

About...

ECCO

EXTENDING THE POSSIBLE CAMERA LINK CABLE LENGTH AT NO EXTRA COST!



IS THERE A REQUIREMENT FOR CAMERA LINK CABLES LONGER THAN 10 METERS?

The well-known and established Camera Link standard offers many advantages to the machine vision solution providers.

Today, its strongest advantages are probably the huge number of compliant components, their robustness and their price. However, the cable length is a clear limitation for some applications requiring more than 10 meters (or more than 6 meters, in case of 85MHz cameras) between the camera and the host computer. This is the case in some robotics applications or in web applications inspecting large parts such as flat panel display for instance.

A VARIETY OF STANDARDS ARE AVAILABLE BUT ...

Looking to extend the 10-meter camera-to-computer limit in this established standard can be challenging and expensive with the solutions so far available on the market.

System integrators can now choose from a plethora of standards such as GigE Vision or the freshly-standardized CoaXPress. GigE Vision is a convincing candidate but it is not suitable for high-end time-sensitive application with its 80MB/s bandwidth limitation. Applications based on the Camera Link standard make the most of its robust 850MB/s bandwidth, as well as stable and predictable image acquisition timing. As for CoaXPress, this standard is still in its infancy, the number of components available at the present time is relatively restricted and they are still expensive. So too are there a number of means to extend this 10-meter distance such as repeaters or optic fiber. These options are generally expensive and can even be extremely costly.

WHAT DOES ECCO STAND FOR?

Euresys, with a wealth of experience in the field of image acquisition for machine vision, addressed this cable length problem with the latest generation Grablink cards: the Grablink Full, Grablink DualBase and Grablink Base. These cards have been developed with a modern and innovative approach while inheriting the experience gained from previous generation products. This led to a new innovative feature, named ECCO, now available on these frame grabbers. ECCO stands for "Extended Camera Link Cable Operation". With ECCO, Euresys has achieved a level of performance that is unique for a Camera Link frame grabber. We have entirely redesigned the Camera Link input stage using modern components and new technologies.

HOW DOES ECCO WORK?

Camera Link cables use a number of data lanes to transfer data signals from the camera to the frame grabber. As these cables are not perfect, the propagation times of the data signals may differ between the lanes. This difference is called "skew". The longer the cable the higher the skew.

ECCO uses an on-board skew compensation technique between the Camera Link data lanes and the clock together with an innovative and more accurate sampling method of the data signals. With ECCO, Grablink frame grabbers are more tolerant to skew and support longer or lower-quality Camera Link cables.

FAR BEYOND THE LIMITS OF THE CAMERA LINK STANDARD

ECCO allows the Grablink boards to go far beyond the Camera Link specifications in term of cable length or speed performance using fully standard Camera Link cables and fully standard Camera Link cameras.

Depending on the clock frequency and the cable quality, which can drastically vary from one cable to another, ECCO allows the new Grablink boards to work with cable lengths of at least 30% in excess of those specified by the Camera Link standard as well as in excess of those acceptable by the other boards with a "conventional" implementation of the standard.

Other ways to take advantage of ECCO would be to keep the same traditional cable length but to achieve 30% higher speed or even to simply use less costly cables.

These 30% can even be more depending on which configuration of the standard is used. Substantially, it is possible to achieve even more than 30% performance improvement when using a Base or Medium Camera Link configuration. This fact is represented in the graphic hereunder by the green area shading off in the higher frequencies.

A PRACTICAL EXAMPLE

Here is a typical and very practical example of the extended performance exhibited by Grablink boards equipped with the ECCO feature.

The standard defines that with a sampling rate of 85MHz, the maximum cable length is 5.9 meters and the maximum skew allowed in the cable is 50ps/m. Using a Grablink board featuring ECCO, the cable length can be extended from 5.9 meters to 10 meters, even if the total skew introduced by the cable is as high as 750ps (75ps/m).

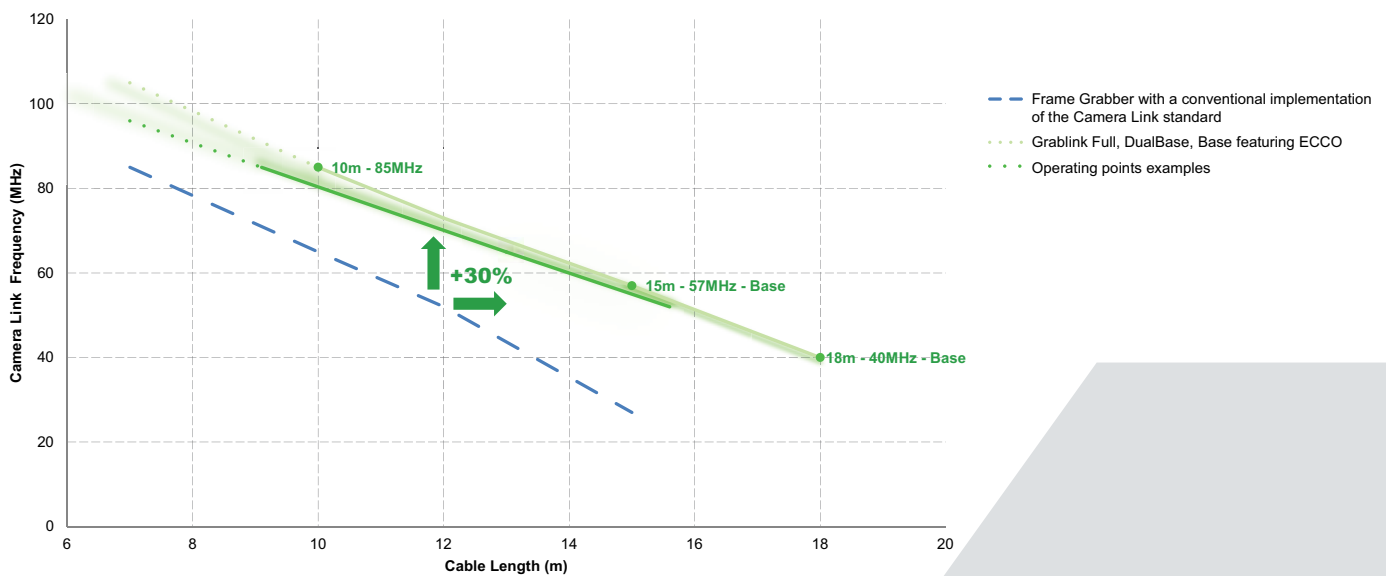
In other words, with a low-quality 10-meter Camera Link cable exhibiting a skew of 750ps (which is 50% more than the 50ps/m skew allowed for cables by the standard), the maximum clock frequency of 85MHz can be reached! All the more impressive given the fact that a "conventional" implementation is not likely to support cameras with a pixel clock frequency higher than 65MHz.

HOW CAN I BENEFIT FROM THE ADVANTAGES OF ECCO?

ECCO is available on the Grablink Full, Grablink DualBase and Grablink Base. This feature is automatically activated provided that the latest Multicam driver is installed.

Using ECCO does not require any specific Camera Link cable or Camera Link camera.

CAMERA LINK FREQUENCY VS CABLE LENGTH WITH GRABLINK FULL, DUALBASE OR BASE FEATURING ECCO



	Conventional Camera Link	ECCO Grablink Base, DualBase, Full
85 MHz	Typ. 5.9 meters	Typ. 10 meters
60 MHz	Typ. 10 meters	Typ. 13 meters
50 MHz	Typ. 12 meters	Typ. 14 meters (Full cfg.) Typ. 16 meters (Base cfg.)
40 MHz	Typ. 14 meters	Typ. 16 meters (Full cfg.) Typ. 18 meters (Base cfg.)



America | Euresys Inc.
27126B Paseo Espada, Suite 704
San Juan Capistrano | CA 92675 | U.S.A.
Toll free: 1.866.387.3797 | Phone: 1.949.743.0612
Email: sales.americas@euresys.com

Asia | Euresys Pte. Ltd.
750A Chai Chee Road | #07-15 Technopark @ Chai Chee
Singapore 469001
Phone: +65 6445 4800
Email: sales.asia@euresys.com

Japan | sales.japan@euresys.com
Europe | Euresys s.a. Corporate Headquarters
14, Avenue du Pré-Ailly | 4031 Angleur | Belgium
Phone: +32 4 367 72 88
Email: sales.europe@euresys.com