GRABLINK™
Full™ - DualBase™ - Base™

Full-Featured Base, Medium and Full Camera Link Frame Grabbers

CAMERA **Link**®
REGISTERED PRODUCT

PCI EXPRESS®

PoCL™
SafePower

PoCL™
SafePower

GRABLINK
Full™

GRABLINK
DualBase™

GRABLINK
Base™

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EURESYS™
Excellence in vision

The GRABLINK™ series Comparison Chart

EURESYS — Excellence in vision

GRABLINK Full™

GRABLINK DualBase™

GRABLINK Base™

	GRABLINK Full	GRABLINK DualBase	GRABLINK Base
Form factor	x4 PCI Express Full height, half length	x4 PCI Express Full height, half length	x1 PCI Express Low profile, half length
Camera Link configurations	Base, Medium, Full	Dual Base	Base
Number of cameras	1	2	1
10-tap configuration camera support	✓	-	-
PoCL Safe Power	-	-	-
Mini Camera Link SDR connector	2	2	1
Tap de-multiplexing incl. tap reversal	✓	✓	✓
Max. pixel-clock frequency	24/48/64/80 bits @ 85MHz	2x24 bits @ 85MHz	24 bits @ 85MHz
Gray scale camera support	✓	✓	✓
Color camera support	RGB and Bayer	RGB and Bayer	RGB and Bayer
Area scan camera support	✓	✓	✓
Line scan camera support	✓	✓	✓
Effective delivery bandwidth	Up to 850 MB/s*	Up to 850 MB/s*	Up to 200 MB/s
On-board memory	128 MB	128 MB	64 MB
On-board processing Input images	8-bit, 10-bit or 12-bit	8-bit, 10-bit or 12-bit	8-bit, 10-bit or 12-bit
Pre-processing functions:			
- 3 LUT operators	✓	✓	✓
- Bayer CFA decoder	✓	✓	✓
- Pixel formatting	✓	✓	✓
- Image reconstruction	✓	✓	✓
I/O electrical style			
Isolated current-sense inputs for a wide voltage input range up to 30V - trigger and general purpose -	4	8	4
Isolated contact output - strobe and general purpose -	4	8	4
High-speed differential inputs - quadrature encoder and general purpose -	2	4	2
+5V and +12V power output with electronic fuse protection	✓	✓	✓

*Application and motherboard dependent

GRABLINK Full™ – GRABLINK DualBase™ – GRABLINK Base™

The **Grablink Full, Grablink Base** and **Grablink DualBase** are state-of-the-art **Camera Link frame grabbers** representing a **complete and competitive offer for machine vision systems**. These new Grablink boards are particularly **well-balanced** in term of **features** offering **on-board processing**, such as LUTs and a Bayer CFA decoder. Moreover, these frame grabbers feature a new **rich set of I/O lines** particularly compatible **with a wide range of sensors and encoders**.

Support of Full, Medium and Base Camera Link® Configuration Cameras

- *Monochrome, Bayer CFA, and color RGB progressive-scan cameras supported*

- *Full pixel clock range: from 20 MHz up to 85 MHz*

- *Serial control of Camera Link cameras:* the Grablink series supports the Camera Link **serial communication line**. The application software can use the Camera Link API functions to control the camera. Alternatively, the serial line can be **configured as an additional PC COM** port ensuring interoperability with existing camera control software.

- *Mini Camera Link® SDR connectors* with camera activity LED indicators

On-Board Processing

- *3 Look-up table (LUT) operators*
  - *Monochrome operation with selectable output bit depth:* 8 bits, 10 bits or 12 bits
  - *RGB and Bayer color operations with selectable output bit depth:* 3 x 8 bits, 3 x 10 bits, 3 x 12 bits or 3 x 16 bits

- *Bayer CFA decoder* computes the R, G and B components of the image

- *Pixel formatting in the following formats:*
  - *Monochrome formats:* Y8, Y10, Y12, Y16
  - *Bayer CFA formats:* BAYER8, BAYER10, BAYER12, BAYER16
  - *Three packed RGB components formats:* RGB24
  - *Three planar RGB components formats:* RGB24PL, RGB30PL, RGB36PL, RGB48PL
  - *Four packed RGB plus alpha components formats:* RGB32

- *Image reconstruction:* tap re-ordering, H/V flipping

- *High-performance DMA transfers* into user allocated memory with **64-bit addressing** capability with image cropping capability

Digital I/O Lines Compatible with a Wide Range of Sensors and Encoders

- *They form a rich set of I/O lines with, per camera:*
  - 4 isolated current-sense inputs for a wide voltage input range up to 30V
  - 4 isolated contact outputs
  - 2 high-speed differential inputs

- *Moreover, +5V and +12V power outputs* with electronic fuse protection are provided. The Grablink Full, DualBase and Base I/O lines can be used as **general-purpose I/O lines**. They also have specific usages as **trigger**, **strobe** or **quadrature encoder input lines**.

Grablink Acquisition Modes

The Grablink acquisition boards support various area-scan and line-scan acquisition modes, which make them easy to integrate into various types of applications.

The Grablink boards are able to precisely control the cameras.

For **area-scan applications**, this includes **asynchronous reset** as well as **exposure control**. The asynchronous reset allows the application to precisely control the instant of the image capture. Of course, synchronous operation modes are also supported.

For **line-scan cameras**, this includes the control of the **line rate** and of the **exposure**. Free-running modes are also supported.

Flexible and Reliable Area–Scan Acquisition Modes

• *Trigger*

When the part is in front of the camera, a signal, called Trigger, is generated and sent to the Grablink to start the acquisition. This external signal is generated by any type of external hardware device, such as a sensor, which is connected to one of the input lines of the Grablink boards. A "software" trigger signal may also be generated by the host application.

- **Trigger delay**: in order to accommodate different positions of the sensor, an optional programmable trigger delay may postpone the start of the acquisition for a given number of microseconds.
- **Trigger decimation**: in order to decrease the acquisition speed, the Grablink may be instructed to skip, at a regular defined rate, some of the pulses sent by the external trigger.

• *Exposure control*

The Grablink acquisition boards are capable of consistently controlling the sensitivity or exposure time of the camera.

• *Light strobe*

When the acquisition starts, at the appropriate timing, the Grablink board is able to generate a signal to control an illumination device connected to one of its output lines.

High–Performance Line–Scan Acquisition Modes

• *The Grablink acquisition boards feature several acquisition modes dedicated to line-scan cameras:*

- **Continuous web scanning** to inspect infinite, continuously moving surfaces without losing a single line.
- **Successive object scanning** to acquire the image of objects moving in front of the camera. The acquisition starts when each object enters the camera field of view, as signaled by an external trigger.

• *Trigger*

Typically, a trigger is used to start the acquisition of lines when the part to be inspected is in position. This external signal is generated by any type of external hardware device, such as a sensor, which is connected to one of the input lines of the Grablink boards. A "software" trigger signal may also be generated by the host application.

- Grablink supports **start and end triggers**. After it is started, the acquisition either
  - ✔ Continues indefinitely (for web inspection applications)
  - ✔ Continues for a programmable number of lines (to acquire the image of objects with a known length)
  - ✔ Continues until an end trigger is received (to acquire the image of objects with a variable length)
- **Trigger delay**: In order to accommodate different positions of the sensor, an optional programmable trigger delay is able to delay the start of the acquisition of a given number of lines.

• *Motion encoders*

When the speed of the web or part to be inspected is not constant, it is important to properly synchronize the camera line rate with the motion of the object, or this can lead to distortion or non-uniform pixel aspect ratio in the image. This can be done using an incremental motion encoder. In this mode, the Grablink frame grabber controls the camera scanning rate based on the data received from the motion encoder.

- When the part moves faster, the acquisition line rate of the camera increases.
- When the part moves slower, the acquisition line rate of the camera decreases.

New Quadrature Motion Encoder Support

Quadrature motion encoders use two signals (or phases), called A and B (cf. illustration above), that the Grablink board can interpret to know in which direction (forward or backward) the part is moving.

- With the **optional direction selector**, the user can define which direction is considered as the forward direction for the application, A to B or B to A. Optionally, the Grablink can be instructed to acquire lines only when the object is moving forward, or only when the object is moving backward.
- With the **backward motion cancellation**, the Grablink is capable of stopping the acquisition when a backward motion is detected. The line acquisition automatically resumes when the motion is again in the forward direction at the exact place where the acquisition was interrupted.
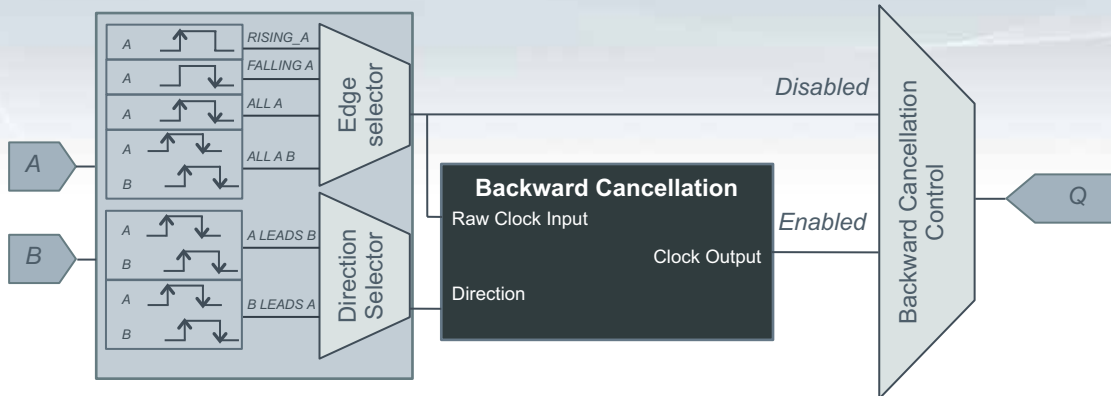
• A unique rate converter

The Grablink boards incorporate a unique device called the rate converter, which works along with the motion encoder. The rate converter allows the camera to acquire lines at any programmable resolution lower or higher than the resolution of the motion encoder. This gives the designer incredible freedom and flexibility during the development of the application.
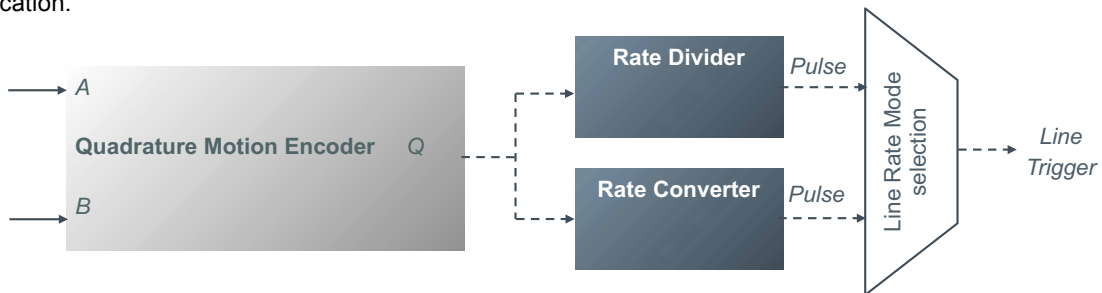
• Rate divider

The rate divider allows the camera to acquire lines at a resolution lower than the resolution of the motion encoder. The rate divider divides the incoming encoder signal by a programmable integer.

• Exposure control

The Grablink acquisition boards are capable of consistently controlling the sensitivity or exposure time of the camera.

• Periodic generator

When the speed of the web or the object to inspect is constant, the Grablink can drive the line scan camera at a constant line rate generated from its programmable internal periodic generator.

Interfaced Cameras

Euresys delivers pre-defined files for many popular cameras; still the user can customize his **CamFiles**. The Grablink frame grabbers interface an impressive choice of different cameras including the most up-to-date ones. A complete list is available on the Interfacing Cameras page of the Euresys web site - **www.euresys.com.**
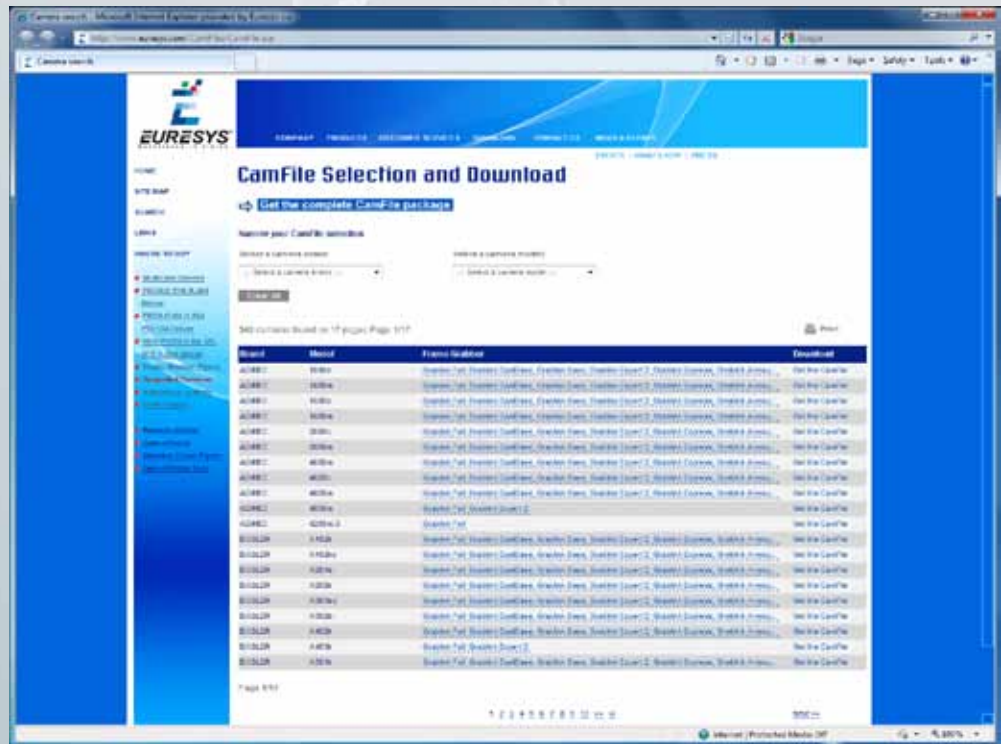
MultiCam Driver for Windows® and Linux (32- and 64-bit)

The **MultiCam driver** enables the consistent control of several Euresys frame grabbers, using an arbitrary number of cameras, from **one or several software applications**. MultiCam allows defining **channels** linking cameras to buffers in the PC memory. The MultiCam channel **identifies all parameters** ruling the acquisition process from a camera. Every camera feature, such as its type, resolution or image format, is described and controlled through **simple parameters**, considerably easing the camera control task. For each channel-controlled camera, a set of dedicated parameters is created from a CamFile.

Supported Development Tools

- The 32-bit and 64-bit binary libraries are designed to be used with ISO-compliant C/C++ compilers for the development of respectively 32-bit (x86) and 64-bit (x86-64) applications.
- The ActiveX controls library is designed to be used with ActiveX-compatible development tools for the development of 32-bit (x86) applications.

Ordering Information

Product Code	Designation
1622	GRABLINK Full
1623	GRABLINK DualBase
1624	GRABLINK Base