Basler pilot

GiGE VISION

GEN<i>CAM

Innovative, Slim Design, Extremely Cost-effective

BASLER
VISION TECHNOLOGIES

click. see. smile!

pilot Series – Are You Looking for a Digital Camera That Combines Speed, High Image Quality, and an Excellent Price/Performance Ratio?

Basler pilot Family – 12 Gigabit Ethernet based camera models that are innovative, easy to integrate, have a slim design, and are extremely cost-effective

The Basler pilot camera family is based on four selected Kodak CCD sensors and one Sony CCD sensor for exceptional image quality. Equipped with a GigE Vision compliant interface, these cameras take maximum advantage of Kodak and Sony sensor technology and can often substitute for more cost-intensive Camera Link cameras and frame grabbers. Because Basler pilot cameras use the same sensors currently used in existing Camera Link cameras, no optics changes are required.

For more flexibility, this series offers additional software features that can be integrated into the image processing software on a remote computer.

Your benefits from the Basler pilot family include:

· Resolutions from VGA to 5 megapixels
· 100 meter cable lengths provided by Gigabit Ethernet to give you the highest flexibility
· Free GigE Vision compliant driver package with performance and filter drivers
· Smallest housing in its class with a 29 x 44 mm footprint
· An easy replacement for Camera Link cameras (e.g., no change of lens)
· Cost-effective Gigabit Ethernet interface does not need a frame grabber
· Compliant with the newest vision industry standards including GenICam, GigE Vision, and EMVA 1288
· 100% quality checked and calibrated to give you consistent performance and reliability

Basler pilot cameras are a perfect fit for a variety of vision applications including semiconductor and component inspection, food inspection, manufacturing quality control, intelligent traffic systems, microscopy and medical imaging, biometrics, and many others.

Software Makes Image Processing Easy
The Basler pilot family comes with a fully tested package of software that lets you easily evaluate and integrate pilot cameras. The package can be downloaded from Basler's website.

Using the viewer included in the package, you can capture a single image or capture images continuously. The viewer gives you full access to camera parameters, letting you adjust image quality and control cameras from a remote computer. Using the viewer is a very easy way to integrate a Basler camera into your application.

Basler also offers a complete software development kit (SDK) to ensure maximum flexibility for customer-specific applications.

Outstanding Image Quality
The Basler pilot family is equipped with four different Kodak CCD sensors and one Sony CCD sensor with each camera available in mono or color. These sensors were selected to provide outstanding image quality in combination with the Basler pilot's read-out and processing electronics. For precise imaging results, all Basler pilot cameras run in progressive scan mode.

Precise Sensor Alignment
In addition to Basler's standard CTT+ automated quality assurance and calibration system, the pilot camera family will be tested and measured with another production tool. This unique tool is an ultra-high precision sensor alignment device. The device automatically mounts the sensor board on the camera's front module in six degrees of freedom with reference to the optical axis. This ensures a constant depth of focus over the whole sensor and guarantees the best imaging results, even with sensors that have pixels smaller than 5 µm, like the piA2400gm/gc has.

Pixel Formats and Preprocessing

For maximum flexibility in color representation, Basler pilot color cameras feature a variety of pixel formats. YUV 4:2:2 pixel formatting is done inside of the camera and YUV image data can be obtained directly. For individual processing, each pixel can be read out separately as a raw value at 8 or 12 bit depth and can be processed as desired in your remote computer. The pilot series features brand new pixel formats that intelligently organize 12 bit pixel data inside of the camera to take full advantage of the interface bandwith.

Gigabit Ethernet (GigE Vision) Drivers

Basler provides its own fully tested Gigabit Ethernet drivers for the Basler pilot camera family. These drivers will be compatible with the GigE Vision standard and optimized for the Basler pilot family.

To give you maximum flexibility, Basler provides two different drivers:

Filter Driver: The filter driver quickly separates incoming packets that contain image data from other traffic on the network and makes the data available to an application running on the computer. This driver can be easily used with common Gigabit Ethernet network cards or with Gigabit Ethernet ports that are part of the computer's motherboard.

Performance Driver: By using the performance driver, even demanding applications with multiple cameras, high data rates, or very strict real-time requirements can be supported. When the performance driver is used in combination with a dedicated network interface card (Intel), the load on the host computer's CPU is significantly reduced. This driver is based on dedicated Intel network interface cards and can be used to get maximum performance from your application.
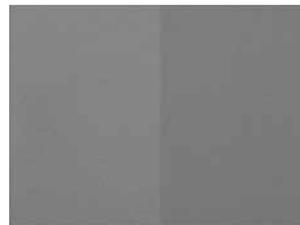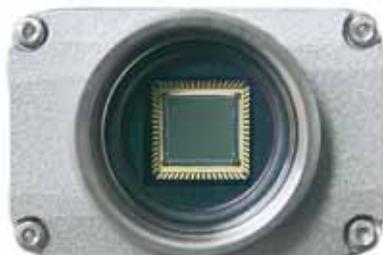
Unbalanced sensor with visible line
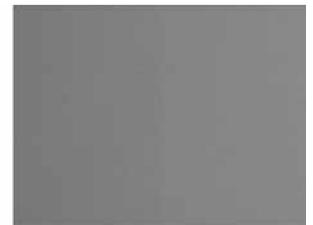
Basler pilot after calibration

Excellent Tap Balance

Basler has leveraged its years of experience in balancing the output from imaging sensors with two taps, so customers can expect a perfectly balanced, homogenous image. This technological advantage has already impressed many customers who use these Basler pilot cameras. All Basler pilot cameras have shown exceptionally good results compared to competitive cameras based on the same sensors. The following drawing shows the effect. (Left unbalanced camera, right factory balanced pilot camera)

Specifications

Basler pilot	piA640 -210gm/gc	piA1000 -48gm/gc	piA1000 -60gm/gc	piA1600 -35gm/gc	piA1900 -32gm/gc	piA2400 -17gm/gc
Camera						
Resolution (H × V pixels)	648 × 488	1004 × 1004	1004 × 1004	1608 × 1208	1928 × 1084	2456 × 2058
Sensor	Kodak KAI-0340	Kodak KAI-1020	Kodak KAI-1020	Kodak KAI-2020	Kodak KAI-2093	Sony ICX625
Sensor Size (optical)	1/3″	2/3″	2/3″	1″	1″	2/3″
Sensor Technology	Progressive Scan CCD, global shutter					
Pixel Size (µm)	7.4 × 7.4	7.4 × 7.4	7.4 × 7.4	7.4 × 7.4	7.4 × 7.4	3.45 × 3.45
Frame Rate	210 fps	48 fps	60 fps	35 fps	32 fps	17 fps
Mono / Color	Mono / Color					
Interface	Gigabit Ethernet					
Video Output Format	Mono 8: 8 bits/pixel Mono 16: 12 bits/pixel YUV 4:2:2: 16 bits/pixel average Raw 8: 8 bits/pixel (R,G or B) Raw 16: 12 bits/pixel (R,G or B) and packed formats					
Synchronization	Via external signal or free run					
Exposure Control	Edge-controlled, level-controlled, or programmable					
Mechanical / Electrical						
Housing Size (L x W x H)	86.7 mm × 44 mm × 29 mm					
Housing Temperature	Up to 50°C					
Housing Alternative	90° angled head (except piA2400-17gm/gc)					
Lens Mount	C-mount					
Digital I/O	2 opto-isolated input ports, 4 opto-isolated output ports					
Power Requirements	12-24 VDC; via Hirose 12-pin connector (max. 10 meter cable lengths)					
Power Consumption (typical)	< 5.5 W	< 5.5 W	< 5.5 W	< 5.5 W	< 5.5 W	< 6.0 W
Weight (typical)	~ 220 g					
Conformity	CE, FCC, ROHS, IP30					
Software Environment						
Driver	Basler pylon driver package for Windows and Linux; 32/64 bit					
Operating Systems	Windows, Linux - 32 bit and 64 bit					
Conformity	GigEVision, GenICam					

Specifications are subject to change without prior notice.

For detailed technical information, please see the camera manual that can be found on our website: www.baslerweb.com/manuals

Dimensions (in mm)
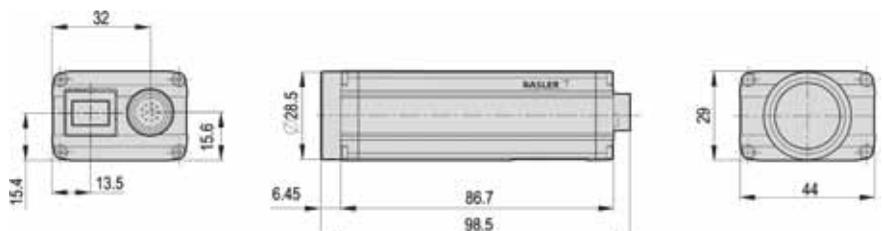
Innovative Technologies in the Basler pilot Family

100 Meter Cable Lengths – High Bandwidth – No Frame Grabber

Basler's pilot family has a Gigabit Ethernet (GigE) interface compliant with the GigE Vision standard. GigE has become a synonym for the new interface technology used in machine vision systems and in related industries like intelligent traffic systems and medical imaging. High bandwidth, long cable lengths, and wide usage in the consumer and industrial markets are the key elements that make GigE attractive for your application.

Because Gigabit Ethernet breaks the bandwidth barrier that was set by FireWire, switching from Camera Link to Gigabit Ethernet is now attractive for you. Another clear advantage of the pilot family is a quantifiable reduction in the cost of a total vision solution because a frame grabber is no longer required. No less important is the 100 meter cable lengths offered by Gigabit Ethernet. These expanded capabilities open exciting new possibilities for vision system design and break through existing limitations to reach a new level that is especially beneficial for factory floor applications.

Unified API – Simple Programming – Interface Independent

Basler pilot cameras will be GenICam compliant and will include an IEEE1394 driver, GigE filter driver, and GigE performance driver. The pilot software will also implement a newly designed image viewer.

The core of GenICam is a description of the camera's properties in an XML descriptor file. Using this file, a translator can directly generate either a C++ application programming interface (API) called GenAPI or the elements of a graphical user interface (GUI). This lets the user easily identify the camera type, as well as the features and functions available on the camera and the parameters associated with each camera function. Future extensions of GenICam will also provide mechanisms for grabbing and streaming images from the camera. The proposed GigE Vision standard stipulates that cameras must provide the XML descriptor file. A descriptor file for IEEE 1394 compliant cameras will be available as well.

Sensitivity Measurement – Reliable Camera Comparison

1288
EMVA Standard Compliant

Basler Components is leading the effort to standardize image quality and sensitivity measurement for machine vision cameras and sensors. All measurements done by Basler will be in 100% compliance with the new European Machine Vision Association EMVA 1288 standard. Because it describes a unified method to measure, compute, and present the specification parameters for cameras and image sensors used in machine vision applications, Basler is giving the EMVA 1288 standard our strongest support.

The pilot family is characterized and measured to provide information about the quality and sensitivity of our products. Data can be obtained from Basler's support team.

What Makes Basler Camera Quality So Special?

To ensure consistently high product quality, we employ several quality inspection procedures during manufacturing. The following list describes some of the most essential actions we take to meet your highest requirements:

- The back focal length on each camera is carefully measured and adjusted. This guarantees an optimum distance between the lens flange and the sensor and ensures compliance with optics standards.

- Our advanced Camera Test Tool (CTT+), the first fully-automated inspection system for digital cameras, checks all of the significant quality aspects of each camera we produce. The CTT+ is a unique combination of optics, hardware, and software that can be quickly and efficiently used to calibrate a camera and to measure its performance against a set of standards. For defined sets of conditions, an automated software program examines the camera's output, makes any calibration adjustments necessary, and compares the output to a strictly defined set of performance criteria.

RoHS Compliance

The Basler pilot series is RoHS compliant. This is especially important in applications where the the end-user requires strict RoHS compliance in all system components.

BASLER COMPONENTS