



# GRABLINK™ series

*High-speed digital Camera Link image acquisition boards*



**GRABLINK  
Avenue™**



**GRABLINK  
Express™**



**NEW  
GRABLINK  
Quickpack CFA PCIe™**

## GRABLINK™ series

GRABLINK Value™ – GRABLINK Value cPCI™ – GRABLINK Avenue™ – GRABLINK Express™  
GRABLINK Expert 2™ – GRABLINK Expert 2 cPCI™ – GRABLINK Quickpack ColorScan™  
GRABLINK Quickpack CFA™ – GRABLINK Quickpack CFA PCIe™

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# The GRABLINK<sup>TM</sup> series Comparison Chart

NEW

NEW

|                                                                | GRABLINK Value                                 | GRABLINK Value cPCI                    | GRABLINK Avenue                                                                     | GRABLINK Express                                                                    | GRABLINK Expert 2                              | GRABLINK Expert 2 cPCI        | GRABLINK Quickpack ColorScan                                                                                                                                                 | GRABLINK Quickpack CFA                                                                                                                                                                          | GRABLINK Quickpack CFA PCIe                                                                                                                                                                     |
|----------------------------------------------------------------|------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Form factor                                                    | 32-bit, 33 MHz PCI<br>Full height, half length | 64-bit, 66 MHz cPCI<br>6U/4HP          | 64-bit, 66 MHz PCI<br>Full height, half length                                      | x1 PCI Express<br>Full height, half length                                          | 64-bit, 66 MHz PCI<br>Full height, half length | 64-bit, 66 MHz cPCI<br>6U/4HP | 64-bit, 66 MHz PCI<br>Full height, half length                                                                                                                               | 64-bit, 66 MHz PCI<br>Full height, half length                                                                                                                                                  | x4 PCI Express<br>Full height, half length                                                                                                                                                      |
| Camera Link configuration                                      | Base                                           | Base                                   | Base                                                                                | Base<br>PoCL Safe Power                                                             | Base, dual-Base,<br>Medium                     | Base, dual-Base,<br>Medium    | Base                                                                                                                                                                         | Base                                                                                                                                                                                            | Base<br>PoCL Safe Power                                                                                                                                                                         |
| Tap demultiplexing incl. tap reversal                          | ✓                                              | ✓                                      | ✓                                                                                   | ✓                                                                                   | ✓                                              | ✓                             | ✓                                                                                                                                                                            | ✓                                                                                                                                                                                               | ✓                                                                                                                                                                                               |
| Max. pixel-clock frequency                                     | 24 bits @ 60 MHz                               | 24 bits @ 60 MHz                       | 24 bits @ 85 MHz                                                                    | 24 bits @ 85 MHz                                                                    | 48 bits @ 60 MHz                               | 48 bits @ 60 MHz              | 24 bits @ 60 MHz                                                                                                                                                             | 24 bits @ 85 MHz                                                                                                                                                                                | 24 bits @ 85 MHz                                                                                                                                                                                |
| Gray scale                                                     | ✓                                              | ✓                                      | ✓                                                                                   | ✓                                                                                   | ✓                                              | ✓                             | -                                                                                                                                                                            | -                                                                                                                                                                                               | -                                                                                                                                                                                               |
| Color                                                          | ✓                                              | ✓                                      | ✓                                                                                   | ✓                                                                                   | ✓                                              | ✓                             | ✓                                                                                                                                                                            | ✓                                                                                                                                                                                               | ✓                                                                                                                                                                                               |
| Area scan                                                      | ✓                                              | ✓                                      | ✓                                                                                   | ✓                                                                                   | ✓                                              | ✓                             | -                                                                                                                                                                            | ✓                                                                                                                                                                                               | ✓                                                                                                                                                                                               |
| Line scan                                                      | ✓                                              | ✓                                      |  |  | ✓                                              | ✓                             | ✓                                                                                                                                                                            | -                                                                                                                                                                                               | -                                                                                                                                                                                               |
| Max. delivery bandwidth                                        | 90 MB/s                                        | 90 MB/s                                | 240 MB/s                                                                            | 180 MB/s                                                                            | 240 MB/s                                       | 240 MB/s                      | 240 MB/s                                                                                                                                                                     | 240 MB/s                                                                                                                                                                                        | 320 MB/s                                                                                                                                                                                        |
| On-board memory                                                | 8-MB                                           | 8-MB                                   | 32-MB                                                                               | 32-MB                                                                               | 16-MB                                          | 16-MB                         | 128-MB                                                                                                                                                                       | 128-MB                                                                                                                                                                                          | 128-MB                                                                                                                                                                                          |
| Pre-processing<br>- Input images<br>- Pre-processing functions | LUTs 3x (8-bit x 8-bit)<br>for R, G, B         | LUTs 3x (8-bit x 8-bit)<br>for R, G, B | -                                                                                   | -                                                                                   | -                                              | -                             | For color line-scan inspection<br>3 x 8-bit<br>Scan delay compensation<br>Shading correction<br>LUTs 3x (8-bit x 8-bit)<br>for R, G, B<br>White balance<br>Up to 50MPixels/s | For color area-scan inspection<br>8-bit, 10-bit or 12-bit<br>Bayer decoding<br>Luminance blender<br>LUTs 4x (16-bit x 16-bit)<br>for R, G, B, Y<br>Automatic white balance<br>Up to 80MPixels/s | For color area-scan inspection<br>8-bit, 10-bit or 12-bit<br>Bayer decoding<br>Luminance blender<br>LUTs 4x (16-bit x 16-bit)<br>for R, G, B, Y<br>Automatic white balance<br>Up to 80MPixels/s |
| -Max. processing rate                                          |                                                |                                        |                                                                                     |                                                                                     |                                                |                               |                                                                                                                                                                              |                                                                                                                                                                                                 |                                                                                                                                                                                                 |

| I/O electrical style -system functions-                                                               | 4 externally | 4 externally | 9 internally & externally | 9 internally & externally | 26 on an I/O board | 26 externally | 2 externally | 9 internally & externally | 9 internally & externally |
|-------------------------------------------------------------------------------------------------------|--------------|--------------|---------------------------|---------------------------|--------------------|---------------|--------------|---------------------------|---------------------------|
| Isol. multi-mode bidirectional I/O* & Isol. 5V power supply -I/N (Trigger/Line trigger) OUT (Strobe)- | 2            | 2            | 2                         | 2                         | 4                  | 4             | 2            | 2                         | 2                         |
| Non-isol. TTL input -Trigger/Line trigger-                                                            | 1            | 1            | -                         | -                         | 3                  | 3             | -            | -                         | -                         |
| Non-isol. TTL output -Strobe-                                                                         | 1            | 1            | -                         | -                         | 3                  | 3             | -            | -                         | -                         |
| Non-isol. bidirectional CMOS I/O                                                                      | -            | -            | -                         | -                         | 16                 | 16            | -            | -                         | -                         |
| Non-isol. universal differential input** -Trigger/Line-                                               | -            | -            | 2                         | 2                         | -                  | -             | -            | 2                         | 2                         |
| Isol. contact output -Strobe-                                                                         | -            | -            | 1                         | 1                         | -                  | -             | -            | 1                         | 1                         |
| Non-isol. bidirectional TTL I/O -Trigger/Line trigger-                                                | -            | -            | 4                         | 4                         | -                  | -             | -            | 4                         | 4                         |
| 5V Power supply                                                                                       | ✓            | ✓            | ✓                         | ✓                         | ✓ (2)              | ✓ (2)         | ✓            | ✓                         | ✓                         |
| 12V Power supply                                                                                      | ✓            | ✓            | ✓                         | ✓                         | ✓                  | ✓             | ✓            | ✓                         | ✓                         |

\*Input: Isolated TTL, Isolated 12V. Output: Isolated TTL, Isolated Open Collector, Isolated Open Emitter. \*\*LVDS and more

# The GRABLINH™ series



GRABLINH Value™

GRABLINH Avenue™

GRABLINH Expert 2™

GRABLINH Express™

GRABLINH Quickpack ColorScan™

GRABLINH Quickpack CFA™

GRABLINH Quickpack CFA PCIe™

GRABLINH Value cPCI™

GRABLINH Expert 2 cPCI™

# High-performance LINE-SCAN and AREA-SCAN Applications

## Flexible and reliable LINE-SCAN acquisition



**Camera modes** The Grablink series interfaces to **state-of-the-art Camera Link line-scan cameras** with **line rate** and **exposure control**. Free running cameras are supported as well.

**Continuous web scanning** The «web mode» allows inspecting a continuously moving surface without losing a single line.

**Successive object scanning** In «page mode», a Grablink acquires a set of consecutive lines constituting a 2D image. The acquisition starts when the object enters the camera field of view, as signaled by an external trigger.

**Motion encoder** When the observed web or object moves at a variable speed, the frame grabber imposes a camera scanning rate derived from a motion encoder. **This guarantees a fixed pixel aspect ratio. Perfect square pixels** are achievable. A built-in rate converter of the Grablink boards defines any ratio between the camera scanning rate and the encoder pulse rate with 1/1000 resolution. Thus, an off-the-shelf encoder can serve several applications. The exposure control feature guarantees a **constant sensitivity** despite the speed variation.

## ADR Technology™\*

### Simple and reliable LINE-SCAN acquisition with constant lighting sensitivity and line rate

In many applications, a **line-scan camera** has to be operated at a **constant cycling rate** in order to maintain a constant sensitivity. The **Grablink Avenue** and the **Grablink Express** implement **ADR\***, a **unique downweb resampling feature**, yielding a defined aspect ratio irrespective of web speed variations, even without an electronic shutter on the camera.

A built-in rate converter accommodates an off-the-shelf motion encoder to control the line acquisition process, enabling any **programmable aspect ratio, including perfect square pixels**.

ADR\* makes the most of the line-scan camera, as the sensitivity is not impaired by the shuttering.

➤ Download the "About ADR Technology" flyer from our web site: [www.euresys.com](http://www.euresys.com).



## Full support of AREA-SCAN acquisition



**Camera modes** Features such as **asynchronous reset**, **exposure control**, **strobe lighting** often required in industrial applications are available on the Grablink series. The synchronous mode is also supported.

**Trigger and exposure control** An external signal can be sent to the frame grabber to trigger the acquisition. The Grablink series is capable of consistently controlling the exposure time and the illumination.

**Camera tap structure** For any tap structure, a Grablink delivers a **re-ordered bitmap image** to the PC memory. **Tap-reversal** is supported. With the **multiplex tap** technique, several taps are interleaved over Camera Link as long as the combined data rate remains below the pixel clock frequency specified for the board.

# Main Features

- **Acquisition:**
  - Up to 24-bit / 48-bit at maximum 85 MHz*
  - Camera Link configurations: Base, dual Base or Medium*
  - Support of LINE-SCAN and AREA-SCAN cameras*
  - Multiple taps, tap reversal, tap multiplex*
- **Large on-board memory**
- **Asynchronous reset, exposure control and I/O lines -trigger & strobe-**
- **Camera Link serial line configurable as an additional PC COM port**
- **MultiCam drivers for Windows® and Linux**

The Grablink series is a range of **high-speed** PCI, PCI Express and Compact PCI frame grabbers for **line-scan or area-scan digital Camera Link cameras**. State-of-the-art cameras are easily connected with off-the-shelf Camera Link compliant cables. The Grablink series is ideal for industrial applications such as inspection of **high-speed moving objects**, **web inspection** or **high-resolution acquisition**.



## Serial control of camera

The Grablink series supports the Camera Link pseudo **RS-232 serial 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.

## Bus mastering

All Euresys frame grabbers are **PCI bus mastering** agents that directly store the acquired images into the PC physical memory without CPU involvement. As a **unique feature**, a Euresys board automatically recovers the **scatter-gather** virtual memory mapping to present the data as a regular bitmap image in a user allocated memory buffer.

## Windows Of Interest [WOI] support

The Grablink series seamlessly support the acquisition of a WOI rather than a full image.

## Interfaced cameras

The Grablink series interfaces an impressive choice of different cameras.

► An up-to-date list is available on the *Interfacing Cameras* page on [www.euresys.com](http://www.euresys.com).



| Model        | Resolution | Frame Rate | Bit Depth | Input Format | Output Format | Compression | Interface   | Power | Price    |
|--------------|------------|------------|-----------|--------------|---------------|-------------|-------------|-------|----------|
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$1,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$1,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$1,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$2,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$2,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$2,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$2,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$3,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$3,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$3,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$3,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$4,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$4,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$4,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$4,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$5,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$5,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$5,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$5,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$6,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$6,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$6,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$6,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$7,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$7,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$7,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$7,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$8,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$8,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$8,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$8,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$9,000  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$9,200  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI         | 5V    | \$9,500  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | PCI Express | 5V    | \$9,800  |
| GrabLink 6.0 | 1080p      | 30 FPS     | 24-bit    | YUYV         | YUYV          | None        | Compact PCI | 5V    | \$10,000 |



## GRABLINK Value™

### Cost-effective Camera Link acquisition

**Base configuration** -24-bit at 60 MHz-  
8-MB on-board memory

**Form factors:** Conventional PCI 32-bit 33 MHz bus  
Compact PCI 6U/4HP 64-bit 66 MHz bus

The **Grablink Value** is an affordable Camera Link frame grabber for **cost-effective industrial applications**. The Grablink Value is recommended for **single-camera systems**.

### Support of the Base configuration

| CAMERA COMPATIBILITY      |      | Monochrome or Bayer                                  |                                | Color RGB         |
|---------------------------|------|------------------------------------------------------|--------------------------------|-------------------|
|                           |      | single-tap                                           | dual-tap                       | single-tap        |
| Tap configuration         |      | Base_1T8, Base_1T10, Base_1T12, Base_1T14, Base_1T16 | Base_2T8, Base_2T10, Base_2T12 | Base_1T24         |
| Camera Link configuration | Base | 1 tap x (8-10-12-14-16 bits)                         | 2 taps x (8-10-12 bits)        | 1 tap x (24 bits) |

### 4 I/O lines available on an external DB9 connector

#### I/O electrical style

- 2 isolated multi-mode bidirectional I/O and associated isolated 5V power supply
  - Input: isolated TTL, isolated 12V
  - Output: isolated TTL, isolated open collector, isolated Open Emitter
- 1 non-isolated TTL input
- 1 non-isolated TTL output
- 5V and 12V power supplies

#### I/O electrical style and function

- TTL trigger or page trigger input
- Opto-isolated trigger or page trigger input
- TTL strobe output
- Opto-isolated strobe output
- TTL line trigger or encoder input
- Opto-isolated line trigger or encoder input



## GRABLINK Avenue™

### Ultra-fast Camera Link acquisition

**Base configuration** -up to 24-bit at 85 MHz-

**Full support of AREA-SCAN cameras** -asynchronous reset and exposure control-

**Simple and reliable LINE-SCAN acquisition** -ADR Technology™-

**32-MB on-board memory**

**Form factors:** Conventional PCI 64-bit, 66 MHz bus, 3V/5V signaling



The **Grablink Avenue** is an ultra-fast PCI frame grabber for **line-scan or area-scan digital Camera Link cameras**. Grablink Avenue is a high-performance **64-bit, 66 MHz PCI bus** board acquiring images from one camera in the Camera Link Base configuration. This board acquires the 24-bit data, with any tap structure, at the **maximum speed of 85 MHz** allowing to be interfaced to the fastest cameras.

### Support of the Base configuration

| CAMERA COMPATIBILITY      |                | Monochrome or Bayer                                  |                                                          |                   | Color RGB                                                                                                         |
|---------------------------|----------------|------------------------------------------------------|----------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------|
|                           |                | single-tap                                           | dual-tap                                                 | quad-tap          | single-tap                                                                                                        |
| Tap configuration         |                | Base_1T8, Base_1T10, Base_1T12, Base_1T14, Base_1T16 | Base_2T8, Base_2T10, Base_2T12, Base_2T14B2, Base_2T16B2 | Base_4T8B2        | Base_1T24, Base_1T24B3, Base_1T30B2, Base_1T36B2, Base_1T36B3, Base_1T42B2, Base_1T42B3, Base_1T48B2, Base_1T48B3 |
| Camera Link configuration | Base           | 1 tap x (8-10-12-14-16 bits)                         | 2 taps x (8-10-12 bits)                                  | -                 | 1 tap x (24 bits)                                                                                                 |
|                           | Extended Base* | -                                                    | 2 taps x (14-16 bits)                                    | 4 taps x (8 bits) | 1 tap x (24-30-36-42-48 bits)                                                                                     |

\*Multiplex tap

### 9 various I/O lines available on an external HD26 connector and on an internal 26-pin header connector

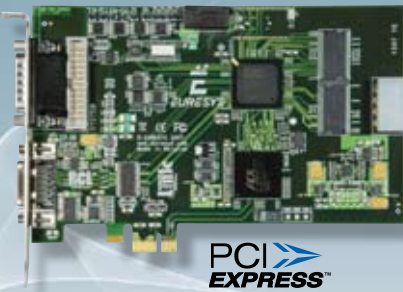
#### I/O electrical style

- 2 isolated multi-mode bidirectional I/O and associated isolated 5V power supply
  - Input: isolated TTL, isolated 12V
  - Output: isolated TTL, isolated open collector, isolated open emitter
- 2 non-isolated universal differential inputs (LVDS and more)
- 1 isolated contact output
- 4 non-isolated bidirectional TTL I/O
- 5V and 12V power supplies

#### I/O electrical style and function

- TTL trigger or page trigger input
- LVDS trigger or page trigger input
- Opto-isolated trigger or page trigger input
- TTL strobe output
- Opto-isolated strobe output
- Fast opto-isolated strobe output
- TTL line trigger or encoder input
- Opto-isolated line trigger or encoder input





## GRABLINK Express™

Cutting-edge PCI Express Camera Link acquisition

**Base Camera Link 1.2 configuration** -24-bit at 85 MHz-  
 -Power over Camera Link compliant -PoCL-  
**Full support of AREA-SCAN cameras** -Asynchronous reset and exposure control-  
**Simple and reliable LINE-SCAN acquisition** -ADR Technology™-  
**32-MB on-board memory**  
**Form factors: PCI Express Full-height, half-length, x1**

The **Grablink Express** is at the cutting-edge of the Camera Link technology through the compliance with the new **standard 1.2 including PoCL** - Power over Camera Link-. It allows a single Camera Link cable to supply power to the camera, on top of transferring high-speed images and controlling the camera. The Grablink Express PoCL frame grabber interfaces the **smallest and fastest cameras** on the market while still being **safely compatible** with cables and cameras from the previous Camera Link standards.

### Support of Camera Link 1.2 Base configuration -including PoCL-

The Grablink Express supports the same type of cameras as the Grablink Avenue -see the chart on page 6-.



The **Power over Camera Link standard** specifies how to supply power to the camera through the Camera Link connector without losing backward compatibility with the previous Camera Link standard.

- Conventional and PoCL cameras and cables supported
- "SafePower" feature
- Over-Current Protection and Over-Voltage Protection circuits

**9 various external and internal I/O lines** identical to the Grablink Avenue I/O lines

\*Patent pending



## GRABLINK Expert 2™

High-performance Camera Link acquisition

**Dual Base or Medium configurations** -48-bit at 60 MHz-  
**16-MB on-board memory**  
**Form factors: Conventional PCI 64-bit 66 MHz bus**  
**Compact PCI 6U/4HP, 64-bit 66 MHz bus**

The **Grablink Expert 2** is a Camera Link frame grabber for **demanding industrial applications**.

### Support of dual Base or Medium configurations

| CAMERA COMPATIBILITY      |        | Monochrome or Bayer                                  |                                                          |                                      | Color RGB                                                     |                   |
|---------------------------|--------|------------------------------------------------------|----------------------------------------------------------|--------------------------------------|---------------------------------------------------------------|-------------------|
|                           |        | single-tap                                           | dual-tap                                                 | quad-tap                             | single-tap                                                    | dual-tap          |
| Tap configuration         |        | Base_1T8, Base_1T10, Base_1T12, Base_1T14, Base_1T16 | Base_2T8, Base_2T10, Base_2T12, Medium_2T14, Medium_2T16 | Medium_4T8, Medium_4T10, Medium_4T12 | Base_1T24, Medium_1T30, Medium_1T36, Medium_1T42, Medium_1T48 | Medium_2T24       |
| Camera Link configuration | Base   | 1 tap x (8-10-12-14-16 bits)                         | 2 taps x (8-10-12 bits)                                  | -                                    | 1 tap x (24 bits)                                             | -                 |
|                           | Medium | -                                                    | 2 taps x (14-16 bits)                                    | 4 taps x (8-10-12 bits)              | 1 tap x (30-36-42-48 bits)                                    | 2 tap x (24 bits) |

### Multiple Windows Of Interest (WOI) support

With some **specific CMOS cameras**, the Grablink Expert 2 supports their possible feature of acquiring up to **16 WOI in the image**, with **overlapping** of the windows.

### 26 I/O lines



The **Grablink Expert 2** is delivered with an auxiliary I/O board implementing the trigger and strobe facilities. On the **Grablink Expert 2 cPCI**, the two I/O connectors are located directly on the front panel.

#### I/O electrical style

- 4 isolated multi-mode bidirectional I/Os and associated isolated 5V power supply
  - Input: isolated TTL, isolated 12V
  - Output: isolated TTL, isolated open collector, isolated open emitter
- 3 non-isolated TTL inputs and 3 similar outputs
- 16 non-isolated bidirectional CMOS I/Os
- 5V and 12V power supplies

#### I/O electrical style and function

- TTL trigger or page trigger input
- Opto-isolated trigger or page trigger input
- TTL strobe output
- Opto-isolated strobe output
- TTL line trigger or encoder input
- Opto-isolated line trigger or encoder input



# GRABLINK Quickpack ColorScan™

*High-resolution Camera Link image acquisition and pre-processing for color LINE-SCAN inspection*

**Image pre-processing accelerated by the FPGA** -up to 50MPixels/s-

Scan-delay compensation      Shading correction

Look-up table transformation      White balance

**Base configuration** 24-bit at up to 60 MHz

**Output formats** RGB 24- and 32-bit packed

RGB 24-bit planar

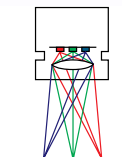
**128 MB on-board memory**

**Form factor:** Conventional PCI 64-bit 66 MHz

The **Grablink Quickpack ColorScan** provides on its **FPGA** the **accelerated** image pre-processing functions necessary for color scanning applications. Color document scanning or PCB inspections are then considerably eased and accelerated providing on the fly enhanced images ready for further processing.

## Image pre-processing functions accelerated by the FPGA

- **Scan-delay compensation** A trilinear color camera captures the luminance information at three light wavelength ranges from three distinct locations. A gap between these lines analyzed in red, green and blue is resulting due to the sensor geometry and the optical arrangement. The scan-delay compensation offered in the Grablink Quickpack ColorScan gathers the color information coming from three different locations in order to **reconstruct consistent RGB information**.
- **On the fly shading correction on the three color components** After the calibration phase, the six profiles are compiled into the frame grabber hardware to correct the distortions. This correction is handled applying a **multiplicative -gain-** and an **additive -offset-** correction to each pixel issued in the scanned signal. This processing drastically improves the quality of the acquired images facilitating the application processing.
- **Three 8-bit x 8-bit Look-up Table Transformer for the R the G and the B components** They include the following setup methods: exhaustive definition of the transformation law, parametric shaping of the transformation law through a few intuitive controls, white balance by RGB gain correction implemented as special transformation laws.
- **White balance correcting for RGB channel imbalance** This imbalance can be due to differences in sensitivity of sensors, to the illumination system and to the optical filter. After calibration, a **correcting gain** is applied to each color channel to compensate for unbalanced R, G and B components.



Raw acquired image



Scan-delay compensated



Scan-delay compensated and shading corrected image



Scan-delay compensated, shading corrected and white balanced image

## Image acquisition and transfer

- **Support of Base configuration for RGB LINE-SCAN camera**

Two kinds of RGB imagers are supported: trilinear and 3-CCD. Only RGB single-tap with **Base\_1T24** tap configuration is supported.

- **Downweb resampling feature for shutterless cameras**

Most high-resolution color line-scan cameras have no electronic shutter capability. Consequently, they have to be operated at a constant cycling rate in order to maintain a constant sensitivity. The Grablink Quickpack ColorScan implements a unique downweb resampling feature yielding a **defined aspect ratio irrespective of web speed variations**. A built-in rate converter accommodates an off-the-shelf motion encoder to control the line acquisition process, enabling **any programmable aspect ratio**, including perfect square pixels.

## 2 I/O lines available externally on a DB-9 connector

### I/O electrical style

- 2 isolated multi-mode bidirectional I/Os and associated isolated 5V power supply
  - Input: isolated TTL, isolated 12V
  - Output: isolated TTL, isolated open collector, isolated open emitter
- 5V and 12V power supplies

### I/O electrical style and function

- TTL trigger or page trigger input
- Opto-isolated trigger or page trigger input
- TTL strobe output
- Opto-isolated strobe output
- TTL line trigger or encoder input
- Opto-isolated line trigger or encoder input



# GRABLINK Quickpack CFA™ boards

*Camera Link image acquisition and pre-processing  
for color AREA-SCAN inspection*

**Image pre-processing accelerated by the FPGA on 8-bit, 10-bit or 12-bit input images -up to 80MPixels/s-**

*Bayer Pattern decoder*

*White balance operator*

*Luminance blender*

*Four LUT operators*

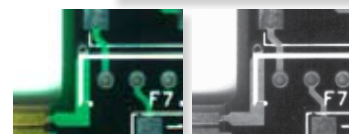
**Base configuration 24-bit at up to 85 MHz  
128 MB on-board memory**

The **Grablink Quickpack CFA** -Color Filter Array- offers a set of dedicated on-board preprocessing functions to speed up image processing for applications such as PCB, food or pharmaceutical inspection without loading the host CPU.

## Image pre-processing functions accelerated by the FPGA

All operators are compatible with **8-, 10- and 12-bit input images**.

- **A Bayer Pattern decoder** computes the R,G and B components of the image
- **An automatic white balance operator**
  - The white balance parameters can be specified by the user or computed automatically from the image.
  - They can be computed continuously (on each image) or once only (under user control).
  - Moreover, they can be computed from automatically selected white pixels in the image, or from a user-specified region of interest.
- **A luminance blender** computes the Y component of the image
- **Four 16-bit x 16-bit LUT operators** on R, G, B and Y channels



## Image acquisition and transfer

- **Support of Base configuration for AREA-SCAN single or dual-tap cameras**

- Bayer pattern color

- Also compatible with monochrome and RGB cameras

As a Base Camera Link configuration board, the Grablink Quickpack CFA supports the same type of cameras as the Grablink Avenue -see the chart on page 6-

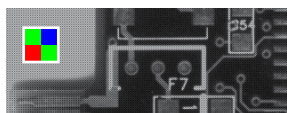
- **9 various I/O lines** available on external and internal connectors, similarly to the Grablink Avenue -page 6-

### Output format

- 8-, 10-, 12- and 16-bit components (R, G, B and Y)

- A wide range of formats is available in the following classes:

- monochrome
- Bayer CFA
- three packed R G B components
- three planar R G B components
- four packed R G B a components
- four packed R G B Y components
- three packed R G B components + Y component
- three planar R G B components + Y component



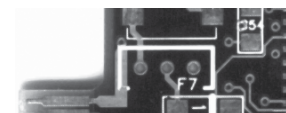
Raw image



Bayer pattern decoder



White balance



Luminance blender

## GRABLINK Quickpack CFA™

**Form factor:** Conventional PCI **64-bit, 66 MHz, 3V/5V signaling**  
**Image Resolution** Up to 4096 by 4096

## GRABLINK Quickpack CFA PCIe™

**NEW**

**PoCL Safe Power compliant** -see on page 7-

**Form factor:** PCI Express **Full-height, half-length, x4**

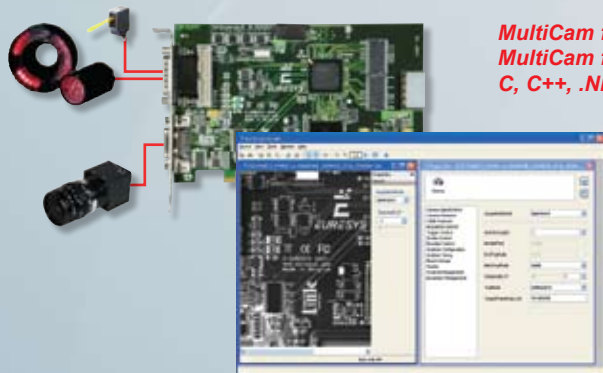
**Image Resolution** Up to 7616 x 4096

**Trigger decimation:** it controls the acquisition rate from an electrical signal by setting a programmable decimation factor.



# Software support

## MultiCam™ Drivers



**MultiCam for Microsoft Windows 2000®, XP®, Server 2003® and Vista®**  
**MultiCam for Linux Suse Linux Enterprise Server 10**  
**C, C++, .NET classes and ActiveX controls**

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 CAM file.

Euresys delivers pre-defined files for many popular cameras; still the user can customize his **CAM files**.

► An up-to-date list is available on the *Interfacing Cameras* page of the Euresys web site.

### MultiCam™ IDEs

| LANGUAGE          | Using ...          | OS       | Environment          |
|-------------------|--------------------|----------|----------------------|
| C++               | C API              | Windows® | MS Visual Studio®    |
|                   |                    |          | Borland C++ Builder® |
|                   | DirectShow filters | Linux    | gcc                  |
| Pascal            | ActiveX controls   | Windows® | MS Visual Studio®    |
|                   | Pascal API         | Windows® | Borland Delphi®      |
| Visual Basic      | ActiveX controls   | Windows® | Borland Delphi®      |
| Visual Basic .NET | .NET objects       | Windows® | MS Visual Studio®    |
| C#                | .NET objects       | Windows® | MS Visual Studio®    |

# Ordering Information

### ORDER CODE

### DESIGNATION

|      |                     |
|------|---------------------|
| 1191 | GRABLINK Value      |
| 1194 | GRABLINK Value cPCI |
| 1198 | GRABLINK Avenue     |
| 1621 | GRABLINK Express    |

### ORDER CODE

### DESIGNATION

|      |                              |
|------|------------------------------|
| 1197 | GRABLINK Expert 2            |
| 1196 | GRABLINK Expert 2 cPCI       |
| 1501 | GRABLINK Quickpack ColorScan |
| 1503 | GRABLINK Quickpack CFA       |
| 6009 | GRABLINK Quickpack CFA PCIe  |

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