MHz | 8, 10, 12, 14 & 16 Mono | PCIe x4 Gen2 | FFLC/FLC, Base | 32/64-bit Windows 7 & Windows 8 | On-board 4-in/4-out (Shared, Reconfigurable)
Xcelera-CL LX1 Base | Camera Link | MDR-26: One Base PoCL | 20 to 50 MHz | 8, 10, 12, 14 & 16 Mono | PCIe x4 Gen2 | ILUTs | 32/64-bit Windows 7 & Windows 8 | N/A
Xcelera-CL LX1 Full | Camera Link | MDR-26: Two Base or One Medium PoCL | 20 to 50 MHz | 8, 10, 12, 14 & 16 Mono | PCIe x8 Gen3 | ILUTs | 32/64-bit Windows 7 & Windows 8 | N/A
Xcelera-CL LX1 Pro | Digital - Camera Link | Test Base or One Medium | 20 to 50 MHz | 8, 10, 12, 14 & 16 Mono | PCIe x8 Gen3 Y86/64 | ILUTs | 32/64-bit Windows 7 & Windows 8 | 160 module (optional)

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A complete listing of products is available from our website.

www.teledynedalsa.com/mv

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**Camera Link HS (CLHS)**
- Scalable bandwidth from 300MB/s to 16000MB/s
- Single compact copper CX4 cable provides 2100MB/s bandwidth
- Fiber optic cables for long-distance, immune to radiated emissions, enables robotic applications
- Proven off-the-shelf, high volume components from multiple sources
- Trigger frequencies into the 100s of kHz supported with low jitter
- Distributed image processing

---

**THE FACTS**
- Scalable bandwidth from 300MB/s to 16000MB/s
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- Trigger frequencies into the 100s of kHz supported with low jitter
- Distributed image processing

---

**Xcelera CL-PX4**
- Supports PCI Express Rev 2.0.x or higher, backwards compatible
- Camera Link Rev 2.0 (one Base PoC-L, Medium or Full PoC-L cameras)
- Delivers 2x performance on host transfers
- Single slot solution with reconfigurable I/Os
- Supported by Sapera SDK and Sapera CamExpert
Teledyne DALSA provides all of the software ingredients necessary to create the right machine vision recipe for your application. Our interconnected collection of software tools and capabilities cater to the needs of all users, from OEM machine builders to End User operators on the factory floor. Whether you are looking to Interface, Program or Apply machine vision components or solutions, Teledyne DALSA has the software expertise and industry knowledge to help.

**SAPERA**, SHERLOCK, **INSPECT**
VISION SOFTWARE FOR ALL USERS

Sapera Essential
- Image acquisition and processing SDK for PC applications

Sapera APP
- FPGA development package for the Xcelera-CL V2 frame grabber

Sapera Embedded
- Image acquisition and processing SDK for the ICON programmable camera

**FEATURES**
- Hardware independent – includes Sapera LT
- Over 400 image processing primitives and image analysis tools
- Includes: 1D, 2D, blob, calibration, color, measurement, pattern matching and more
- Optimized for multi-core technologies
- Compatible with C/C++, C# and Visual Basic programming languages using Microsoft Visual Studio, .NET or Borland compilers
- Provided with easy-to-use application wizards, demo programs and Architect, a graphical point and click assistant for rapid prototyping

**APPLICATIONS**
- Provides a complete catalog of image acquisition and processing solutions for monochrome, color, area scan and line scan applications
- Camera configuration files can be loaded for each application recipe. Sapera LT supports all types of image capture for monochrome, color, area scan and line scan cameras and offers select image processing functions when combined with Teledyne DALSA hardware products.

**INTERFACE**
Sapera LT software provides fast, reliable image capture from Teledyne DALSA cameras and Frame grabbers, as well as hundreds of fast image processing models that support common interface formats like GigE Vision and Camera Link. Sapera LT is supplied with a camera configuration tool called “ClirVIEW”, that allows users to tune camera parameters for their application. Personalized camera configuration files can be loaded for each application recipe.

Sapera LT supports all types of image capture for monochrome, color, area scan and line scan cameras and offers select image processing functions when combined with Teledyne DALSA hardware products.

**PROGRAM**
Our Sapera tool kit provides an extensive library of image processing, algorithm and control functions for vision engineers who design and program their own applications. Compatible with standard development tools and conventional programming languages, Sapera libraries support development on Win32 platforms as well as Teledyne DALSA programmable cameras (ICON) and frame grabbers (FPGA code).

**FEATURES**
- Hardware independent – includes Sapera LT
- Over 400 image processing primitives and image analysis tools
- Includes: 1D, 2D, blob, calibration, color, measurement, pattern matching and more
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Designed specifically 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.

INDUSTRIAL VISION SOLUTIONS

We offer a wide range of cost-effective solutions from smart cameras to high performance multi-camera systems including:
- support for area cameras (VGA to 12Mpixels)
- support for line scan applications that demand higher resolution and faster throughput

INDUSTRIAL VISION SOLUTIONS

We offer a wide range of cost-effective solutions from smart cameras to high performance multi-camera systems including:
- support for area cameras (VGA to 12Mpixels)
- support for line scan applications that demand higher resolution and faster throughput

VISION CAPABILITIES

Our full suite of vision tools and capabilities enable the following inspection tasks:

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
The BOA vision system comprises all of the elements of an industrial machine vision solution:
- Sensor (640 x 480 to 1600 x 1200)
- Compact size - 44 x 44 x 56 mm
- Light control
- Processing – CPU/DSP/FPGA
- IO – Expandable via PL-200 module
- Factory communications - Ethernet/IP, Modbus, Profinet and direct support for PLCs
- Developer and operator application interfaces
- Protective enclosure
- IP67 Industrial Enclosure
- 360 degree mounting
- Support for M12 factory cordsets

BOA vision systems are available in 3 different software configurations:

- BOA INS
  The standard product is offered with our iNspect Express application software. This interface combines ease-of-use with a common set of tools and capabilities that can be applied to a multitude of inspection applications.

- 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 inspect 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 design flexibility and tools to tackle a diverse range of applications across all industrial segments.

MULTI CAMERA VISION SYSTEMS

Teledyne DALSA vision platforms provide the performance and flexibility to meet the challenging requirements of multi-camera applications. They offer a centralized processing model that supports low cost camera expansion.

### APPLICATION

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### PROCESSING SCALE

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</table>

### MEMORY

- Analog
- Analog
- Analog
- Camera Link
- Camera Link
- Camera Link

### IMAGE

- Max. # Sensors
- Expansable

### Sensor Format

- Area
- Area
- Area
- Area
- Area
- Area

### Color Support

- Yes
- Yes
- Yes
- Yes
- Yes
- Yes

### Sensor Size Min.

- 640 x 480
- 640 x 480
- 1024 x 768
- 1024 x 768
- 1024 x 768
- 1024 x 768

### Sensor Size Max.

- User Defined
- User Defined
- User Defined
- User Defined
- User Defined
- User Defined

### Sensor Speed

- 60 fps
- 60 fps
- User Defined
- User Defined
- User Defined
- User Defined

### COMMUNICATION

- USB
- 2 (2.0)
- 2 (2.0)
- 2 (2.0)
- 3 (2.0)
- 2 (2.0)

### Ethernet (Mbps)

- 1 x 1000
- 1 x 1000
- 2 x 1000
- 2 x 1000
- 6 x 1000
- 3 x 1000

### Serial (RS232)

- 1
- 1
- 1
- 1
- 1
- 1

### Visual (LEDs)

- 36
- 20
- 7
- 3

### DISPLAY OPTIONS

- Setup GUI
- Remote Local
- Local Local
- Local Local
- Local Local
- Local Local

### I/O

- Direct Direct
- Direct Direct
- Direct Direct
- Direct Direct

### Type

- 24V Optic
- 24V Optic
- 24V
- 24V Optic
- 24V

### # Inputs (configurable)

- 6
- 8
- 6
- 12
- 6 + 2 triggers

### SOFTWARE

- Application
- iNspect Express
- iNspect Express
- iNspect Express
- Sherlock
- Sherlock

### POWER

- 24V @ 1A
- 24V @ 1A
- 24V @ 2.5A
- 24V @ 2.5A
- 12V @ 5A
- 24V @ 2.5A

---

**BOA SMART VISION 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 manufacturers a robust and flexible automated inspection system that is easy to integrate and deploy on the factory floor.

A complete listing of products is available from our website: www.teledynedalsa.com/mv

---

**Teledyne DALSA™**

Everywhere You Look
With more than 30 years of image sensor and camera technology development, design and engineering knowledge, combined with manufacturing capabilities and a commitment to service and support, we are uniquely suited to deliver customer-driven solutions for the most challenging vision applications.

CUSTOM AND SEMI-CUSTOM SOLUTIONS

Imaging solutions to meet your exacting requirements.

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 fibre optic interfaces
- Active sensor cooling

MANUFACTURING CAPABILITIES
From silicon to cameras, Teledyne DALSA’s manufacturing capabilities include:
- 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 versions, 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 >10 Giga pixel/sec throughput
- 40MHz, 12k-pixel line scan, stackable mechanical design
- 256-output TDI cameras with 4 Giga pixel/sec throughput
- 12-bit dynamic range at 1.2 Giga/sec
- 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 Giga/sec
- Cooling options for low noise and long exposure

APPLICATIONS
- Astronomy
- X-ray
- Electronics Inspection
- Defence & Security
- Professional Photography
- Print Inspection

www.teledynedalsa.com/mv
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.

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