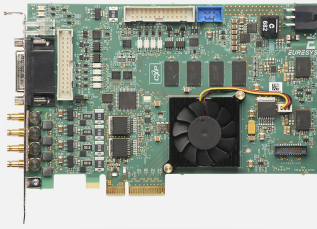




Coaxlink Quad CXP-3

Four-connection CXP-3 CoaXPress frame grabber



At a Glance

- Four CoaXPress CXP-3 connections: 1,250 MB/s camera bandwidth
- Connect four cameras to one card
- Works with extra-long camera cables (100+ meters)
- PCIe 2.0 (Gen 2) x4 bus: 1,700 MB/s delivery bandwidth
- Extensive camera control functions
- Memento Event Logging Tool

Benefits

Long cable support: 100+ meters

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

Coaxlink uses DIN 1.0/2.3 connectors with push/pull latching system for reliable connections

Connect up to 4 cameras to a single Coaxlink card

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

Form Factor	PCI Express card
Format	Standard profile, half length, 4-lane PCI Express card
Cooling method	Air cooling, fan-cooled heatsink
Mounting	For insertion in a standard height, 4-lane or higher, PCI Express card slot
Connectors	<ul style="list-style-type: none">• 'A', 'B', 'C', 'D' on bracket:<ul style="list-style-type: none">– 4x DIN 1.0/2.3 female connectors– 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' and 'INTERNAL I/O 2' on PCB:<ul style="list-style-type: none">– 2x 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 power• 'C2C-LINK' on module:<ul style="list-style-type: none">– 6-pin 2-row 0.1-in header– Card to card link
Lamp indicators	<ul style="list-style-type: none">• 'A', 'B', 'C', 'D' on bracket:<ul style="list-style-type: none">– 4x bi-color red/green LEDs– CoaXPress Host connector indicator lamps• 'FPGA STATUS LAMP' on PCB:<ul style="list-style-type: none">– Bi-color red/green LED– FPGA status lamp• 'BOARD STATUS LAMP' on PCB:<ul style="list-style-type: none">– Bi-color red/green LED
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	170 g, 6.00 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 (PCIe 2.0)• 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. 12.1W (2.5 W @ +3.3V, 9.6 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	4x DIN1.0/2.3 75 Ohms CXP-3
Status LEDs	1 CoaXPress Host connection status per connector
Number of cameras	Up to four 1-connection cameras
Line-scan cameras supported	No
Maximum aggregated camera data transfer rate	12.5 Gbit/s (1,250 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)
Number of CXP data streams (per camera)	1 data stream per camera
Maximum CXP stream packet size	8,192 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">• Gray-scale• Color (RGB and Bayer CFA)
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	1 GB
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

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	<p>20 I/O lines:</p> <ul style="list-style-type: none"> • 4 differential inputs (DIN) • 4 singled-ended TTL inputs/outputs (TTLIO) • 8 isolated inputs (IIN) • 4 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 • IOUT: 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

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.

- 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:
 - 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.
- 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).

I/O Toolbox composition

Firmware-dependent I/O toolbox composition:

- 4-camera: 8 LIN, 1 QDC, 1 DIV, 1 DEL

C2C-Link

Description

- Allows to accurately synchronize the trigger and start-of-exposure of multiple grabber-controlled area-scan and line-scan cameras.
- C2C-Link is able to synchronize 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)

Specification

- 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	<p>EGrabber class, with C++ and .NET APIs:</p> <ul style="list-style-type: none"> • .NET assembly designed to be used with development environments compatible with .NET frameworks version 2.0 or higher <p>GenICam GenTL producer libraries compatible with C/C++ compilers:</p> <ul style="list-style-type: none"> • 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
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Memento	Compatible with Memento Event Logging tool
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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	<ul style="list-style-type: none"> • European Council EMC Directive 2004/108/EC • United States FCC rule 47 CFR 15
EMC - Emission	<ul style="list-style-type: none"> • 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
KC Certification	Korean Radio Waves Act, Article 58-2, Clause 3
Flammability	PCB compliant with UL 94 V-0
RoHS	European Union Directive 2011/65/EU (ROHS2)
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"> • 1638 - Coaxlink Quad CXP-3
Optional accessories	<ul style="list-style-type: none"> • 1625 - DB25F I/O Adapter Cable • 1636 - InterPC C2C-Link Adapter • 3303 - C2C-Link Ribbon Cable • 3304 - HD26F I/O Adapter Cable



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