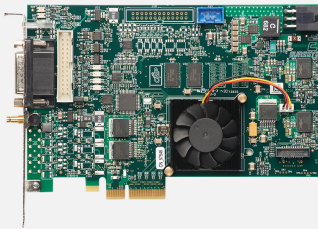




Coaxlink Mono

One-connection CoaXPress frame grabber



At a Glance

- One CoaXPress CXP-6 connection: 625 MB/s camera bandwidth
- PCIe 2.0 (Gen 2) x4 bus: 1,700 MB/s delivery bandwidth
- Feature-rich set of 10 digital I/O lines
- Extensive camera control functions
- Memento Event Logging Tool

Benefits

Acquire images from the fastest and highest resolution cameras

- Highest data acquisition rate in the industry
- 6.25 Gbit/s (625 MB/s) bandwidth from camera to host PC memory

Long cable support for Coaxlink CXP-6

- 40 meters at CXP-6 speed (6.25 Gbps)
- 100 meters at CXP-3 speed (3 Gbps)

Use standard coaxial cables

- A single inexpensive cable for data transfer, camera control, trigger and power supply
- Top reliability and flexibility, performs in the harshest environments

Robust connectors for reliable connections

- Coaxlink CXP-6 uses DIN 1.0/2.3 connectors with push/pull latching system

Memento Event Logging Tool

- Memento is an advanced development and debugging tool available for Coaxlink cards.
- Memento records an accurate log of all the events related to the camera, the frame grabber and its driver as well as the application.
- It provides the developer with a precise timeline of time-stamped events, along with context information and logic analyzer view.
- It provides valuable assistance during application development and debugging, as well as during machine operation.

Direct GPU transfer

- Sample programs for AMD DirectGMA and NVIDIA (CUDA) available.
- Direct GPU transfer eliminates unnecessary system memory copies, lowers CPU overhead, and reduces latency, resulting in significant performance improvements in data transfer times for applications.

- Direct capture of image data to GPU memory is available using AMD's DirectGMA. Compatible with AMD FirePro W5x00 and above and all AMD FirePro S series products.

PCIe 2.0 (Gen 2) x4 bus

- 1,700 MB/s sustained bus bandwidth

General purpose I/O lines

- Compatible with a wide range of sensors and motion encoders.
- High-speed differential inputs: Quadrature motion encoder support up to 5 MHz.
- Isolated current-sense inputs: 5V, 12V, 24V signaling voltages accepted, up to 50 kHz, individual galvanic isolation up to 500VAC RMS.
- Isolated contact outputs.
- High-speed 5V-compliant TTL inputs/ LVTTTL outputs.

High-performance DMA (Direct Memory Access)

- Direct transfer into user-allocated memory and hardware boards that expose PCI addresses
- Hardware scatter-gather support
- 64-bit addressing capability

Area-scan triggering capabilities

- A trigger is used to start the acquisition when the part is in position. Hardware triggers come from the Coaxlink's I/O lines. Software triggers come from the application.
- An optional trigger delay is available to postpone the acquisition for a programmable time.
- A trigger decimation function allows to skip some of the triggers.
- Camera exposure control allows the application to control the exposure time of the camera.
- When the acquisition starts, at the appropriate timing, the Coaxlink board generates a signal to control an illumination device connected to one of its output lines.

The Coaxlink driver includes the following tools:

- Genicam Browser: An application giving access to the Genicam features exposed by the GenTL Producer(s) in the system.
- GenTL Console: A command-line tool giving access to the functions and commands exposed by the Euresys GenTL Producer.

Compliant with Genicam Including support for

- GenApi
- The Standard Feature Naming Convention (SFNC)
- GenTL

Windows, Linux and macOS drivers available

- Including support for Intel 32-bit and 64-bit platforms as well as ARM 64-bit platforms

Applications

Machine Vision for the Electronic Manufacturing Industry

- High speed image acquisition for AOI, 3D SPI, 3D lead/ball inspection machines.

Machine Vision for the General Manufacturing Industries

- High frame rate image acquisition for inspection machines
- Image acquisition for robots

Video Acquisition and Recording

- High-frame-rate video acquisition for motion analysis and recording

Video Monitoring, Surveillance & Security

- Transmission and acquisition of high-definition video over long coaxial cables for traffic surveillance, monitoring and control

Specifications

Mechanical

Format	Standard profile, half length, 4-lane PCI Express card
Cooling method	Air cooling, fan-cooled
Mounting	For insertion in a standard height, 4-lane or higher, PCI Express card slot
Connectors	<ul style="list-style-type: none">• 'A' on bracket:<ul style="list-style-type: none">– DIN 1.0/2.3 female connector– CoaXPress host interface• EXTERNAL I/O' on bracket:<ul style="list-style-type: none">– 26-pin 3-row high-density female sub-D connector– I/O lines and power output• INTERNAL I/O 1' on PCB:<ul style="list-style-type: none">– 26-pin 2-row 0.1" pitch pin header with shrouding– I/O lines and power output• 'AUXILIARY POWER INPUT' on module:<ul style="list-style-type: none">– 6-pin PEG power socket– 12 VDC power input for PoCXP camera(s) and I/O• 'C2C-LINK' on module:<ul style="list-style-type: none">– 6-pin 2-row 0.1-in header– Card to card link
LED indicators	<ul style="list-style-type: none">• 'A' on bracket:<ul style="list-style-type: none">– Bi-color red/green LED– CoaXPress Host connector indicator• 'FPGA STATUS LAMP' on PCB:<ul style="list-style-type: none">– Bi-color red/green LED– FPGA status indicator• 'BOARD STATUS LAMP' on PCB:<ul style="list-style-type: none">– Bi-color red/green LED– Board status indicator
Switches	'RECOVERY' on card PCB: <ul style="list-style-type: none">• 3-pin 1-row 0.1" header• Firmware emergency recovery
Dimensions	L 167.65 mm x H 111.15 mm L 6.6 in x H 4.38 in
Weight	150 g, 5.29 oz
Host bus	
Standard	PCI Express 2.0
Link width	<ul style="list-style-type: none">• 4 lanes• 1 lane or 2 lanes with reduced performance

Link speed	<ul style="list-style-type: none"> • 5.0 GT/s (PCIe2.0) • 2.5 GT/s (PCIe 1.0) with reduced performance
Maximum payload size	512 bytes
DMA	32- and 64-bit
Peak delivery bandwidth	2,000 MB/s
Effective (sustained) delivery bandwidth	1,700 MB/s (Host PC motherboard dependent)
Power consumption	Typ. 9.3 W (2.1 W @ +3.3V, 7.2 W @ +12V), excluding camera and I/O power output

Camera / video inputs

Interface standard(s)	CoaXPress 1.0, 1.1 and 1.1.1
Connectors	1x DIN1.0/2.3 CXP-6
Status LEDs	One CoaXPress Host connection status LED per connector
Number of cameras	One 1-connection area-scan camera
Maximum aggregated camera data transfer rate	6.25 Gbit/s (625 MB/s)
Supported CXP down-connection speeds	1.25 GT/s (CXP-1), 2.5 GT/s (CXP-2), 3.125 GT/s (CXP-3), 5 GT/s (CXP-5), and 6.25 GT/s (CXP-6)
Number of CXP data streams (per camera)	1 data stream per camera
Maximum CXP stream packet size	16,384 bytes
PoCXP (Power over CoaXPress)	<ul style="list-style-type: none"> • PoCXP Safe Power: <ul style="list-style-type: none"> – 17 W of 24V DC regulated power per CoaXPress connector – PoCXP Device detection and automatic power-on – Overload and short-circuit protections • On-board 12V to 24V DC/DC converter • A +12V power source must be connected to the AUXILIARY POWER INPUT connector using a 6-pin PEG cable
Camera types	<ul style="list-style-type: none"> • Area-scan cameras: <ul style="list-style-type: none"> – Gray-scale and color (RGB and Bayer CFA) – Single-tap (1X-1Y) progressive-scan
Camera pixel formats supported	Raw, Monochrome, Bayer, RGB, and RGBA (PFNC names): <ul style="list-style-type: none"> • Raw • Mono8, Mono10, Mono12, Mono14, Mono16 • BayerXX8, BayerXX10, BayerXX12, BayerXX14, BayerXX16 where XX = GR, RG, GB, or BG • RGB8, RGB10, RGB12, RGB14, RGB16 • RGBA8, RGBA10, RGBA12, RGBA14, RGBA16 • YCbCr601_422_8, YCbCr601_422_10 • YCbCr709_422_8, YCbCr709_422_10 • YUV422_8, YUV422_10

Area-scan camera control

Trigger	<ul style="list-style-type: none"> • Precise control of asynchronous reset cameras, with exposure control. • Support of camera exposure/readout overlap. • Support of external hardware trigger, with optional delay and trigger decimation.
Strobe	<ul style="list-style-type: none"> • Accurate control of the strobe position for strobed light sources. • Support of early and late strobe pulses.

On-board processing

On-board memory	512 MB
Image data stream processing	<ul style="list-style-type: none">• Unpacking of 10-/12-/14-bit to 16-bit with selectable justification to LSb or MSb• Optional swap of R and B components• Little endian conversion
Input LUT (Lookup Table)	Only available for monochrome cameras: <ul style="list-style-type: none">• 8 to 8 bits• 10 to 8, 10 or 16 bits• 12 to 8, 12 or 16 bits
Data stream statistics	<ul style="list-style-type: none">• Measurement of:<ul style="list-style-type: none">– Frame rate (Area-scan only)– Line rate– Data rate• Configurable averaging interval
Event signaling and counting	<ul style="list-style-type: none">• The application software can be notified of the occurrence of various events:<ul style="list-style-type: none">– Standard event: the EVENT_NEW_BUFFER event notifies the application of newly filled buffers– A large set of custom events• Custom events sources:<ul style="list-style-type: none">– I/O Toolbox events– Camera and Illumination control events– CoaXPress data stream events– CoaXPress host interface events• Each custom event is associated with a 32-bit counter that counts the number of occurrences• The last three 32-bit context data words of the event context data can be configured with event-specific context data:<ul style="list-style-type: none">– Event-specific data– State of all System I/O lines sampled at the event occurrence time– Value of any event counter

General Purpose Inputs and Outputs

Number of lines	10 I/O lines: <ul style="list-style-type: none">• 2 differential inputs (DIN)• 2 singled-ended TTL inputs/outputs (TTLIO)• 4 isolated inputs (IIN)• 2 isolated outputs (IOUT)
Usage	<ul style="list-style-type: none">• Any I/O input lines can be used by any LIN tool of the I/O Toolbox• Selected pairs of I/O input lines can be used by any QDC tool of the I/O toolbox to decode A/B signals of a motion encoder• The LIN and QDC tools outputs can be further processed by the other tools (DIV, MDV, DEL) of the I/O toolbox to generate any of the following "trigger" events:<ul style="list-style-type: none">– The "cycle trigger" of the Camera and Illumination controller– The "cycle sequence trigger" of the Camera and Illumination controller– The "start-of-scan trigger" of the Acquisition Controller (line-scan only)– The "end-of-scan trigger" of the Acquisition Controller (line-scan only)

Electrical specifications	<ul style="list-style-type: none"> • DIN: High-speed differential inputs compatible with ANSI/EIA/TIA-422/485 differential line drivers and complementary TTL drivers • TTLIO: High-speed 5V-compliant TTL inputs or LVTTTL outputs, compatible with totem-pole LVTTTL, TTL, 5V CMOS drivers or LVTTTL, TTL, 3V CMOS receivers • IIN: Isolated current-sense inputs with wide voltage input range up to 30V, compatible with totem-pole LVTTTL, TTL, 5V CMOS drivers, RS-422 differential line drivers, potential free contacts, solid-state relays and opto-couplers • IOOUT: Isolated contact outputs compatible with 30V / 100mA loads
Filter control	<ul style="list-style-type: none"> • Glitch removal filter available on all System I/O input lines • Configurable filter time constants: <ul style="list-style-type: none"> – for DIN and TTLIO lines: 50 ns, 100 ns, 200 ns, 500 ns, 1 μs – for IIN lines: 500 ns, 1 μs, 2 μs, 5 μs, 10 μs
Polarity control	Yes
Power output	Non-isolated, +12V, 1A, with electronic fuse protection
I/O Toolbox tools	<p>The I/O Toolbox is a configurable interconnection of tools that generates events (usually triggers) from input lines. The composition of the toolset is product- and firmware-dependent.</p> <ul style="list-style-type: none"> • Line Input tool (LIN): Edge detector delivering events on rising or falling edges of any selected input line. • Quadrature Decoder tool (QDC): A composite tool including: <ul style="list-style-type: none"> – A quadrature edge detector delivering events on selected transitions of selected pairs of input lines. – An optional backward motion compensator for clean line-scan image acquisition when the motion is unstable. – A 32-bit up/down counter for delivering a position value. • Divider tool (DIV): to generate an event every nth input events from any I/O toolbox event source. • Multiplier/divider tool (MDV): to generate m events every d input events from any I/O toolbox event source. • Delay tool (DEL): to delay up to 16 events from one or two I/O toolbox event sources, by a programmable time or number of motion encoder ticks (any QDC events). • User Actions Scheduler tool (UAS): to delegate the execution of User Actions at a scheduled time or encoder position. Possible user actions include setting low/high/toggle any bit of the User Output Register or generation of any User Events.
I/O Toolbox composition	8 LIN, 1 QDC, 1 DIV, 1 MDV, 2 DEL, 1 UAS

C2C-Link

Description	<ul style="list-style-type: none"> • Accurate synchronization of the trigger and the start-of-exposure of multiple grabber-controlled area-scan cameras. • Accurate synchronization of the start-of-cycle, start-of-scan and end-of-scan of multiple grabber-controlled line-scan cameras.
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Specification

- C2C-Link synchronizes cameras connected to:
 - the same Coaxlink card
 - to different cards in the same PC (requires an accessory cable such as the "3303 C2C-Link Ribbon Cable" or a custom-made C2C-Link cable)
 - to different cards in different PCs (requires one "1636 InterPC C2C-Link Adapter" for each PC and one RJ 45 CAT 5 STP straight LAN cable for each adapter but the last one)
- Maximum distance:
 - 60 cm inside a PC
 - 1200 m cumulated adapter to adapter cable length
- Maximum trigger rate:
 - 2.5 MHz for configurations using a single PC, or up to 10 PCs and 100 m total C2C-Link cable length
 - 200 kHz for configurations up to 32 PCs and 1200m total C2C-Link cable length
- Trigger propagation delay from master to slave devices:
 - Less than 10 ns for cameras on the same Coaxlink card or on different Coaxlink cards in the same PC
 - Less than 265 ns for cameras on different Coaxlink cards in different PCs (3 PCs and 40m total C2C-Link cable length)

Software

Host PC Operating System

- Microsoft Windows 10, 8.1, 7 for x86 (32-bit) and x86-64 (64-bit) processor architectures
- Linux for x86 (32-bit), x86-64 (64-bit) and aarch64 (64-bit) processor architectures
- macOS for x86-64 (64-bit) processor architecture

Refer to release notes for details

APIs

EGrabber class, with C++ and .NET APIs:

- .NET assembly designed to be used with development environments compatible with .NET frameworks version 4.0 or higher

GenICam GenTL producer libraries compatible with C/C++ compilers:

- x86 dynamic library designed to be used with ISO-compliant C/C++ compilers for the development of x86 applications
- x86_64 dynamic library designed to be used with ISO-compliant C/C++ compilers for the development of x86_64 applications
- aarch64 dynamic library designed to be used with ISO-compliant C/C++ compilers for the development of aarch64 applications

Supported Memento event categories

Yes

Environmental conditions

Operating ambient air temperature 0 to +55 °C / +32 to +131 °F

Operating ambient air humidity 10 to 90% RH non-condensing

Storage ambient air temperature -20 to +70 °C / -4 to +158 °F

Storage ambient air humidity 10 to 90% RH non-condensing

Certifications

Electromagnetic - EMC standards

- European Council EMC Directive 2004/108/EC
- United States FCC rule 47 CFR 15

EMC - Emission

- EN 55022:2010 Class B
- FCC 47 Part 15 Class B

EMC - Immunity	<ul style="list-style-type: none"> • EN 55024:2010 Class B • EN 61000-4-3 • EN 61000-4-4 • EN 61000-4-5 • EN 61000-4-6
Flammability	PCB compliant with UL 94 V-0
RoHS	European Union Directive 2015/863 (ROHS3)
REACH	European Union Regulation 1907/2006
WEEE	Must be disposed of separately from normal household waste and must be recycled according to local regulations

Ordering Information

Product code - Description	<ul style="list-style-type: none"> • 1630 - Coaxlink Mono
Optional accessories	<ul style="list-style-type: none"> • 1636 - InterPC C2C-Link Adapter • 3303 - C2C-Link Ribbon Cable



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