

#### Key Features:

- 1 to 8 CoaXPress links support
- PCIe Gen3 x8 Half-length card
- Up to 136 Gb image buffer
- Camera controls and triggers
- Up to 4 re-transmit links
- Per-link LED indication on card bracket
- Flexible machine I/O:
  - 8 TTL configurable I/Os
  - 8 LVTTTL configurable I/Os
  - 4 LVDS inputs/4 LVDS outputs
  - 8 opto-isolated outputs
  - 8 opto-isolated inputs
  - 8 quadrature rotary encoders
  - Integrated strobe controller
  - 8 timers
- CoaXPress V1.1 compliant
- Power over CoaXPress with 13W per link
- Multiple Camera synchronization
- Multiple Frame Grabbers synchronization
- DIN 1.0/2.3 connectors for CoaXPress links
- GUI interface
- Supporting Windows and Linux OS
- API for developing custom applications
- Plug-ins modules for Matlab, HALCON and Labview
- Gen<i>i</i>Cam compliant
- GenTL support
- Data rates up to 6.25 Gbps per link
- Transfer Rate of up to 50 Gbps
- 0°C to 55°C operating environment temperature

## Komodo CoaXPress Frame Grabber with 8 channels

### Innovative Approach

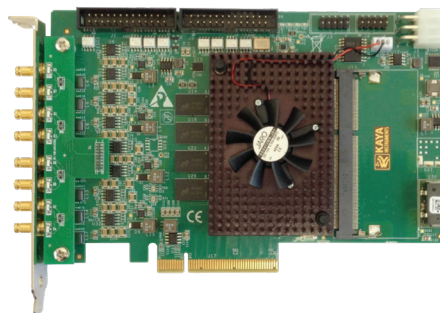
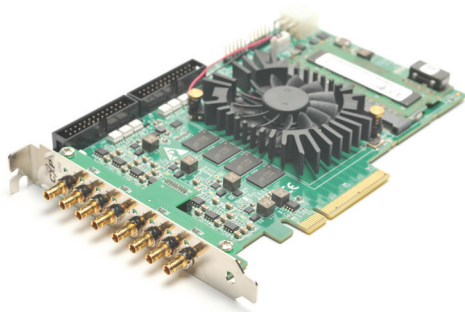
Komodo is best in class Frame Grabber supporting CoaXPress standard. The Komodo is capable of receiving video streams from up to 8 CoaXPress links in single, dual, quad or octal modes. It can be used for simultaneous capture from multiple cameras. Each link supports standard CoaXPress bitrates up to 6.25 Gbps. This CoaXPress Frame Grabber is ideally suited for industrial, defense and aerospace Machine Vision Systems and applications.

### Intelligent Design

The Komodo can easily receive video streams on the CoaXPress links and transmit them to computer memory through the PCIe interface. This product also provides GPIO for machine control signals, such as triggers, timers, shaft encoders, exposure control and general I/O, which can be control aside video stream acquisition.

The Komodo uses standard DIN connectors as a CoaXPress interface to the camera and standard 100 mil headers for general purpose I/O. The Frame Grabber utilizes PCIe Gen3 x8 links for communication with Host PC for video uploading and configuration.

## Datasheet | Komodo™ CoaXPress™ Frame Grabber with 8 channels



|  |   |
|--|---|
| Product Name                                 | Komodo CoaXPress Frame Grabber with 8 channels  |
| Form Factor                                  | PCI Express card  |
| Format                                       | Standard profile, half length, 8-lane PCI Express card  |
| Cooling method                               | Air cooling, fan-cooled heatsink  |
| Mounting                                     | For insertion in a standard height, 8-lane or higher, PCI Express card slot   |
| Connectors                                   | Ports 0 through 7 on bracket<br>8x DIN 1.0/2.3 female connectors<br>CoaXpress host interface<br>Internal I/O connector 1<br>26-pin 2-row 0.1" pitch pin header with shrouding for I/O lines<br>Internal I/O connector 2<br>26-pin 2-row 0.1" pitch pin header with shrouding for I/O lines<br>Auxiliary power input (PoCXP) on PCB<br>6-pin PEG power socket 12 VDC power input for PoCXP camera(s) |
| Dimensions                                   | L 167.65 mm x H 111.15 mm<br>L 6.6 in x H 4.38 in   |
| Weight                                       | 225gr   |
| <b>Host bus</b>                              |   |
| Standard                                     | PCI Express 3.0   |
| Link width                                   | 8 lanes, 1, 2 or 4 lanes with reduced performance   |
| Link speed                                   | <ul style="list-style-type: none"> <li>• 8.0 GT/s (PCIe 3.0)</li> <li>• 5.0 GT/s (PCIe 2.0) with reduced performance</li> </ul>   |
| Maximum payload size                         | 512 bytes   |
| DMA  | <ul style="list-style-type: none"> <li>• 32- and 64-bit</li> <li>• Scatter gather support</li> <li>• Physical address support (GPU transfers)</li> </ul>  |
| Peak delivery bandwidth                      | 7,880 MB/s  |
| Effective (sustained), delivery bandwidth    | 6,710 MB/s (Host PC motherboard dependent)  |
| Power consumption                            | Typ. 16.8 W (3.8 W @ +3.3V, 13 W @ +12V), excluding camera and I/O power output   |
| <b>Camera / video inputs</b>                 |   |
| Interface standard(s)                        | CoaXPress 1.0 and 1.1   |
| Status LEDs                                  | 1 CoaXPress Host connection status per connector<br>4 System status LEDs  |
| Number of cameras                            | Up to 8   |
| Number of links, per single camera           | Up to 8   |
| Syncronisation between cameras               | Yes   |
| Line-scan cameras supported,                 | Yes   |
| Maximum aggregated camera data transfer rate | 50 Gbit/s   |

|                                      |   |
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| Supported CXP down-connection speeds | <ul style="list-style-type: none"> <li>• 1.25 GT/s (CXP-1)</li> <li>• 2.5 GT/s (CXP-2)</li> <li>• 3.125 GT/s (CXP-3)</li> <li>• 5 GT/s (CXP-5)</li> <li>• 6.25 GT/s (CXP-6)</li> </ul>  |
| Number of data streams (per camera)  | 1 data stream per camera  |
| Maximum stream packet size           | 8,192 bytes   |
| PoCXP (Power over CoaXPress)         | <ul style="list-style-type: none"> <li>• PoCXP Safe Power: ,</li> <li>• 13 W of 24V DC regulated power per CoaXPress connector</li> <li>• PoCXP Device detection and automatic power-on</li> <li>• Overload and short-circuit protections</li> <li>• On-board 12V to 24V DC/DC converter</li> <li>• A +12V power source must be connected to the auxiliary power input connector</li> </ul>   |
| Camera types                         | <ul style="list-style-type: none"> <li>• Area-scan cameras: <ul style="list-style-type: none"> <li>• Gray-scale and color (RGB and Bayer CFA)</li> <li>• Single-tap (1X-1Y) progressive-scan</li> </ul> </li> <li>• Line-scan cameras:, <ul style="list-style-type: none"> <li>• Gray-scale and color RGB</li> </ul> </li> </ul>  |
| Camera pixel formats supported       | Raw, Monochrome, Bayer, RGB, YUV, YCbCr and RGBA (PFNC names): <ul style="list-style-type: none"> <li>• Raw</li> <li>• Mono8, Mono10, Mono12, Mono14, Mono16</li> <li>• BayerXX8, BayerXX10, BayerXX12, BayerXX14, BayerXX16 where XX = GR, RG, GB, or BG</li> <li>• RGB8, RGB10, RGB12, RGB14, RGB16</li> <li>• RGBA8, RGBA10, RGBA12, RGBA14, RGBA16</li> <li>• YUV411_8, YUV411_10, YUV411_12, YUV411_14, YUV411_16</li> <li>• YUV422_8, YUV422_10, YUV422_12, YUV422_14, YUV422_16</li> <li>• YUV444_8, YUV444_10, YUV444_12, YUV444_14, YUV444_16</li> <li>• YCbCr601_411_8, YCbCr601_411_10, YCbCr601_411_12, YCbCr601_411_14, YCbCr601_411_16</li> <li>• YCbCr601_422_8, YCbCr601_422_10, YCbCr601_422_12, YCbCr601_422_14, YCbCr601_422_16</li> <li>• YCbCr601_444_8, YCbCr601_444_10, YCbCr601_444_12, YCbCr601_444_14, YCbCr601_444_16</li> </ul> |
| <b>Area-scan camera control</b>      |   |
| Trigger                              | Precise control of asynchronous reset cameras, with exposure control.<br>Support of camera exposure/readout overlap.<br>Support of triggering from encoder or timer<br>Support of external hardware trigger, with optional delay, filtering and trigger decimation.   |
| Strobe                               | Accurate control of the strobe position for strobe light sources.<br>Support of early and late strobe pulses.   |
| <b>Line-scan camera control</b>      |   |
| Scan/page trigger                    | Precise control of start-of-scan and end-of-scan triggers.<br>Support of external hardware trigger, with optional delay and filtering.<br>Support of triggering from encoder<br>Support of infinite acquisition, without missing lines.   |
| Line trigger                         | Support for quadrature motion encoders, with programmable filters, selection of acquisition direction and backward motion compensation.   |
| Line strobe                          | Accurate control of the strobe position for strobe light sources.   |
| <b>On-board processing</b>           |   |
| On-board memory                      | <ul style="list-style-type: none"> <li>• 1 GB</li> <li>• Up to 16GByte SODIMM</li> </ul>  |
| Bayer De-Mosaic                      | Full 16bit resolution <ul style="list-style-type: none"> <li>• Bilinear 3x3</li> <li>• Bilinear 3x2 for linescan with gradient correction</li> </ul>  |
| Color Transformation                 | Full 16bit resolution 18bit coefficients table <ul style="list-style-type: none"> <li>• Color space conversion</li> <li>• Gain and Offset</li> </ul>  |
| Decimation                           | Line skip   |
| Additional features                  | Unpacking of 10-/12-/14-bit to 16-bit with justification to LSB   |
| Frame Timestamp                      | 64bit with 8ns precision  |

|   |   |
|---|---|
| Data stream statistics                    | Measurement of: <ul style="list-style-type: none"> <li>• Frame/Line rate</li> <li>• CRC Errors</li> <li>• Dropped frames</li> <li>• Received packets</li> <li>• Test packets</li> </ul>   |
| Event signaling and counting              | The application software can be notified of the occurrence of various events: <ul style="list-style-type: none"> <li>• Newly aquired buffers</li> <li>• Camera and Illumination control events</li> <li>• I/O events</li> <li>• Timer events</li> <li>• Encoder events</li> </ul> |
| <b>General Purpose Inputs and Outputs</b> |   |
| Number of lines                           | 40 I/O lines: <ul style="list-style-type: none"> <li>4 differential inputs</li> <li>4 differential outputs</li> <li>8 singled-ended TTL inputs/outputs</li> <li>8 singled-ended LVTTTL inputs/outputs</li> <li>8 opto-isolated inputs</li> <li>8 opto-isolated outputs</li> </ul> |
| Usage                                     | Any System I/O input lines can be connected to any I/O line<br>Any I/O line can be used to decode A/B and Z signals of a motion encoder<br>Any I/O line can generate any trigger event<br>Any I/O line can trigger a timer  |
| Electrical specifications                 | Differential lines - LVDS compatible<br>TTL lines - 5V TTL compliant<br>LVTTTL lines - 3.3V LVTTTL compliant<br>Isolated lines - opto isolated lines with voltage range up to 30V   |
| Filter control                            | Glitch removal filter available on all System I/O input lines<br>Configurable filter time constants   |
| Polarity control                          | Yes   |
| Encoders                                  | 8 quadrature encoders with A/B and Z inputs<br>32bit position counter<br>Forward and backward counting<br>Position trigger support<br>Noise filtering   |
| Timers                                    | 8 general purpose timers<br>Configurable delay and duration<br>32bit accumulator  |
| Event reporting                           | 64bit system timestamp event reporting<br>Each I/O line can generate event on configurable edge<br>Each Timer can generate event<br>Each encoder can generate event   |
| <b>Frame grabber synchronisation</b>      |   |
| Synchronisation                           | Precise area and linscan cameras synchronisation across different frame grabbers  |
| <b>Software</b>                           |   |
| Host PC Operating System                  | Microsoft Windows 7/10 32- and 64-bit versions, Linux open source driver compatible with a wide range of distributions, tested and precompiled for Ubuntu 14.04 , RedHat 6.5 , CentOS 7 32- and 64-bit versions   |
| Buffer management                         | Circular buffer support<br>Accumulation of several frames/lines to single buffer to reduce CPU load<br>DMA Buffer filling directly to system memory   |
| GUI                                       | Supported for Windows and Linux OS<br>Multicamera display and configuration<br>Flexible buffer queuing<br>Image/video recording and playback  |
| Debuging capabilities                     | Event logging<br>Statistics counters  |
| GeniCam                                   | Support of genicam up to 2.4<br>Full camera and frame grabber parameters configuration  |



|                                   |  |
|-----------------------------------|--|
| <b>Environmental conditions</b>   |  |
| Operating ambient air temperature | 0°C to +50°C / +32°F to +122 °F  |
| Operating ambient air humidity    | 10% to 90% RH non-condensing   |
| Storage ambient air temperature   | -20°C to +70°C / -4°F to +158°F  |
| Storage ambient air humidity      | 10% to 90% RH non-condensing   |
| <b>Certifications</b>             |  |
| Electromagnetic - EMC standards   | The European Council EMC Directive 2004/108/EC<br>The Unites States FCC rule 47 CFR 15   |
| EMC - Emission                    | EN 55022:2010 Class B<br>FCC 47 Part 15 Class B  |
| EMC - Immunity                    | EN 55024:2010 Class B<br>EN 61000-4-3<br>EN 61000-4-4<br>EN 61000-4-6  |
| Flammability                      | PCB compliant with UL 94 V-0   |
| RoHS                              | Compliant with the European Union Directive 2011/65/EU (ROHS2)   |
| REACH                             | Compliant with the European Union Regulation No 1907/2006  |
| WEEE                              | Must be disposed of separately from normal household waste and must be recycled according to local regulations                       |
| <b>Ordering Information</b>       | KY-FGK-801   |
| <b>Optional accessories</b>       | <ul style="list-style-type: none"> <li>• GPIO Expansion bracket</li> <li>• DDR3 Extra memory SODIMM 2GB, 4GB, 8GB or 16GB</li> </ul> |

## Compatibility

### Supported vision standart



### Supported operating systems



Windows



Linux

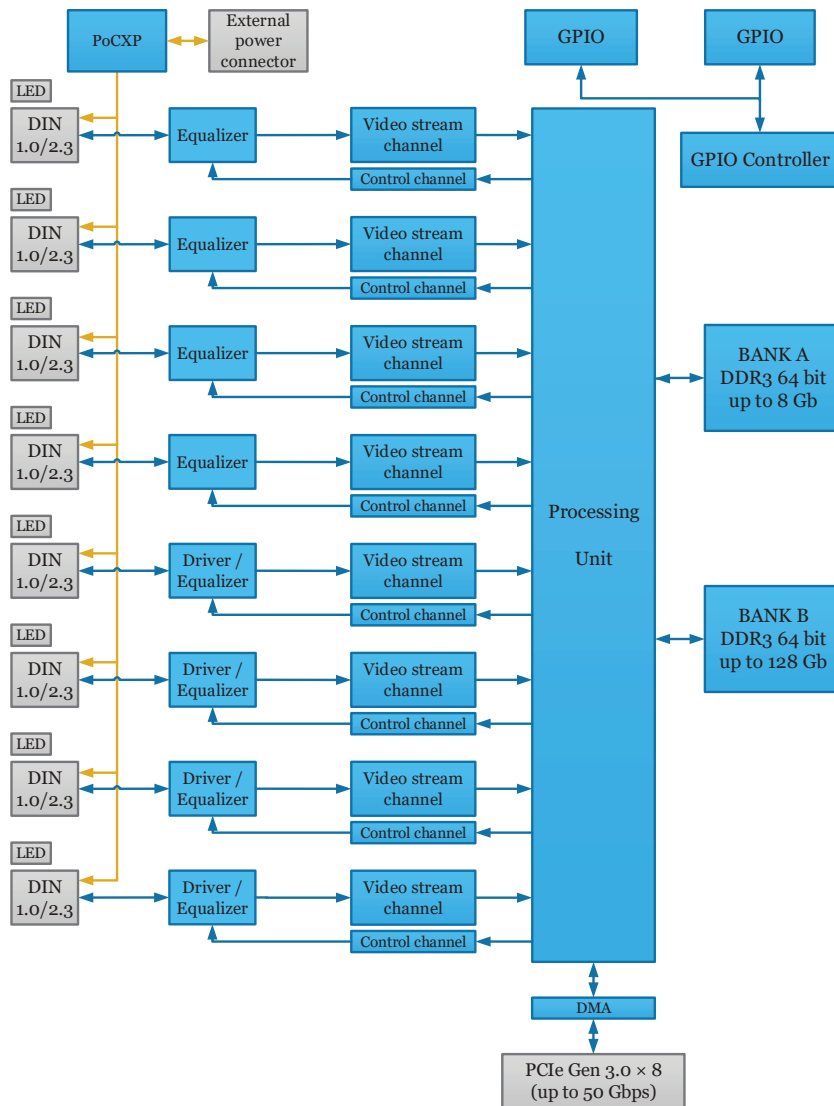
### Supported vision libraries



Compatible with more than 30 popular machine vision libraries

KAYA Instrument strives to create and maintain compatibility and interfaces for the most common and advanced vision image-processing libraries and applications. Major support is available for **MVTec Halcon**, **National Instruments LabVIEW** and **MathWorks MATLAB**. Please check our KAYA website for an up-to-date list of other supported libraries and software packages.

## Komodo Frame Grabber HW Block Diagram



## Contact

19 Avenue de Norvège  
91140 Villebon sur Yvette  
FRANCE

info@techway.fr  
+33 (0)1 64 53 37 90

www.techway.fr

Please visit [www.kayainstruments.com](http://www.kayainstruments.com) for complete product information.  
Get in touch with our teams at [sales@kayainstruments.com](mailto:sales@kayainstruments.com).  
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Worldwide  
**KAYA Instruments**

20 HaMesila St. Nesher 3688520  
POB 25004, Haifa 3125001  
Israel

[info@kayainstruments.com](mailto:info@kayainstruments.com)

Tel. +972 72 272 3500  
Fax. +972 72 272 3511

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