Smart features in our cameras

Our Gigabit Ethernet camera families mvBlueCOUGAR-X and mvBlueCOUGAR-XD as well as our USB 3.0 camera families mvBlueFOX3-1 and mvBlueFOX3-2 are fitted with an FPGA. This integrated circuit enables logic circuits to be developed and to be executed in the industrial camera. In itself, an FPGA is nothing new, but the component has a potential in it that our industrial cameras fully exploit, thereby making them considerably smarter.

The following smart features are available¹:

Action Commands

Description

Action Commands are commands that can be sent to devices in the same subnet via Unicast or Multicast. Depending on the setting, these have exclusive, write-only or read-only rights on the respective device. The
Action Commands enable:

- Trigger-over-Ethernet
- The synchronization of multiple cameras, for example by
  - Increasing or resetting counters
- Resetting timers
- etc.

Please note that Ethernet networks may experience delays. However, these are negligible for many applications.

Benefits & Advantages

Action Commands

- Simplify the cabling of your application
- Reduce the installation work required.

As a result, you can

- Reduce your hardware costs

Available for

- mvBlueCOUGAR-X (GigE Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for

Auto functions
Description

With **Auto functions**, the following features of the camera can be controlled automatically:

- The exposure time
- The gain
- The white balance

Benefits & Advantages

Auto Functions

- Mean that the camera automatically adapts to changing light conditions
- Generate the maximum performance potential
- Reduce the installation work required.

As a result, you can

- Reduce your hardware costs
- Reduce your software costs
- Reduce your development expenses

Available for

- [mvBlueFOX3-1](#) (USB3 Vision)
- [mvBlueFOX3-2](#) (USB3 Vision)
- [mvBlueFOX3-3M](#) (USB3 Vision)
- [mvBlueFOX3-4](#) (USB3 Vision)
- [mvBlueFOX3-5M](#) (USB3 Vision)
- [mvBlueCOUGAR-X](#) (GigE Vision)
- [mvBlueCOUGAR-XD](#) (Dual GigE Vision)
Interesting for

mvBlockScan

Description

The mvBlockScan acquires an Area of Interest (AOI) block which consists of several lines. The user defines the amount of AOI blocks which are used to create one image. With this functionality the feature offers the possibility,

- To realize a line scan application with Pregius global shutter area scan sensors from Sony and this
- In connection with the standard interfaces USB3 and GigE Vision

Benefits & Advantages

The mvBlockScan

- Simplifies the handling of line scan applications (e.g. during focusing),
- Increases the usability of area scan cameras,
- Reduces the costs because
  - A frame grabber is not needed and
  - The area scan camera is less pricy than a line scan camera with the same line rate.

As a result, you can

- Reduce your hardware costs
- Reduce your development efforts
Available for

- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-X (GigE Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for

Chunk data

Description

**Chunk data** is metainformation such as

- Camera parameters
- Timestamps
- Frame counter in the image
- etc.

that is sent in the same data stream as the image to the host application. This metainformation can be used for the following purposes:

- To reproduce camera settings
- To assign images to various sources

Benefits & Advantages
Chunk data

- Generates the maximum performance potential
- Simplifies the hardware structure

As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-1 (USB3 Vision)
- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-X (GigE Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for

Counters/Timers (Micro PLC)

Description

**Counters/Timers** enable time-sensitive I/O and acquisition control, thereby replacing PLC control (hence the name Micro PLC or Hardware Real-Time Controller). In total, four counters and two timers are available to our cameras, enabling the following:
• The flexible generation of trigger signals
• The synchronization of multiple cameras
• The quick generation of image sequences with varying flash and lighting settings (the flash can be powered directly with this)
• Dark and light images can be taken as reference image subtractions
• Lighting of images with various wavelengths (R/G/IR) can be controlled
• Disturbances can be removed by means of digital filtering circuits (inputs)

Benefits & Advantages

Counters/Timers

• Replace flash controllers and other control components
• Enable comfortable operation of these controllers/components via the camera software
• Simplify the cabling of your application
• Reduce the installation work required.

As a result, you can

• Reduce your hardware costs
• Reduce your software costs
• Reduce your development expenses

Available for

• mvBlueFOX3-1 (USB3 Vision)
• mvBlueFOX3-2 (USB3 Vision)
• mvBlueFOX3-3M (USB3 Vision)
• mvBlueFOX3-4 (USB3 Vision)
• mvBlueFOX3-5M (USB3 Vision)
• mvBlueCOUGAR-X (GigE Vision)
• mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for
Event Control

Description

Event Control enables a host application to be notified as soon as an internal event has taken place. Possible triggers for this could be

- The end of sensor exposure (exposure end)
- Rising edges on the digital inputs
- The end of a frame (frame end, meaning the camera is ready for a new trigger)
- etc.

Benefits & Advantages

Event Control

- Optimizes the processes
- Increases the speed
- Generates the maximum performance potential

As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-1 (USB3 Vision)
- mvBlueFOX3-2 (USB3 Vision)
Interesting for

Color Correction Matrix (CCM)

Description

With the **color correction matrix (CCM)**, matrices are used to carry out colour corrections for colour optimisation. There is a matrix with sensor-specific correction coefficients, a matrix with parameters for colour saturation - effective for all image formats (RGB and YUV) - as well as a matrix for the choice of colour space of the display unit. This feature

- Enables a natural, colourfast reproduction or
- Adapts the display to application-specific circumstances (display)
Benefits & Advantages

Color correction matrix (CCM)
• Optimizes image display quality
• Generates the maximum performance potential

As a result, you can

• Reduce your software costs
• Reduce your development expenses

Available for

- **mvBlueFOX3-1** (USB3 Vision)
- **mvBlueFOX3-2** (USB3 Vision)
- **mvBlueFOX3-3M** (USB3 Vision)
- **mvBlueFOX3-4** (USB3 Vision)
- **mvBlueFOX3-5M** (USB3 Vision)
- **mvBlueCOUGAR-X** (GigE Vision)
- **mvBlueCOUGAR-XD** (Dual GigE Vision)

Interesting for

Flat-Field Correction (FFC)

Description

With **flat-field correction** (FFC), every individual pixel of the sensor is corrected, so that when recording a homogeneous area, for example, it can be guaranteed that every pixel has the same output value. This feature can balance out

• Inhomogeneous lights
- Vignetting of the image
- Sensor errors such as fixed pattern noise or photo response non uniformity
Benefits & Advantages

Flat-field correction (FFC)

- Prevents and corrects defective or unfavourable imaging characteristics
- Simplifies the hardware structure
As a result, you can

- Reduce your hardware costs
- Reduce your software costs
- Reduce your development expenses

Available for

- `mvBlueFOX3-1` (USB3 Vision)
- `mvBlueFOX3-2` (USB3 Vision)
- `mvBlueFOX3-3M` (USB3 Vision)
- `mvBlueFOX3-4` (USB3 Vision)
- `mvBlueFOX3-5M` (USB3 Vision)
- `mvBlueCOUGAR-X` (GigE Vision)
- `mvBlueCOUGAR-XD` (Dual GigE Vision)

Interesting for

Frame Averaging

Description

With **Frame Averaging** you can average the gray scale values of each pixel. According to the sensor, you can choose between

- an adaptive image feedback ("communication of the gray values"), in which the feedback factor is adjusted in terms of pixels on the basis of the change of the gray tone of this pixel, and
- a classic averaging with a pixel value addition and a division afterwards.
As a result, in images with full bit depth

- Noise can be reduced
- Movements can be compensated
- An accumulation of lower intensity values can result
Benefits & Advantages

Frame Averaging

- Generates the maximum performance potential

As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-1 (USB3 Vision)
Interesting for

Frame Buffering (image memory in the camera)

Description

With frame buffering, cooperation is enabled between the internal image memory of our cameras in connection with the FPGA. As a result, you can

- Look back at the past, for example in traffic or at traffic lights (pre-/post-trigger mode)
- Bridge bus bottlenecks
- Record image sequences
- Achieve temporarily higher frequencies (burst mode)

Benefits & Advantages

Frame buffering

- Increases data security
- Enables higher acquisition rates than the bus bandwidth actually permits
- Generates the maximum performance potential

As a result, you can
- Reduce your software costs
- Reduce your development expenses

**Available for**

- **mvBlueFOX3-1** (USB3 Vision)
- **mvBlueFOX3-2** (USB3 Vision)
- **mvBlueFOX3-3M** (USB3 Vision)
- **mvBlueFOX3-4** (USB3 Vision)
- **mvBlueFOX3-5M** (USB3 Vision)
- **mvBlueCOUGAR-X** (GigE Vision)
- **mvBlueCOUGAR-XD** (Dual GigE Vision)

**Interesting for**

High Dynamic Range (HDR)

**Description**

Sensors that have a **high dynamic range (HDR)** mode, indicate an

- expanded dynamic range
**Benefits & Advantages**

High Dynamic Range (HDR) sensors

- Enable recordings under extreme differences in brightness (e.g. welding, light change day/night)
- Record extreme contrasts in one image
- Generate the maximum performance potential
- Simplify the hardware structure

As a result, you can
• Reduce your hardware costs

Available for

• **mvBlueFOX3-1** (USB3 Vision)
• **mvBlueCOUGAR-X** (GigE Vision)

Interesting for

Multi AOI

Description

Often, several areas in one image are of interest. With the **Multi AOI** feature, you can

• select multiple image sections and
• receive access to these.
Benefits & Advantages

With the Multi AOI, you can define image sections that are relevant to you.

As a result,

- you obtain higher frame rates and
- generate the maximum performance potential.
As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-X (GigE Vision)

Interesting for

Multi Camera Handling

Description

In order for your multi camera application to run reliably, our cameras provide a wide range of features. These include

- A bandwidth brake for the optimal use of the available resources
- The possibility to directly synchronise and control the cameras among themselves
- etc.
Benefits & Advantages

As a result of the comfortable support of multi-camera applications

- External controllers are no longer required
- The cabling or the entire hardware is simplified
- The installation work required reduces

As a result, you can

- Reduce your hardware costs
- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-1 (USB3 Vision)
- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-X (GigE Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for

Real-Time Gamma LUT

Description
The **Real-Time Gamma LUT** (Lookup Table) is a freely writeable RAM for any desired output characteristics. This feature enables

- Optimum use to be made of the camera's dynamic range
- The image to be changed in the Bayer or RGB path in the direction that the human eye perceives light and color, or generally
- The image to be adapted to individual circumstances
Benefits & Advantages

Real-Time Gamma LUT

- Optimizes image display quality
Generates the maximum performance potential

As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- **mvBlueFOX3-1** (USB3 Vision)
- **mvBlueFOX3-2** (USB3 Vision)
- **mvBlueFOX3-3M** (USB3 Vision)
- **mvBlueFOX3-4** (USB3 Vision)
- **mvBlueFOX3-5M** (USB3 Vision)
- **mvBlueCOUGAR-X** (GigE Vision)
- **mvBlueCOUGAR-XD** (Dual GigE Vision)

Interesting for

Sequencer

Description

With the **Sequencer**, you can simply define image sequences that

- Contain a certain set of parameters such as gain, binning, exposure time etc.
- And which can be controlled via trigger input and signal.
Benefits & Advantages

The sequencer

- Records information that would not be able to be achieved via a setting
- Generates the maximum performance potential
- Simplifies the hardware structure

As a result, you can

- Reduce your hardware costs
- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-X (GigE Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)

Interesting for

mvSmartFrameRecall®
Description

The mvSmartFrameRecall® generates small preview images with reduced resolution (thumbnails), which are transferred to the host PC with IDs. At the same time, the corresponding image in full resolution is archived in the camera's image memory. If the image is required in full resolution, the application sends a request and the image is transferred in the same data stream as the preview image. The feature enables

- Large sensors with high frame rates to also be fully exploited via Gigabit Ethernet and
- to be used at full speed

Benefits & Advantages

mvSmartFrameRecall®

- Reduces the amount of data
- Relieves the entire system
- Generates the maximum performance potential
- Simplifies the hardware structure
- Reduces the installation work required

As a result, you can

- Reduce your hardware costs
- Reduce your software costs
- Reduce your development expenses

Available for

- mvBlueFOX3-2 (USB3 Vision)
- mvBlueFOX3-3M (USB3 Vision)
- mvBlueFOX3-4 (USB3 Vision)
- mvBlueFOX3-5M (USB3 Vision)
- mvBlueCOUGAR-XD (Dual GigE Vision)
Interesting for

User data in the camera

Description

Every camera has a free non-volatile RAM that can be used for **user data**. With this feature, you can

- Deposit customer-specific data such as serial numbers etc. (and thereby use the camera as a dongle)
- Secure configuration data

Benefits & Advantages

The User Data feature

- Simplifies the hardware structure

As a result, you can

- Reduce your software costs
- Reduce your development expenses

Available for

- **mvBlueFOX3-1** (USB3 Vision)
- **mvBlueFOX3-2** (USB3 Vision)
- **mvBlueFOX3-3M** (USB3 Vision)
- **mvBlueFOX3-4** (USB3 Vision)
- **mvBlueFOX3-5M** (USB3 Vision)
Interesting for

1The availability of specific smart features can be limited to certain camera models. Please contact us to clarify if the desired feature is available for your camera model or can be added to.