

# Basler dart

## AREA SCAN CAMERAS



**USB**<sup>®</sup> **BCON**  
VISION FOR LVDS

- Board level cameras with bare board, S- and CS-mount options
- Designed for minimal space, lowest weight and power requirements
- Long-term availability and industrial-proven reliability
- PGI – Basler’s unique feature set for powerful in-camera image optimization

# OVERVIEW

## Basler dart – Highly Flexible not only for Your Embedded Imaging Solutions

The Basler dart camera line has been developed to meet the requirements of a broad variety of vision applications. With its one-board design, this camera series offers the latest technology in a very small format. A distinctive combination of high quality and cost-effectiveness in development and product design allows us to offer you a starting list price of €99.

Select your dart from an ideal mix of board level type cameras including but not limited to your choice of mount or interface:

- Bare board model without any additional lens mount, to meet high demands in extremely cost-driven system designs
- M12 / S-mount or CS-mount front for highest flexibility, using a complete camera in very space-limited environment
- Single cable solution with plug and play USB 3.0 interface
- Basler's LVDS-based interface BCON, designed to meet your requirements for lean vision architecture

With PGI, the dart camera offers a unique new feature set. PGI is a powerful in-camera image optimization that improves your images even at the full speed of your camera, and has a unique combination of features consisting of improved sharpness, denoising, color-anti-aliasing and 5×5 debayering. This gives you the opportunity to get the best pictures directly from your camera without any additional processor load. Use the options supplied through the Basler pylon Camera Software Suite to enable PGI, or change settings for selected PGI components for optimal results. Learn more at [www.baslerweb.com/PGI](http://www.baslerweb.com/PGI).

The dart also offers separate in- and outputs for trigger or flash control, and a broad set of features. In addition, this series has the most popular camera footprint of 29mm×29mm for its S- and CS-mount models, and only 27mm×27mm for the bare board option. With its low power consumption, dart also reduces heat dissipation challenges.

Get the digital board level camera that is not only targeting embedded applications within the manufacturing industry, but also retail, medical and traffic markets. Achieve improved performance at lower costs. This innovation in camera technology is available in a variety of models with different lens mounts, resolutions, interfaces and with sensors from leading manufacturers. If you are looking for a simple but sophisticated high-quality camera, the dart will hit your target!

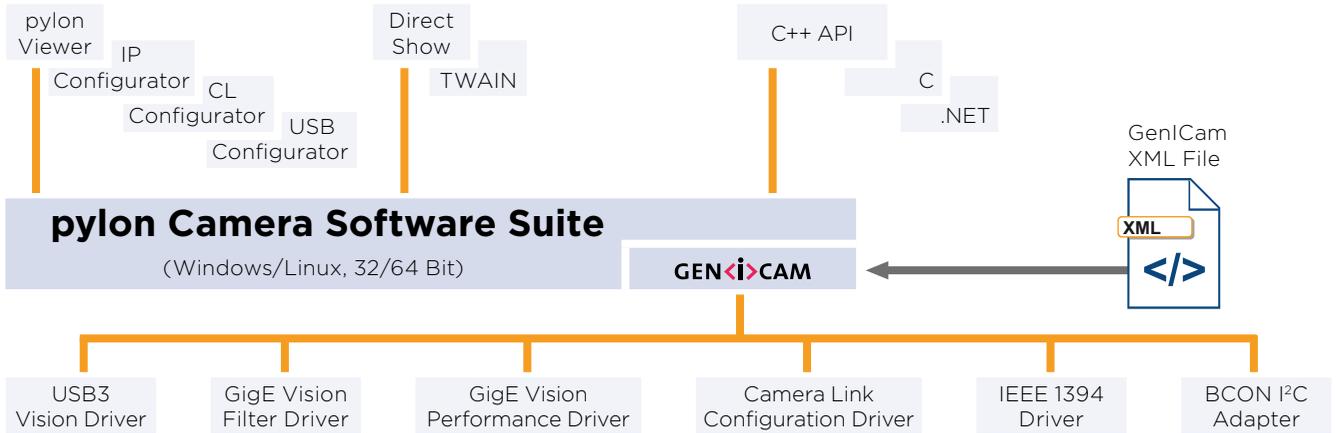
### Your benefits include:

- Smallest board level cameras with extremely low weight and power consumption
- USB3 Vision: Plug and play with a single cable solution compliant with industry standards
- Basler's LVDS-based interface BCON for challenging embedded technology requirements
- Field-proven Basler pylon Camera Software Suite with sophisticated drivers
- Perfect price/performance ratio with starting list price of €99
- Long-term availability and support



**Basler pylon Camera Software Suite**

The pylon Camera Software Suite operates with all Basler line scan and area scan cameras - no matter what interface they use. It offers stable, reliable and flexible data exchange between Basler cameras and PCs, for Windows and Linux on x86 and ARM based systems - at a very low processor load.



The architecture of the pylon Camera Software Suite is based on GenICam Technology, which offers easy access to the newest camera models and the latest features. Changing an existing camera device in any application essentially becomes a plug and play process.

An easy-to-use set of tools lets you configure the camera’s interface. Use the pylon Viewer to set camera parameters, to capture and display images, and to evaluate the camera. The pylon Camera Software Suite also contains a powerful SDK that supports any type of application development

Besides other Basler camera interfaces like GigE Vision, IEEE1394 and Camera Link, pylon also supports the interfaces which are of particular interest for the dart camera family: USB3 Vision and BCON.

**pylon for dart with USB3 Vision interface**

pylon contains a USB3 Vision Driver which fully supports the USB3 Vision standard, and perfectly fits the dart USB3 cameras. It allows the camera to use the full speed and bandwidth of USB 2.0 or USB 3.0 respectively for image transmission, while reducing resource load and using off-the-shelf hardware components. The easy-to-use pylon SDK is available for Windows and Linux (on x86/x64 and ARM based systems) and allows the creation of applications in C, C++, and .NET languages (e.g. C#, VB.NET).

**pylon for dart with BCON interface**

The proven and user-friendly pylon Camera Software Suite is also available for the dart with BCON interface and supports Linux on x86 or ARM-based systems. The programming interface for creating user-specific applications is identical to other interfaces, such as USB3 vision. This fact makes migrations (e.g. dart USB to dart BCON) much easier.

Based on GenICam technology, the camera configuration is performed via the I²C bus of the Linux system. The required driver adapter is provided by pylon as a sample implementation in source code, as well as ready-compiled binary. pylon introduces a new hardware adapter C API which lets the user create their own I²C adapter. The user can take the pylon sample implementation as a blueprint for their own adapter code, or simply use the ready-compiled binary as-is without any modification.

Due to the fact that pylon does not know anything about the LVDS image acquisition hardware used, the user must create their own logic for image data transfer. As an option, the new hardware adapter C API can also be used to implement the image acquisition for the actual image grabbing hardware. After doing so, pylon can be used without limitation - even for image data transfer.

# TECHNICAL DETAILS



## Basler dart with USB 3.0 Interface – Plug and Play for Easy Integration

The dart camera series offers two interface options to tailor to your system's requirements. With the USB 3.0 interface, you can benefit from compliance with the international USB3 Vision standard and the upcoming next generation of camera interfaces.

as well as simple integration with all machine vision applications.

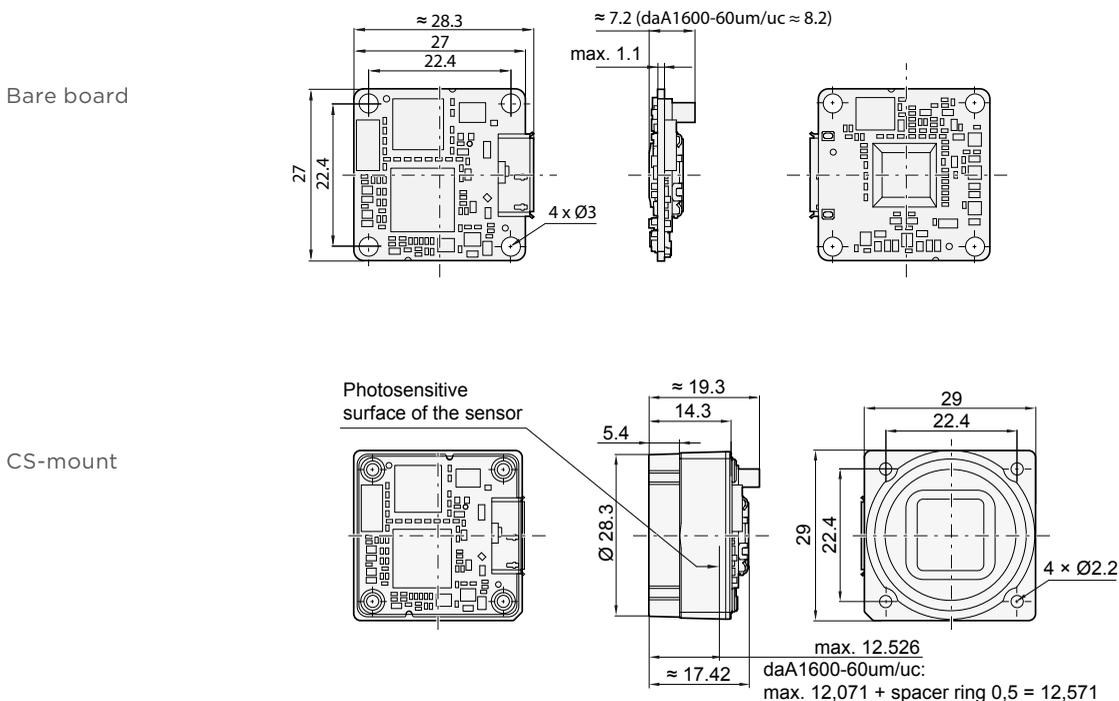
Find more benefits of this interface on [baslerweb.com/USB3](http://baslerweb.com/USB3).

All dart cameras with USB 3.0 interface provide camera data and power over only one cable. The high bandwidth of USB 3.0 technology enables the dart cameras to deliver high-quality raw picture and video data in full motion. Compressing data, which causes image quality loss, is not necessary. These models also offer backwards compatibility to USB 2.0.

With USB 3.0, you can be sure to enjoy an extraordinarily high transfer bandwidth, outstanding real-time capability, high stability and smooth fault handling,



## Dimensions (in mm)



# TECHNICAL DETAILS

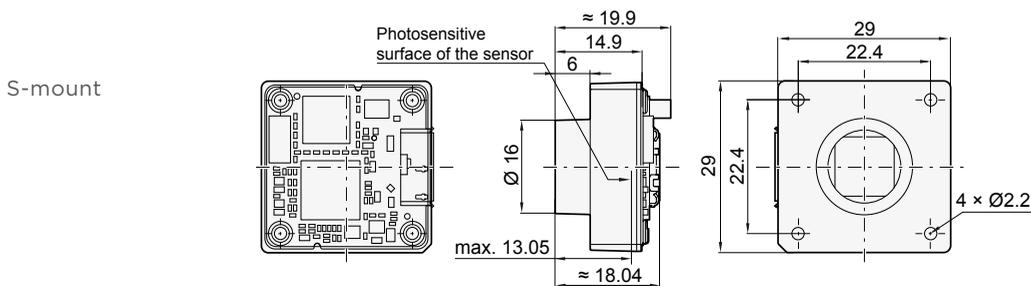


## Specifications

Basler dart USB 3.0	daA1280-54 um/uc	daA1600-60 um/uc	daA1920-15 um	daA1920-30 um/uc	daA2500-14 um/uc
<b>Camera</b>					
Resolution (H×V pixels)	1280×960	1600×1200	1920×1080	1920×1080	2592×1944
Sensor	Aptina AR0134	EV76C570	Aptina MT9P031	Aptina MT9P031	Aptina MT9P031
Sensor Size (optical)	1/3"	1/1.8"	1/3.7"	1/3.7"	1/2.5"
Sensor Technology	CMOS, global shutter		CMOS, rolling shutter		
Pixel Size [ $\mu\text{m}^2$ ]	3.75×3.75	4.5×4.5	2.2×2.2	2.2×2.2	2.2×2.2
Frame Rate [fps]	54	60	15	30	14
Mono / Color	Mono / Color		Mono	Mono / Color	
Video Output Format	Mono (8, 12), YUV 4:2:2 Packed (YCbCr 422), Bayer (8, 12), RGB 8				
Interface	USB 3.0				
Synchronization	Via external trigger or free-run				
Exposure Control	Via external trigger or programmable via the camera API				
<b>Mechanical / Electrical</b>					
Housing Size (L×W×H) [mm]	Bare board model: 7.2×27×27 (daA1600-60um/uc: 8.2×27×27)		S-mount models: 20×29×29 CS-mount models: 20×29×29		
Housing Temperature	Up to 50°C				
Lens Mount	Bare board, S, CS		Bare board	Bare board, S, CS	
Digital I/O	2 Fast-GPIO (configurable as In/Out)				
Power Requirements	Via USB 3.0 interface				
Power Suspend Mode	Yes, less than 20 mW, configurable				
Power Consumption (typical)	-1.3 W	-1.3 W	-1.2 W	-1.3 W	
Weight (typical)	S-, CS-mount models: <15 g		Bare board model: <5 g		
Conformity	CE, FCC, RoHS, UL, USB3 Vision, USB-IF (in preparation)				
<b>Software / Driver</b>					
Driver	Basler pylon Camera Software Suite or 3rd party USB3 Vision Software				
Operating System	Windows, Linux - 32 bit and 64 bit				
Conformity	USB3 Vision, GenICam				

Specifications are subject to change without prior notice.

Latest specifications and availability can be found on our website [www.baslerweb.com/dart](http://www.baslerweb.com/dart). Please visit [www.baslerweb.com/manuals](http://www.baslerweb.com/manuals) for the detailed camera User's Manual and [www.baslerweb.com/thirdparty](http://www.baslerweb.com/thirdparty) for information on third party software.



# TECHNICAL DETAILS

## Basler BCON Interface Based on LVDS Technology – Flexible and Lean Embedded Vision Architectures



With the dart series, Basler introduces its BCON interface, developed to meet your challenging requirements in embedded vision technology. BCON offers high flexibility for connecting to LVDS-based technology, and is ideal for many applications with digital image processing. LVDS (Low-Voltage-Differential-Signaling) describes a standardized interface for high speed data transfer. As this does not define the image transmission in detail, Basler developed a unique interface for image data transfer called BCON. It also enables the developer of an embedded system to switch from one dart camera model to another without any additional integration costs or effort.

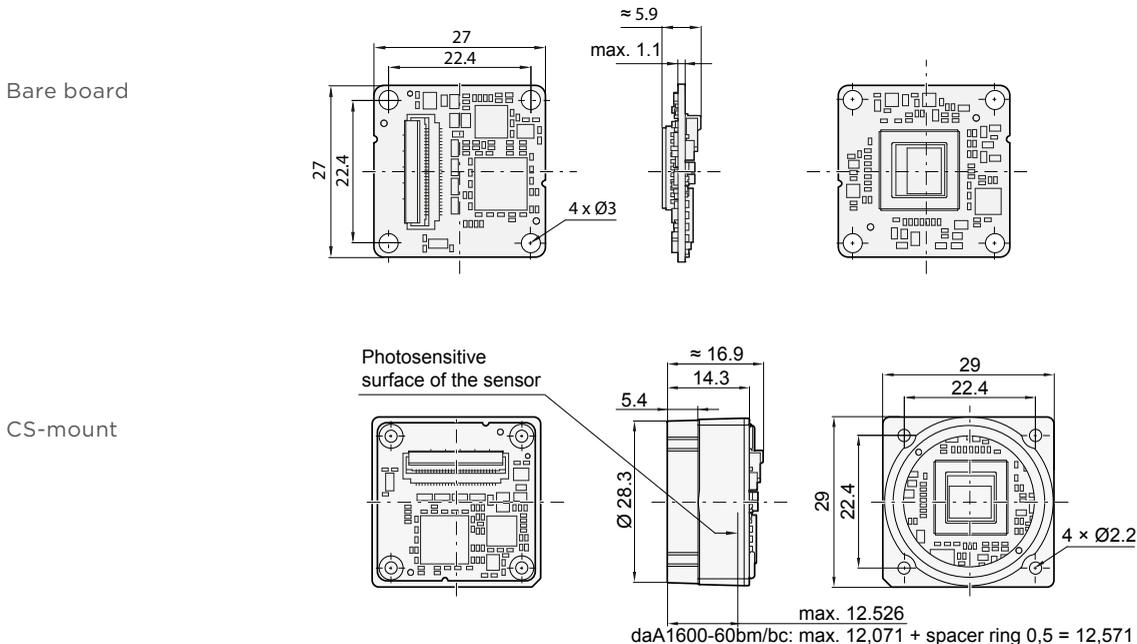
Software Suite based on GenICam delivers an easy-to-use SDK for seamless software integration of dart cameras.

The new dart models with BCON interface are also attractive to embedded technology experts through benefits including small board level design and powerful in-camera image optimization (PGI). Your choice includes e.g. factors such as lens mount, resolution, and speed provided by sensors from leading manufacturers. Secure your competitive advantage through improved performance and an optimized total cost of ownership for your vision system. To find out more please visit [baslerweb.com/BCON](http://baslerweb.com/BCON).

The dart BCON camera enables savings in your system's setup and operation. In particular, dart can be used with an embedded processing board for lean, next-generation imaging front end and vision architecture. Moreover, in-/output signals and power supply can be enabled through a Flat Flex cable. Powerful new-generation FPGA (Field Programmable Gate Array) boards, as well as SoCs (System on Chip), can be connected. Well known for Basler's cameras and also compatible with BCON, the pylon Camera



### Dimensions (in mm)



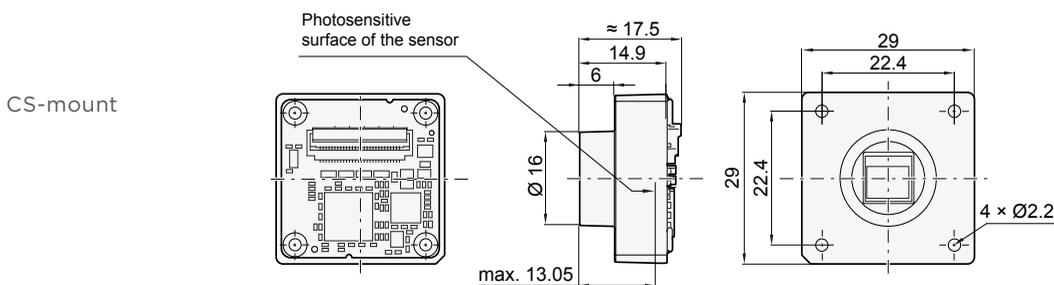
# TECHNICAL DETAILS



## Specifications

Basler dart BCON	daA1280-54bm/bc	daA1600-60bm/bc	daA2500-14bm/bc
<b>Camera</b>			
Resolution (H×V pixels)	1280×960	1600×1200	2592×1944
Sensor	Aptina AR0134	EV76C570	Aptina MT9P031
Sensor Size (optical)	1/3"	1/1.8"	1/2.5"
Sensor Technology	CMOS, global shutter		CMOS, rolling shutter
Pixel Size [ $\mu\text{m}^2$ ]	3.75×3.75	4.5×4.5	2.2×2.2
Frame Rate [fps]	54	60	14
Mono / Color	Mono / Color		
Video Output Format	Mono 8/12, YUV 4:2:2 Packed (YCbCr 422), Bayer 8/12, RGB 8		
Interface	Basler BCON		
Synchronization	Via external trigger or free-run		
Exposure Control	Via external trigger or programmable via the camera API		
<b>Mechanical / Electrical</b>			
Dimensions (L×W×H) [mm]	Bare-Mount Models: 4.9×27×27 (daA1600-60bm/bc: 5.9×27×27)		S-Mount Models: 17.5×29×29 CS-Mount Models: 16.9×29×29
Board Temperature	Up to 50°C		
Lens Mount	Bare board, S, CS		
Digital I/O	1 LVDS Input, 2 Outputs encoded with serial image data stream		
Power Requirements	Via Basler BCON interface		
Power Consumption (typical)	~1.2 W		
Weight (typical)	S-, CS-mount models: <5g Bare board model: <5g		
Conformity	CE, FCC, RoHS, UL (in preparation)		
<b>Software / Driver</b>			
Driver	Basler pylon Camera Software Suite		
Operating System	Linux - 32 bit and 64 bit		
Conformity	GenICam		

Specifications are subject to change without prior notice.  
 Latest specifications can be found on our website. Please visit [www.baslerweb.com/manuals](http://www.baslerweb.com/manuals) for the detailed camera User's Manual and [www.baslerweb.com/thirdparty](http://www.baslerweb.com/thirdparty) for information on third party software.



## OTHER INFORMATION

### About Basler

Founded in 1988, Basler is a leading global manufacturer of high quality digital cameras and lenses for factory automation, medical & life sciences, retail and traffic applications. The company employs 500 people at its headquarters in Ahrensburg, Germany and subsidiaries in the United States and Asia.

Basler's portfolio of products offers customers the vision industry's widest selection of industrial and network cameras as well as lenses. Today it includes some 300 camera models - and it's still growing. We're committed to developing technology that drives business results for our customers: cameras and lenses that are easy to use, easy to integrate, and deliver an exceptional price/performance ratio.

### 3-Year Warranty

Basler offers a 3-year warranty for their cameras and Basler Lenses. We make this unprecedented promise because we have unparalleled confidence in our products. We continually reinvest in research, development and superior manufacturing capabilities so that our customers can fully rely on the products we manufacture.

### How Does Basler Ensure Superior Quality and Reliable High Performance?

Our approach to quality assurance is rigorous: we continually audit all facets of our business to ensure powerful performance, increase efficiency and reduce costs for our customers. We are compliant with all major quality standards including ISO 9001, CE, RoHS, and more. To ensure consistently high product quality, we employ several quality inspection procedures during manufacturing.

Every Basler camera is subjected to exhaustive optical and mechanical tests before leaving the factory. We have developed a unique combination of optics, hardware, and software tools that can quickly and efficiently calibrate a camera and measure its performance against a set of standard performance criteria. Regardless of what technology or camera model you choose you can be assured of consistent performance.



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