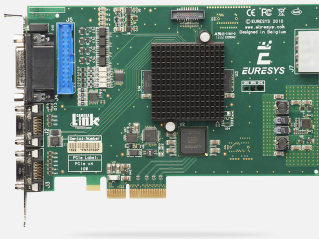




# Grablink Full

用于单个完整配置 Camera Link 相机的图像采集卡



## 特性一览

- 连接1路Camera Link 80 位、Full、Medium 或Base 级配置相机
- 直接兼容市场上数以百计的 Camera Link 相机
- ECCO：延长的 Camera Link 线缆长度
- PCIe x4 总线：850 MB/s 持续传输带宽
- 特征丰富的 10 条数字 I/O 线
- Memento 事件日志工具

## 优势

### ECCO: Extended Camera Link Cable Operation

- 支持最长可达20米Camera link 线缆！
- 下载该文档了解更多信息

### 直接兼容市场上数以百计的 Camera Link 相机

请查阅«支持的摄像机»（在支持菜单中）以下载相关 Cam 文件。

### 通用 I/O 线

- 兼容多种传感器和运动编码器。
- 高速差分输入：正交运动编码器，支持高达 5 MHz。
- 隔离电流检测输入：接受 5V、12V、24V 信号电压，最高 50 kHz，各个电隔离高达 500 VAC RMS。
- 隔离触式输出。

### 高性能 DMA（直接存储器存取）

- Direct transfer into user-allocated memory and hardware boards that expose PCI addresses
- 硬件分散 - 聚集支持
- 64 位寻址能力

### 区域扫描触发功能

- 触发器用于在零件就位时启动采集。硬件触发器来自 Grablink 的 I/O 线。软件触发器来自于应用程序。
- 可控的延时触发器，用来控制推迟图像采集的时间点。
- 触发抽取功能允许跳过某些触发器。
- 相机曝光控制允许应用来控制相机的曝光时间。
- 当系统开始采集图像时，Grablink采集卡会在一个适当的时间点生成信号来控制连接在输出端的照明设备。

### 线扫描触发功能

**Grablink** 支持连续滚网扫描（以检查无限、连续移动的表面而不丢失行）和离散的目标扫描（以采集在相机前方移动的目标图像）。

- 触发器用于在零件就位时启动采集。硬件触发器来自主板 I/O 线。软件触发器来自于应用程序。
- 启动以后，采集将：
  - 无限进行下去 (用于滚网式监测应用)
  - 继续进行可编程的行数（以采集已知长度的目标图像）
  - 继续进行直至收到结束触发信号（以采集可变长度的目标图像）
- 可控的延时触发器，用来以可编程的行数推迟开始采集。

### 线扫描触发功能

- **Grablink** 图像采集卡根据从运动编码器接收到的信号来控制相机扫描率。如果零件移动速度变快，相机的采集线率将增大。如果零件移动速度变慢，相机的采集线率将减小。
- **Grablink** 板解读来自正交运动编码器的 A/B 信号，了解零件向哪个方向（向前或向后）移动。
- 可以选择仅当采集对象向前或者向后移动的时候命令**Grablink**卡进行图像采集。
- 监测到向后运动时，名为“向后动作取消”的功能即停止采集。当在采集中断位置再次向前运动时，自动恢复行采集。
- 速率转换器能够让相机以任何低于或高于运动编码器分辨率的可编程分辨率来采集行。这就为设计师在应用程序开发过程中提供了惊人的自由度和灵活性。
- 速率分割器允许相机采集的图像分辨率高于或低于运动编码器的分辨率，它实现于利用一个可编程的整数倍来对编码器输入信号进行分割。

### 带速率转换器的可控线性扫描操作

- 速率转换器是一个智能的、可编程的倍频器/分频器。
- 用于运动编码器和线扫描相机，允许用户选择该图像中的像素纵横比。
- 它提供了一种方法来校准采集链以轻松达到正方形（1:1 纵横比）像素。

### Windows drivers available

## 应用

### 电子制造业的机器视觉

- 用于AOI、3D SPI、3D铅/球检测机的高速图像采集。
- 极高分辨率线扫描图像采集，用于平板显示器检测和太阳能电池检测

### 一般制造业的机器视觉

- 用于检查机的高帧率图像采集
- 表面检测机的线扫描图像采集
- 用于纺织品检测的线扫描图像采集

### 印刷业的机器视觉

- 用于印刷检查机的高速线扫描图像采集

### 视频采集和录制

- 用于运动分析和记录的高帧速率视频采集

## 规格

### Mechanical

Form Factor	PCI Express card
Format	Standard profile, half length, 4-lane PCI Express card
Cooling method	Air-cooling, passive heatsink
Mounting	For insertion in a standard height, 4-lane or higher, PCI Express card slot

Connectors	<ul style="list-style-type: none"> <li>• 'BASE' on bracket: <ul style="list-style-type: none"> <li>– 26-position Shrunken Delta Ribbon (SDR) socket</li> <li>– Camera Link Base connector</li> </ul> </li> <li>• 'MEDIUM/FULL' <ul style="list-style-type: none"> <li>– 26-position Shrunken Delta Ribbon (SDR) socket</li> <li>– Camera Link Medium/Full/80-bit connector</li> </ul> </li> <li>• 'EXTERNAL I/O' on bracket: <ul style="list-style-type: none"> <li>– 26-pin 3-row high-density female sub-D connector</li> <li>– I/O lines and power output</li> </ul> </li> <li>• 'INTERNAL I/O' on PCB: <ul style="list-style-type: none"> <li>– 26-pin 2-row 0.1" pitch pin header with shrouding</li> <li>– I/O lines and power output</li> </ul> </li> <li>• 'POWER INPUT' on module: <ul style="list-style-type: none"> <li>– 4-pin MOLEX power socket</li> <li>– 12 VDC power input for I/O</li> </ul> </li> </ul>
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Dimensions	L 167.65 mm x H 111.15 mm L 6.6 in x H 4.38 in
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Weight	133 g, 4.69 oz
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### Host bus

Standard	PCI Express 1.0
Link width	4 lanes
Link speed	2.5 GT/s (PCIe 1.0)
Maximum payload size	1024 bytes
DMA	32- and 64-bit
Peak delivery bandwidth	1,024 MB/s
Effective (sustained) delivery bandwidth	<ul style="list-style-type: none"> <li>• Up to 833 MB/s for a PCI Express payload size of 256 bytes and 64-bit addressing</li> <li>• Up to 844 MB/s for a PCI Express payload size of 256 bytes and 32-bit addressing</li> <li>• Up to 754 MB/s for a PCI Express payload size of 128 bytes and 64-bit addressing</li> <li>• Up to 780 MB/s for a PCI Express payload size of 128 bytes and 32-bit addressing</li> </ul>
Power consumption	Max. 6.9 W; Typ. 5.7 W (0.48 A @ 3.3V; 0.34 A @ +12V)

### Camera / video inputs

Interface standard(s)	Camera Link 2.0
Connectors	2 Shrunken Delta Ribbon (SDR) Miniature Camera Link (MiniCL)
ECCO - Extended Camera Link Cable Operation	ECCO
Number of cameras	One 80-bit (10 x 8-bit taps), Full, Medium or Base camera
Line-scan cameras supported	Yes
Maximum aggregated camera data transfer rate	6.8 Gbit/s (850 MB/s)
Camera Link configuration	Base, Medium, Full, 80-bit (10 x 8-bit taps)
Camera Link clock frequency	From 20 MHz up to 85 MHz
Camera types	<ul style="list-style-type: none"> <li>• Gray-scale and color (RGB and Bayer) cameras</li> <li>• Area-scan and line-scan cameras</li> </ul>
Camera pixel formats supported	Monochrome, Bayer, and RGB (PFNC names): <ul style="list-style-type: none"> <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> </ul>

## Area-scan camera control

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

## Line-scan camera control

Scan/page trigger	<ul style="list-style-type: none"><li>• Precise control of start-of-scan and end-of-scan triggers.</li><li>• Support of external hardware trigger, with optional delay.</li><li>• Support of infinite acquisition, without missing line, for web inspection applications.</li></ul>
Line trigger	<ul style="list-style-type: none"><li>• Support for quadrature motion encoders, with programmable noise filters, selection of acquisition direction and backward motion compensation.</li><li>• Rate Converter tool for fine control of the pixel aspect ratio.</li><li>• Rate Divider tool</li></ul>
Line strobe	<ul style="list-style-type: none"><li>• Accurate control of the strobe position for strobed light sources.</li></ul>

## On-board processing

On-board memory	128 MB (64 MB for image data)
Image data stream processing	<ul style="list-style-type: none"><li>• Unpacking of 10-/12-/14-bit to 16-bit with selectable justification to LSb or MSb</li></ul>
Input LUT (Lookup Table)	<ul style="list-style-type: none"><li>• Monochrome: 8-bit, 10-bit or 12-bit per pixel, up to 1000 MPixel/s</li><li>• RGB: 3x8-bit, 3x10-bit or 3x12-bit per pixel, up to 250 MPixel/s</li></ul>
Bayer CFA to RGB decoder	<ul style="list-style-type: none"><li>• Advanced interpolation method using average and median functions on a 3x3 kernel</li><li>• Up to 225 MPixel/s</li></ul>

## General Purpose Inputs and Outputs

Number of lines	10 I/O lines: <ul style="list-style-type: none"><li>• 2 differential inputs (DIN)</li><li>• 4 isolated inputs (IIN)</li><li>• 4 isolated outputs (IOUT)</li></ul>
Usage	<ul style="list-style-type: none"><li>• The input lines can be used by the acquisition channel as:<ul style="list-style-type: none"><li>– Camera frame trigger source (area-scan only)</li><li>– Acquisition sequence trigger source (area-scan only)</li><li>– Camera line trigger source (line-scan only)</li><li>– Page acquisition trigger source (line-scan only)</li><li>– Page acquisition end trigger source (line-scan only)</li><li>– (Quadrature) motion encoder input (line-scan only)</li></ul></li><li>• The IOUT 1 output line can be used by the acquisition channel as:<ul style="list-style-type: none"><li>– Illumination strobe output</li></ul></li><li>• All the input lines can be used as general purpose inputs</li><li>• All the output lines can be used as general purpose outputs</li></ul>
Electrical specifications	<ul style="list-style-type: none"><li>• DIN: High-speed differential inputs compatible with ANSI/EIA/TIA-422/485 differential line drivers and complementary TTL drivers</li><li>• 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</li><li>• IOUT: Isolated contact outputs compatible with 30V / 100mA loads</li></ul>

Filter control	<ul style="list-style-type: none"> <li>• Glitch removal filter available only on input lines used as trigger sources</li> <li>• Configurable with five time constants: <ul style="list-style-type: none"> <li>– 100 ns, 500 ns, and 2.5 <math>\mu</math>s for trigger / page trigger / page end trigger sources</li> <li>– 40 ns, 100 ns, 200 ns, 500 ns, 1 <math>\mu</math>s, 5 <math>\mu</math>s, 10 <math>\mu</math>s for line trigger sources</li> </ul> </li> </ul>
Power output	Non-isolated, +5V, 1A and +12V, 1A, with electronic fuse protection

## Software

Host PC Operating System	<ul style="list-style-type: none"> <li>• Microsoft Windows 10, 8.1, 7 for x86 (32-bit) and x86-64 (64-bit) processor architectures</li> <li>• Linux for x86 (32-bit) and x86-64 (64-bit) processor architectures</li> </ul> <p>Refer to release notes for details</p>
APIs	<ul style="list-style-type: none"> <li>• MultiCam 32- and 64-bit binary libraries (Windows and Linux), for ISO-compliant C/C++ compilers</li> </ul>
Memento	Compatible with Memento Event Logging tool

## Environmental conditions

Operating ambient air temperature	0 to +50 °C / +32 to +122 °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"> <li>• European Council EMC Directive 2004/108/EC</li> <li>• United States FCC rule 47 CFR 15</li> </ul>
EMC - Emission	<ul style="list-style-type: none"> <li>• EN 55022:2010 Class B</li> <li>• FCC 47 Part 15 Class B</li> </ul>
EMC - Immunity	<ul style="list-style-type: none"> <li>• EN 55024:2010 Class B</li> <li>• EN 61000-4-2</li> <li>• EN 61000-4-3</li> <li>• EN 61000-4-4</li> <li>• EN 61000-4-5</li> <li>• EN 61000-4-6</li> </ul>
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"> <li>• 1622 - Grablink Full</li> </ul>
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