6/10/2025

Datasheet

Coaxlink QSFP28

100G CoaXPress-over-Fiber frame grabber

- One QSFP28 port compliant with 100 Gbps optical modules
- Four-connection 25 Gbps CoaXPress-over-Fiber
- 12,500 MB/s camera bandwidth
- 8 GB of on-board memory
- PCIe 4.0 (Gen 4) x8 bus: 13,500 MB/s bus bandwidth
- Feature-rich set of 20 digital I/O lines
- Extensive camera control functions
- Memento Event Logging Tool

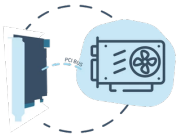
Main benefits

Support the next step in camera bandwidth

- Highest data acquisition rate in the industry
- Up to 12,500 MB/s camera bandwidth from camera to host PC memory
- One QSFP28 interface has the equivalent bandwidth of
  - 10x CXP-12 connections
  - 14x Camera Link Full connections
  - 20x CXP-6 connections

PCIe 4.0 (Gen 4) x8 bus

- 15,700 MB/s peak bus bandwidth
- 13,500 MB/s sustained bus bandwidth

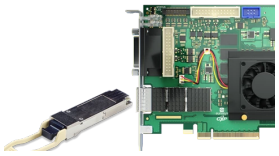


Direct GPU transfer

- 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.

High-performance DMA (Direct Memory Access)

- Direct transfer into user-allocated memory
- Hardware scatter-gather support

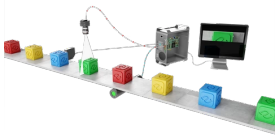


What are the cable options for the Coaxlink QSFP28?

One of the most important benefits of CoaXPress-over-Fiber is the wide variety of connectivity already available from multiple companies. The advantage of using modules compared to fixed interfaces is that cameras and frame grabbers can be equipped with any suitable type of transceiver as required by the application.

There are basically three types of cable for the Coaxlink QSFP28:

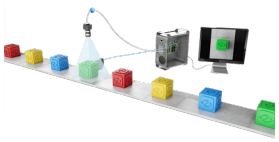
- AOC (Active Optical Cable) where the fiber cable is permanently attached to the optical transceivers.
- MPO/MTP fiber cables with multiple pairs of multi-mode fiber (typically), where the optical transceivers can be disconnected.
- Duplex LC/UPC fiber cables with one pair of single-mode fiber (typically), where the optical transceivers can be disconnected.



Line-scan triggering capabilities

Euresys' frame grabbers offer many capabilities to synchronize line-scan or 1D cameras, sensors and lighting controllers. Frame grabbers can control the camera scanning rate based on the signals received from a motion encoder.

They support continuous web scanning (to inspect infinite, continuously moving surfaces without losing a single line) and discrete object scanning (to acquire the image of objects moving in front of the camera).



Area-scan triggering capabilities

Euresys' frame grabbers offer many capabilities to synchronize area-scan or 2D cameras, sensors and lighting controllers, for stationery or moving objects in the field of view, or moving cameras.

C2C-Link camera synchronization

Allows to accurately synchronize multiple area-scan or line-scan cameras connected

- to the same card
- to different cards in the same PC
- to different cards in different PCs

Compatible with eGrabber

- eGrabber Studio: eGrabber's new interactive evaluation and demonstration application
- GenICam Browser: An application giving access to the GenICam features exposed by the GenTL Producer(s)
- GenTL Console: A command-line tool giving access to the functions and commands exposed by the Euresys GenTL Producer

Windows, Linux and macOS drivers available

Including support for Intel 64-bit platforms as well as ARM 64-bit platforms.

Other benefits

What are the benefits of using CoaXPress-over-Fiber for my application?

- Available as CXP to nGMII (device) or nGMII to CXP (host) Bridge IP Cores
- Ultra-high data/frame rates
- Many accessory and cabling options to cover any length requirement
- Low CPU overhead, low latency, low jitter image acquisition
- Highest camera count per PC performance
- Very competitive cost/performance ratio
- Wide industry acceptance due to JIIA standardization

What are the pros and cons of using fiber optics?

Pros

- First and foremost, cable length is not an issue anymore as fiber connectivity is basically not limited in length.
- Fiber optics provide more bandwidth, as connectivity at 10 and 25 Gbps per fiber is standard today and widely used in data centers.
- Fiber optics are immune to electrical noise, which will be a significant advantage on the production floor and in some medical applications.
- Fiber optics are lighter and smaller in size than the equivalent copper cabling, making it appropriate for applications where this characteristic is essential, like in aircrafts or vehicles.

Cons

- There is no “power over fiber”. As signals in fiber optics are transmitted using light, there is no way to transfer power over fiber optics and devices such as cameras must be powered separately.

What are the jitter and latency of CoaXPress-over-Fiber? How do they compare to "traditional" CoaXPress?

CoaXPress-over-Fiber is based on the CoaXPress protocol and it exhibits the same high performance as CoaXPress in terms of jitter and latency. In addition, as CoaXPress-over-Fiber supports higher transmission speed compared to CoaXPress.

Flexible line-scan camera operation with the rate converter

- The rate converter is a smart, programmable frequency multiplier/divider.
- Used with motion encoders and line-scan cameras, it allows the user to choose the aspect ratio of the pixels in the image.
- It provides a way to calibrate the acquisition chain to easily reach square (1:1 aspect ratio) pixels.

Line-scan Metadata insertion

When activated, this feature records metadata beside image data. Line metadata are captured every acquired image line. Buffer metadata are only captured when the first image line of a buffer is acquired. The metadata are composed with a configurable set of general purpose event counters, quadrature encoder position counters and/or I/O line status. This feature allows line-scan applications to correlate image data with system events including motion encoder positions.

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 input with wide voltage input range up to 30V, signaling up to 200 kHz, individual galvanic isolation up to 250 VDC and 170 VAC RMS.
- Isolated contact outputs.
- High-speed 5V-compliant TTL inputs/ LVTTL outputs.

Specifications

Mechanical

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

'QSFP28' on card bracket:

- QSFP+ 28Gb/s 4X Pluggable Transceiver port
- CoaXPress-over-Fiber Host Interface

'EXTERNAL I/O' on card bracket:

- 26-pin 3-row high-density D-Sub female socket with UNC4-40 jack socket screws
- I/O lines and I/O power output

'INTERNAL I/O 1' on printed circuit board:

- 26-pin 2-row 0.1" pitch pin header with shrouding
- I/O lines and I/O power output

'INTERNAL I/O 2' on printed circuit board:

- 26-pin 2-row 0.1" pitch pin header with shrouding
- I/O lines and I/O power output

'I/O EXTENSION' on printed circuit board:

- 26-pin 2-row 0.05" pitch pin header with shrouding
- I/O extension cable socket

'C2C-LINK' on printed circuit board:

- 6-pin 2-row 0.1" pitch pin header with shrouding
- Card-to-card link

'AUXILIARY POWER INPUT' on printed circuit board:

- 6-pin PEG power socket
- 12 V DC power input for I/O power output

LED indicators

'A', 'B', 'C', 'D' on bracket:

Bi-color red/green LEDs

CoaXPress Host connector indicator

'FPGA STATUS LAMP' on PCB:

Bi-color red/green LED

FPGA status indicator

'BOARD STATUS LAMP' on PCB:

Bi-color red/green LED

Board status indicator

Switches

'RECOVERY' on PCB:

2-way DIP switch

Firmware emergency recovery

Dimensions

PCB L x H: 167.65 mm x 111.15 mm [6.6 in x 4.38 in]

Weight

Net weight: 210 g [7.4 oz]

Gross weight: 310 g [10.9 oz]

Host bus

Standard

PCI Express 4.0

Link width

8 lanes

1 lane, 2 lanes or 4 lanes with reduced performance

Link speed

16.0 GT/s (PCIe 4.0)

8.0 GT/s (PCIe 3.0) with reduced performance

5.0 GT/s (PCIe 2.0) with reduced performance

Maximum payload size

512 bytes

DMA

32- and 64-bit

Peak delivery bandwidth

15,700 MB/s

Effective (sustained) delivery bandwidth

13,500 MB/s (Host PC motherboard dependent)

Power consumption

Typ. 30.64 W (0.04 W @ +3.3V, 30.6 W @ +12V), excluding I/O power output and optical transceiver module

Camera / video inputs

Camera interface standard

CoaXPress

Interface standard(s)

CoaXPress 1.0, 1.1, 1.1.1, 2.0, 2.1, CoaXPress-over-Fiber Bridge Protocol 1.1

Maximum link speed

CXP-31

Maximum link width

4 connections

Connectors

QSFP+ 28Gb/s 4X Pluggable Transceiver (QSFP28) port

Compliant with CoaXPress-over-Fiber

Available power for the module: 5 W (SFF-8436 Power class 7)

Status LEDs

One CoaXPress Host connection status LED per connection

Number of cameras

Area-scan cameras:

One 1- or 2- or 4-connection camera

Line-scan cameras:

One 1- or 2- or 4-connection camera

Maximum number of cameras

1

Line-scan cameras supported

Yes

Maximum aggregated camera data transfer rate

100 Gbps (12,500 MB/s)

Supported CXP down-connection speeds

25 Gbps (CXP-31)

Supported CXP up-connection speeds

Low-speed 20.83... Mbps (Device discovery)

Low-speed 41.66... Mbps (CXP-31)

Number of CXP data streams (per camera)

1 data stream per camera

Maximum CXP stream packet size

16,384 bytes

Camera types

Area-scan cameras:

- Grayscale and color (YCbCr, YUV, RGB and Bayer CFA)
- Single-tap (1X-1Y) progressive-scan
- Two-tap (1X-2YE) on two distinct data streams

Line-scan cameras and contact imaging sensors:

- Grayscale and color RGB

Camera pixel formats supported

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

Raw

Area-scan camera control

Trigger

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

Accurate control of the strobe position for strobed light sources.

Support of early and late strobe pulses.

Line-scan camera control

Scan/page trigger

Precise control of start-of-scan and end-of-scan triggers.

Support of external hardware trigger, with optional delay.

Support of infinite acquisition, without missing line, for web inspection applications.

Line trigger

Support for quadrature motion encoders, with programmable noise filters, selection of acquisition direction and backward motion compensation.

Rate Converter tool for fine control of the pixel aspect ratio: Rate Conversion Ratio in the range 0.001 to 1000 with an accuracy better than 0.1%.

Rate Divider tool

Line strobe

Accurate control of the strobe position for strobed light sources.

On-board processing

On-board memory

8 GB

Image data stream processing

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

Measurement of:

- Frame rate (Area-scan only)
- Line rate
- Data rate

Configurable averaging interval

General Purpose Inputs and Outputs

Number of lines

20 I/O lines:

4 differential inputs (DIN)

4 singled-ended TTL inputs/outputs (TTLIO)

8 isolated inputs (IIN)

4 isolated outputs (IOUT)

NOTE: The number of I/O lines can be extended using I/O modules attached to the I/O EXTENSION connector.

Usage

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

Electrical specifications

DIN: High-speed differential inputs, up to 5 MHz, compatible with ANSI/EIA/TIA-422/485 differential line drivers and complementary TTL drivers

TTLIO: High-speed 5V-compliant TTL inputs or LVTTL outputs, compatible with totem-pole LVTTL, TTL, 5V CMOS drivers or LVTTL, TTL, 3V CMOS receivers

IIN: 200 kHz isolated current-sense input with wide voltage input range up to 30V, compatible with totem-pole (push-pull) HTL drivers, 5V TTL/RS-422 differential line drivers, 5V CMOS drivers, potential free contacts, solid-state relays and opto-couplers

IOUT: Isolated contact outputs compatible with 30V / 100mA loads

NOTE: IIN and IOUT lines provide a functional isolation grade for the circuit technical protection. It does not provide an isolation that can protect a human being from electrical shock!

Filter control

Glitch removal filter available on all System I/O input lines

Configurable filter delay:

- Custom value
- Fixed values for DIN and TTLIO lines: 50 ns, 100 ns, 200 ns, 500 ns, 1 μs
- Fixed values 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):

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.

Device Link Trigger tool (DLT): delivers an event on reception of a valid high-speed CoaXPress 2.0 connection trigger packet message from the remote device.

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.

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).

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.

The 'Input Tools' (LIN, QDC, DLT and UAS) can be further processed by the 'Event Tools' (DEL, DIV and MDV) to generate any of the following "trigger" events:

- 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)

I/O Toolbox composition

Determined by the selected firmware variant:

'1-camera': 8 LIN, 1 QDC, 2 DLT, 1 UAS, 2 DEL, 1 DIV, 1 MDV, 2 C2C

'1-camera, line-scan': 8 LIN, 1 QDC, 2 DLT, 1 UAS, 2 DEL, 1 DIV, 1 MDV, 3 C2C

C2C-Link

Description

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.

Specification

C2C-Link synchronizes cameras connected to:

- the same 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:

- 120 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 card or on different cards in the same PC

Less than 265 ns for cameras on different cards in different PCs (3 PCs and 40m total C2C-Link cable length)

Software

Driver name

eGrabber

Current release

eGrabber 25.05

Host PC Operating System

Microsoft Windows 11, 10 for x86-64 (64-bit) processor architecture

Linux for x86-64 (64-bit) and AArch64 (64-bit) processor architectures

macOS for x86-64 (64-bit) and AArch64 (64-bit) processor architectures

APIs

EGrabber class, with C++ and .NET APIs: .NET assembly designed to be used with development environments compatible with .NET frameworks version 4.6 or higher

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

'x86_64' dynamic library designed to be used with ISO-compliant C/C++ compilers for the development of x86-64 (64-bit) applications

'aarch64' dynamic library designed to be used with ISO-compliant C/C++ compilers for the development of AArch64 (64-bit) applications

Memento supported

Yes

Environmental conditions

Operating ambient air temperature

0 °C to +55 °C / +32 °F to +131 °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

Certifications

EMC standards

To be confirmed:

European Council EMC Directive2014/30/EU

United States FCC rule 47 CFR 15

EMC - Emission

EN 55032:2015 + A11:2020 (harmonized standard) / CISPR 32:2015 + A1:2019 Class B

FCC 47 Part 15 Class B

EMC - Immunity

EN 55035:2017 + A11:2020 (harmonized standard) / CISPR 35:2016

EN 61000-6-2:2019 / IEC 61000-6-2:2016

EN 61000-6-2:2005 (harmonized standard)

EN 61000-4-2:2009

EN 61000-4-3:2006

EN 61000-4-4:2013

EN 61000-4-6:2014

KC Certification

Korean Radio Waves Act, Article 58-2, Clause 3

Flammability

PCB compliant with UL 94 V-0

RoHS

European Union Directive 2015/863 (ROHS3)

WEEE

Must be disposed of separately from normal household waste and must be recycled according to local regulations

Ordering Information

Product status

Preliminary

Product code - Description

PC3628 Coaxlink QSFP28

Related products

PC1625 DB25F I/O Adapter Cable

PC1636 InterPC C2C-Link Adapter

PC3303 C2C-Link Ribbon Cable

PC3304 HD26F I/O Adapter Cable

Offices

- Europe, Middle East & Africa
  Euresys SA
  Contact support : support.europe@euresys.com

  Sensor to Image GmbH
  Contact support : support.europe@euresys.com

- China
  Euresys Shanghai Liaison Office
  Contact support : support.china@euresys.com

  Euresys Shenzhen Liaison Office
  Contact support : support.china@euresys.com

- Japan
  Euresys Japan K.K.
  Contact support : support.japan@euresys.com

- South Korea
  Euresys South Korea Liaison Office
  Contact support : support.korea@euresys.com

- Asia (other countries)
  Euresys Pte. Ltd.
  Contact support : support.asia@euresys.com

- North, Central & South America
  Euresys Inc.
  Contact support : support.usa@euresys.com

  TKH Vision Experience Center
  Contact support : support.usa@euresys.com