

# Basler Scout



Versatile, Fully Digital, Attractively Priced

# scout Series – Are You Looking for a Cost-effective Digital Camera That Supports 100 Meter Cable Lengths?

### **Basler scout Family – 36 Different Models – Sophisticated in Detail, Versatile, Fully Digital, and Attractively Priced**

The Basler scout family is based on a selection of the best Sony CCD sensors and offers a wide variety of resolutions and speeds. The family also includes a high-performance CMOS sensor from Micron. With their new Gigabit Ethernet (GigE) and FireWire-b™ (IEEE1394b) interface technologies, the cameras in this family are defined by state of the art technology that lets you get the maximum performance from each sensor.

Your benefits from the Basler scout family include:

- Resolutions from VGA to 2 megapixels with either a FireWire-b or a Gigabit Ethernet interface
- 100 meter cable lengths provided by Gigabit Ethernet to give you the highest flexibility
- Up to 12 bit depths and no bandwidth limitation on 8 bit data flow inside the camera
- Free drivers for FireWire and Gigabit Ethernet (GigE Vision™)
- Small, rugged housing for easy integration
- Compatible 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

The Basler scout family features a GenICam compliant API and uses new drivers. The FireWire-b cameras are also compatible with Basler's existing BCAM driver and API for FireWire cameras. Along with the drivers, GUI based software is provided that lets users easily set camera parameters, adjust image quality, and control cameras from a remote computer.

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

### **Outstanding Image Quality**

The scout family is equipped with seven assorted Sony CCD sensors in mono and color. These sensors were selected to provide outstanding image quality in combination with the scout's read-out and processing electronics. For precise imaging results, all scout cameras run in progressive scan mode.



Users of interlaced analog cameras can easily switch to a scout camera equipped with Micron's MT9V022 CMOS progressive scan sensor.

### **Gigabit Ethernet (GigE Vision) Drivers**

Basler provides its own Gigabit Ethernet drivers for the scout camera family. These drivers will be compatible with the GigE Vision standard and optimized for the scout family. To give you maximum flexibility, Basler provides two different drivers:

**Filter driver:** The filter driver quickly separates incoming packets carrying image data from other traffic on the network and makes the data available for vision applications running on the computer.

**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.

### **Precise Sensor Alignment**

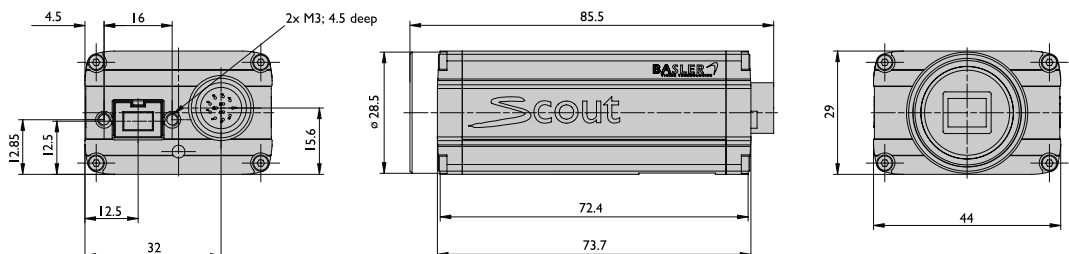
In addition to Basler's standard CTT+ automated quality assurance and calibration system, the scout camera family will be tested and measured with another production tool. This unique tool is an ultra-high precision sensor alignment device. The device automatically mounts the sensor board on the camera's front module in six degrees of freedom with reference to the optical axis. This ensures a constant depth of focus over the whole sensor. For sensors with small pixels (< 5 µm) this is essential for good imaging results.

# TECHNICAL DETAILS

## Specifications

| Basler scout   | scA640<br>-70fm/fc   | scA640<br>-74fm/fc | scA750<br>-60fm/fc | scA780<br>-54fm/fc    | scA1000<br>-20fm/fc* | scA1000<br>-30fm/fc | scA1390<br>-17fm/fc* | scA1400<br>-17fm/fc | scA1600<br>-14fm/fc* |
|--|--|--------------------|--------------------|-----------------------|----------------------|---------------------|----------------------|---------------------|----------------------|
| <b>Camera</b>  |  |                    |                    |                       |                      |                     |                      |                     |                      |
| Sensor Size (H x V pixels)                                 | 659 x 490  | 659 x 490          | 752 x 480          | 782 x 582             | 1034 x 779           | 1034 x 779          | 1392 x 1040          | 1392 x 1040         | 1628 x 1236          |
| Sensor Type  | Sony ICX424  | Sony ICX414        | Micron<br>MT9V022  | Sony ICX415           | Sony ICX204          | Sony ICX204         | Sony ICX267          | Sony ICX285         | Sony ICX274          |
| Sensor Read Out  | Progressive scan CCD   |                    |                    | Progressive scan CMOS |                      |                     | Progressive scan CCD |                     |                      |
| Optical Size   | 1/3"   | 1/2"               | 1/3"               | 1/2"                  | 1/3"                 | 1/3"                | 1/2"                 | 2/3"                | 1/1.8"               |
| Pixel Size (in $\mu\text{m}$ )                             | 7.4 x 7.4  | 9.9 x 9.9          | 6.0 x 6.0          | 8.3 x 8.3             | 4.65 x 4.65          | 4.65 x 4.65         | 4.65 x 4.65          | 6.45 x 6.45         | 4.4 x 4.4            |
| Max. Frame Rate (at full resolution)                       | 71   | 74                 | 63                 | 54                    | 20                   | 30                  | 17                   | 17                  | 14                   |
| Mono/Color   | Yes/Yes  |                    |                    |                       |                      |                     |                      |                     |                      |
| Video Output Type (Interface)                              | IEEE1394b (screw lock possible)  |                    |                    |                       |                      |                     |                      |                     |                      |
| Video Output Format  | Mono 8: 8 bits/pixel   Mono 16: 12 bits/pixel   YUV 4:2:2: 16 bits/pixel average   YUV 4:2:2: (YUYV): 16 bits/pixel average<br>Raw 8: 8 bits/pixel (R,G, or B)   Raw 16: 12 bits/pixel (R,G, or B)   scA750-60f/fc (8 bits/pixel only) |                    |                    |                       |                      |                     |                      |                     |                      |
| Synchronization  | Via external trigger, via the IEEE1394 bus, or free run  |                    |                    |                       |                      |                     |                      |                     |                      |
| Exposure Control   | Programmable via the 1394 bus  |                    |                    |                       |                      |                     |                      |                     |                      |
| <b>Mechanical / Electrical</b>                             |  |                    |                    |                       |                      |                     |                      |                     |                      |
| Power Requirements   | 8 – 36 VDC; provided via the IEEE1394 cable; < 1% ripple   |                    |                    |                       |                      |                     |                      |                     |                      |
| Lens Mount   | C-mount; CS-mount (optional)   |                    |                    |                       |                      |                     |                      |                     |                      |
| Typical Power Consumption at 12V                           | 2.5 W  | 2.5 W              | 2.5 W              | 2.5 W                 | 2.5 W                | 2.5 W               | 2.5 W                | 3 W                 | 3 W                  |
| Housing Size (L x W x H)                                   | 73.7 mm x 44 mm x 29 mm (without lens adapter)   |                    |                    |                       |                      |                     |                      |                     |                      |
| Weight (typical)   | 110g   | 110g               | 110g               | 110g                  | 110g                 | 110g                | 110g                 | 120g                | 110g                 |
| Conformity   | CE, FCC, DCAM  |                    |                    |                       |                      |                     |                      |                     |                      |
| I/O Ports  | 2 opto-isolated input ports, 4 opto-isolated output ports  |                    |                    |                       |                      |                     |                      |                     |                      |
| <b>Software Environment</b>                                |  |                    |                    |                       |                      |                     |                      |                     |                      |
| Software Driver  | IEEE1394b driver, Basler BCAM driver   |                    |                    |                       |                      |                     |                      |                     |                      |
| GenICam Compatible   | Yes (No, with BCAM 1.9)  |                    |                    |                       |                      |                     |                      |                     |                      |
| Specifications are subject to change without prior notice. | * Availability – end of 2006   |                    |                    |                       |                      |                     |                      |                     |                      |

## Dimensions (in mm)



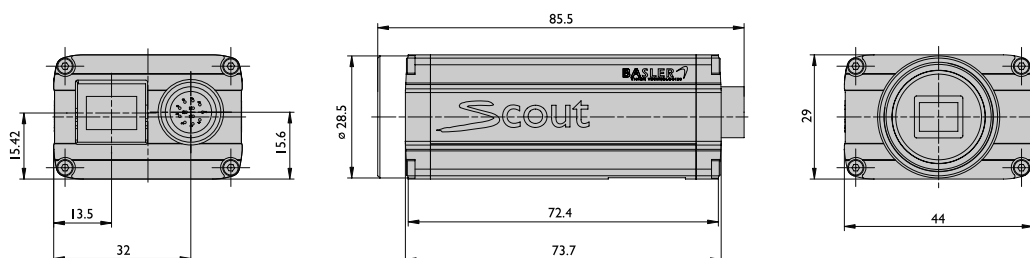
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| Sensor Read Out                      | Progressive scan CCD  |                    |                    | Progressive scan CMOS |                      | Progressive scan CCD |                     |                     |                     |
| Optical Size                         | 1/3"  | 1/2"               | 1/3"               | 1/2"                  | 1/3"                 | 1/3"                 | 1/2"                | 2/3"                | 1/1.8"              |
| Pixel Size (in $\mu\text{m}$ )       | 7.4 x 7.4   | 9.9 x 9.9          | 6.0 x 6.0          | 8.3 x 8.3             | 4.65 x 4.65          | 4.65 x 4.65          | 4.65 x 4.65         | 6.45 x 6.45         | 4.4 x 4.4           |
| Max. Frame Rate (at full resolution) | 70  | 79                 | 60                 | 55                    | 20                   | 31                   | 17                  | 17                  | 14                  |
| Mono/Color                           | Yes/Yes   |                    |                    |                       |                      |                      |                     |                     |                     |
| Video Output Type (Interface)        | Gigabit Ethernet (GigE Vision compatible)   |                    |                    |                       |                      |                      |                     |                     |                     |
| Video Output Format                  | Mono 8: 8 bits/pixel   Mono 16: 12 bits/pixel   YUV 4:2:2: 16 bits/pixel average   YUV 4:2:2 (YUYV): 16 bits/pixel average<br>Raw 8: 8 bits/pixel (R,G, or B)   Raw 16: 12 bits/pixel (R,G, or B)   scA750-60g/gc (8 bits/pixel only) |                    |                    |                       |                      |                      |                     |                     |                     |
| Synchronization                      | Via external trigger, or free run   |                    |                    |                       |                      |                      |                     |                     |                     |
| Exposure Control                     | Programmable via GigE Vision (camera API)   |                    |                    |                       |                      |                      |                     |                     |                     |
| <b>Mechanical / Electrical</b>       |   |                    |                    |                       |                      |                      |                     |                     |                     |
| Power Requirements                   | 12 – 24 V; via Hirose 12-pin connector (max. 10 meter cable lengths)  |                    |                    |                       |                      |                      |                     |                     |                     |
| Lens Mount                           | C-mount; CS-mount (optional)  |                    |                    |                       |                      |                      |                     |                     |                     |
| Housing Size (L x W x H)             | 73.7 mm x 44 mm x 29 mm (without lens adapter)  |                    |                    |                       |                      |                      |                     |                     |                     |
| Typical Power Consumption at 12 V    | 3 W   | 3 W                | 3 W                | 3 W                   | 3 W                  | 3 W                  | 3.5 W               | 3.5 W               | 3.4 W               |
| Weight (typical)                     | 110 g   | 110 g              | 110 g              | 110 g                 | 110 g                | 110 g                | 110 g               | 120 g               | 110 g               |
| Conformity                           | CE, FCC, GigE Vision  |                    |                    |                       |                      |                      |                     |                     |                     |
| I/O Ports                            | 2 opto-isolated input ports, 4 opto-isolated output ports   |                    |                    |                       |                      |                      |                     |                     |                     |
| <b>Software Environment</b>          |   |                    |                    |                       |                      |                      |                     |                     |                     |
| Software Driver                      | Basler filter driver and performance driver; GigE Vision compliant  |                    |                    |                       |                      |                      |                     |                     |                     |
| GenICam Compatible                   | Yes   |                    |                    |                       |                      |                      |                     |                     |                     |

Specifications are subject to change without prior notice.

\* Availability – end of 2006

# Dimensions (in mm)



## Innovative Technologies in the Basler scout Family

### 100 Meter Cable Lengths – High Bandwidth – No Frame Grabber



Basler's scout 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 scout 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.



### FireWire-b – Doubled Bandwidth – Easy to Use

The scout family continues Basler's success with the FireWire interface and takes it to a new level of performance. FireWire, also known as IEEE1394, has become a standard image data and camera command transmission mechanism in the

machine vision industry. Its key benefit is real-time communication between your camera and remote computer.

The scout family breaks the existing 400 Mbit/s data rate limitation of FireWire-a and offers up to 800 Mbit/s as specified by FireWire-b. This means that scout cameras can provide maximum performance in terms of frame rate and bit depth compared to cameras limited by the FireWire-a data rate. In addition, FireWire integration is easy, cost-effective, and standardized. It supports plug-and-play and there is no need for a frame grabber. The scout family is also backward compatible with FireWire-a.



The Basler scout camera will be GenCam compatible

and will include an IEEE1394 driver, GigE filter driver, and GigE performance driver. The scout software will also implement a newly designed image viewer.

The core of GenCam 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 GenCam 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 IEEE1394 compliant cameras will be available as well.

## How Does Basler Measure and Define Image Quality?

1288

EMVA Standard Compliant



Basler-VC 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 scout family will be characterized and measured to provide information about the quality and sensitivity of our products.

## What Makes Basler Camera Quality So Special?



### Basler Camera Test Tool

To ensure consistently high product quality, we employ several quality inspection procedures during manufacturing. This list describes three 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 compliance to 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.

- As a final check, our cameras must pass a stress test. Each camera is tested over the entire temperature range specified in our documentation. By doing this, we can identify and remove temperature sensitive weak spots in the camera. Thus, consistent image quality in conditions with quickly changing temperatures is guaranteed.

Basler customers get a 100% tested camera, all of the benefits that go along with 100% testing, and a much higher level of satisfaction. This is a definite win-win situation.

## RoHS Compliance

When the Basler scout family enters series production, it will be RoHS compliant. This is especially important in applications where the end-user requires strict RoHS compliance in all system components.



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