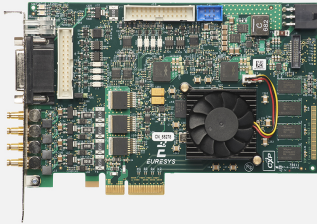


Coaxlink Quad 3D-LLE

3D 프로파일링을 위한 온보드 레이저 라인 추출 기능이 포함된 Quad CXP-6 프레임 그라버



둘러보기

- 호스트 CPU 사용량 없이 레이저 라인 추출
- 싱글 및 듀얼 레이저 라인을 깊이 맵으로 추출
- 16비트 3D height 맵 실시간 생성
- 다양한 알고리즘 지원: 최대치, 피크, 무게중심(COG)
- 정밀도: 최대 1/256픽셀(피크 및 COG 알고리즘 적용)
- 성능: 1024 x 128 이미지에서 19,000 profiles/s 지원. 1024 x 64 이미지에서 38,000 profiles/s 지원

장점

호스트 CPU 사용량 없이 레이저 라인 추출

Coaxlink의 온보드 FPGA는 호스트 CPU에 부하를 주지 않으면서 이미지 캡처 도중 레이저 라인의 위치를 측정합니다.

16비트 3D height 맵 실시간 생성

Coaxlink는 지연 시간 없이 실시간으로 연산 처리된 3D height 맵을 호스트 PC로 직접 전송합니다.

가장 빠르고 가장 높은 고해상도 카메라에서 이미지 캡처

- 업계 최고 수준의 데이터 캡처 속도
- 카메라 대 호스트 PC 메모리 대역폭 25 Gbit/s(2,500 MB/s)

듀얼 레이저 라인 추출

소프트웨어 및 하드웨어 구현에 의해 지원되는 듀얼 레이저 라인 추출 프로세스는 막힘의 효과를 줄여줍니다. 막힘은 물체의 일부분에 레이저 빛이 도달하지 못할 때 발생합니다. 서로 다른 각도에서 두 레이저를 사용하면 이러한 정의되지 않은 영역을 줄일 수 있습니다. Easy3DLaserLine에 포함된 개체 기반 보정을 이용하면 캡처한 데이터를 단일 보정된 포인트 클라우드로 조합할 수 있습니다.

Coaxlink CXP-6를 위한 긴 케이블 지원

- CXP-6 속도(6.25 Gbps)에서 40m
- CXP-3 속도(3 Gbps)에서 100m

표준 동축 케이블 사용

- 데이터 전송, 카메라 제어, 트리거, 전원 공급을 하나로 해결할 수 있는 저렴한 케이블
- 가장 혹독한 환경에서도 최고의 신뢰성, 유연성, 성능 제공

안정적인 연결을 위한 견고한 커넥터

- Coaxlink CXP-6은 push/pull 래치 시스템이 적용된 DIN 1.0/2.3 커넥터를 사용합니다

Memento 이벤트 로그 톨

- Memento는 Coaxlink 카드에서 이용할 수 있는 고급 개발 및 디버깅 톨입니다.
- Memento는 카메라, 프레임 그래버, 드라이버, 애플리케이션과 관련된 모든 이벤트 로그를 정확하게 기록합니다.
- 이 제품은 타임 스탬프 기록된 이벤트에 대한 정확한 시간 정보를 맥락 정보와 함께 개발자에게 제공합니다,
- 애플리케이션 개발, 디버깅뿐 아니라 기계 운용 중에도 유용한 장점을 제공합니다.

범용 IO 라인

- 광범위한 센서 및 모션 인코더와 호환:
- 고속 차동 입력: 최대 5 MHz까지 지원하는 쿼드러처 모션 인코더.
- 절연 전류 감지 입력: 5V, 12V, 24V 신호 전압 인가 가능, 최대 50 kHz, 최대 250VDC 및 170VAC RMS의 갈바닉 개별 절연.
- 절연 접점 출력.
- 고속 5V 규격 TTL 입력/LVTTL 출력.

고성능 DMA(Direct Memory Access)

- PCI 주소를 노출시키는 하드웨어 보드 및 사용자 할당 메모리로 직접 전송
- 하드웨어 분산-수집(scatter-gather) 지원
- 64비트 주소 지정 기능

Area 스캔 트리거 기능

- 트리거는 일부분이 위치에 들어 왔을 때 캡처를 시작하는 데 사용됩니다. 하드웨어 트리거는 Coaxlink의 I/O 라인에서 제공됩니다. 소프트웨어 트리거는 애플리케이션에서 제공됩니다.
- 옵션 트리거 지연을 사용하여 프로그래밍 가능한 시간 동안 캡처를 연기할 수 있습니다.
- 트리거 제거 기능은 일부 트리거를 무시하는 기능입니다.
- 카메라 노출 제어 기능을 사용하면 애플리케이션에서 카메라의 노출 시간을 제어할 수 있습니다.
- 캡처가 시작되면 적절한 시점에 Coaxlink 보드가 출력 라인 중 하나에 연결된 조명 장치를 제어하기 위한 신호를 생성합니다.

Coaxlink 드라이버에는 다음과 같은 도구가 포함되어 있습니다:

- Genicam 브라우저: 시스템에서 GenTL Producer(s)에 의해 노출된 GenIcamfeatures 기능에 대한 액세스를 제공하는 애플리케이션.
- GenTL 콘솔: Euresys GenTL Producer에 의해 노출된 함수와 명령에 대한 액세스를 제공하는 커맨드 라인 톨.

Genicam과 호환

다음 지원 포함

- GenApi
- 표준 기능 명명 규칙(SFNC)
- GenTL

Windows, Linux 및 macOS 드라이버 이용 가능

- Intel 32비트 및 64비트 플랫폼뿐 아니라 ARM 64비트 플랫폼에 대한 지원 포함

DG06 기술 개발 부서의 지원으로 개발

애플리케이션

전자제품 제조산업용 머신 비전

- 전자 검사 기계용 3D 이미지 캡처

일반 제조산업용 머신 비전

- 검사 기계용 3D 이미지 캡처

Mechanical

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	• 'A', 'B', 'C', 'D' on bracket: – 4x DIN 1.0/2.3 female connectors – CoaXPress host interface • 'EXTERNAL I/O' on bracket: – 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: – 2x 26-pin 2-row 0.1" pitch pin header with shrouding – I/O lines and power output • 'AUXILIARY POWER INPUT' on module: – 6-pin PEG power socket – 12 VDC power input for PoCXP camera(s) and I/O power • 'C2C-LINK' on module: – 6-pin 2-row 0.1-in header – Card to card link
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 card PCB: • 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	180 g, 6.35 oz

Host bus

Standard	PCI Express 2.0
Link width	• 4 lanes • 1 lane or 2 lanes with reduced performance
Link speed	• 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. 16.8 W (3.8 W @ +3.3V, 13 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	Four DIN1.0/2.3 75 Ohms CXP-6
Status LEDs	One CoaXPress Host connection status LED per connector
Number of cameras	One 1- or 2- or 4-connection camera
Maximum aggregated camera data transfer rate	25 Gbit/s (2,500 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)	• PoCXP Safe Power: – 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	• Grayscale area-scan cameras
Camera pixel formats supported	Monochrome 8-bit (Mono8)

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.

On-board processing

On-board memory	1 GB
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Image data stream processing

Laser Line Extraction (LLE) processing core to compute the vertical position of one detected laser line along a ROI using one of the following algorithms:

- Maximum Detection algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 65536 pixels
 - Depth map format: 16-bit unsigned integer number
 - Accuracy: 1 pixel
- 8-bit Maximum Detection algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 256 pixels
 - Depth map format: 8-bit unsigned integer number
 - Accuracy: 1 pixel
- Peak Detection algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 2048 pixels
 - Depth map format: UQ11.5 fixed-point unsigned number
 - Accuracy: 1/32 pixel
- High accuracy Peak Detection algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 256 pixels
 - Depth map format: UQ8.8 fixed-point unsigned number
 - Accuracy: 1/256 pixel
- Center Of Gravity algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 2048 pixels
 - Depth map format: UQ11.5 fixed-point unsigned number
 - Accuracy: 1/32 pixel
- High accuracy Center Of Gravity algorithm
 - Maximum ROI width: 8192 pixels
 - Maximum ROI height: 256 pixels
 - Depth map format: UQ8.8 fixed-point unsigned number
 - Accuracy: 1/256 pixel

Data stream statistics

- Measurement of:
 - Frame rate (Area-scan only)
 - Line rate
 - Data rate
 - Configurable averaging interval
-

Event signaling and counting

- The application software can be notified of the occurrence of various events:
 - Standard event: the EVENT_NEW_BUFFER event notifies the application of newly filled buffers
 - A large set of custom events
- Custom events sources:
 - 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:
 - 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	20 I/O lines: • 4 differential inputs (DIN) • 4 singled-ended TTL inputs/outputs (TTLIO) • 8 isolated inputs (IIN) • 4 isolated outputs (IOUT)
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 • 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: – 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	• 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	• Glitch removal filter available on all System I/O input lines • Configurable filter time constants: – 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.
- 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

- 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:
 - 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 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

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
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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	• 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	• EN 55024:2010 Class B • EN 61000-4-3 • EN 61000-4-4 • 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 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	• 1637 - Coaxlink Quad 3D-LLE
Optional accessories	• 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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