



Have the courage to use your own sense!

Immanuel Kant

CEO's Note

Dear Reader,

In this issue of our Chips Newsletter we want to focus on an inconspicuous but extremely successful product from ESPROS. It is the epc901 line sensor that saw the light of day ten years ago. So to speak and in the truest sense of the word. In fact, it is the first product to use our OHC15L technology to convert light into electrical charge with an almost unbelievable quantum efficiency of 90% at 850nm wavelength. At the time, the industry saw these values in disbelief and the competitors probably rubbed their eyes. I can remember at a congress in Toulouse where a listener to one of our presentations asked whether the quantum efficiency curve was "a kind of simulation".

My colleague, who gave the presentation of the combined imager sizes, answered dryly: "No, that's measurement!" And we didn't do the measurement, but an independent research institute.

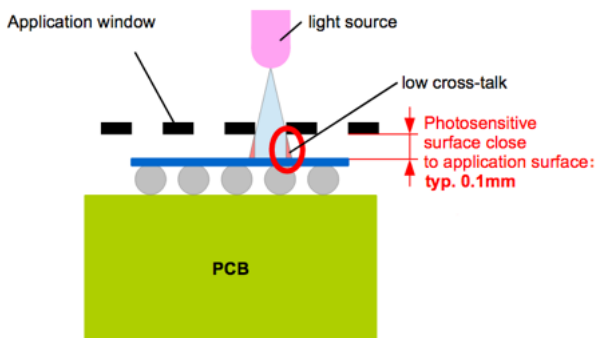
Well, the epc901 product has quietly become extremely successful. Be it in triangulation sensors with a distance resolution better than 100nm, in linear or angular encoders, miniature spectrometers or in surface scan applications, where maximum sensitivity and maximum speed are important.

We are happy to have this super-successful product in our range. And most importantly, [Digi-Key stocks](#) it.

Beat De Coi

epc901 CCD line sensor for linear encoders, triangulation & line scanners

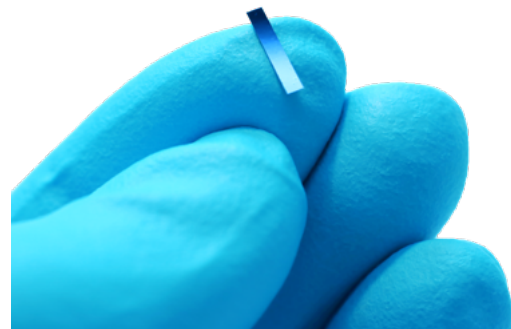
The [epc901](#) is a small footprint and very thin line imager. It is designed to fulfill the need of very low optical cross-talk in encoder sensors, because the ruler can be placed as close to 50µm above the optical sensitive part of the imager. This is possible due to its backside illuminated imaging technology (BSI). Standard frontside imagers need a distance of 10 times more and thus have to deal with a high level of cross-talk.



BSI imager - low optical cross-talk

Although, it is a high-performance CCD line sensor capable of storing a total of 4 frames in the frame store elements for ultra high-speed image acquisition of up to 500k lines per second. In the continuous mode, even 50k lines per second are possible.

It also very sensitive meaning only low illumination power is needed. It has high-resolution 1024 physical pixel with a pixel-pitch of $7.5 \times 120 \mu\text{m}$. With its low power consumption of typically 165 mW with a power save mode of 4.5 mW.



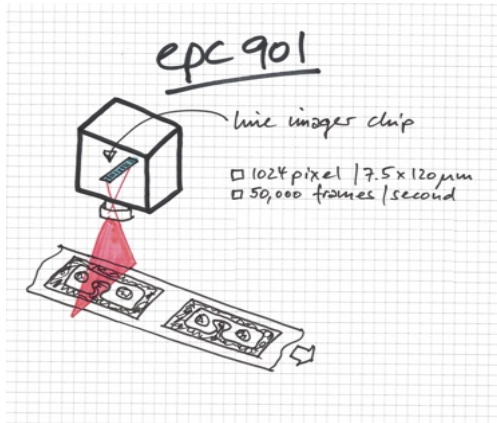
epc901 - CSP32 housing (8.0 x 1.3 x 0.3 mm)

The acquisition of the image is controlled by the external control signal SHUTTER. The epc901 flags when a frame is ready for read-out by asserting the DATA_RDY signal.

The transmission of the frame over the video amplifier is controlled by the external control signal READ. When a read-out is initiated by a pulse on the READ signal, it is sampled by a CDS stage. After a fixed delay the frame can be shifted out through the video amplifier by applying the appropriate amount of read clock edges.

The 901 offers the following features: single or multi-frame acquisition, correlated-double sampling (CDS) per pixel single-ended or differential analog video output, two temperature sensors on chip and incredible compactness with its Slim-line CSP32 housing, (8.0 × 1.3 × 0.3 mm).

This slim design advantage with its backside imager ensures low optical cross-talk.



A surface scan application with the epc901

Other key features are

- Very high sensitivity due to 100% fill factor
- Ultra high-speed image acquisition
- 4 analog frame stores on chip
- Single or multi-frame acquisition

As a line scanner, the epc901 offers high pixel density and frame storing. As a linear & rotary encoder it offers accuracy to less than 1 μ rad. The compact imager results in compact form factor and reliable fit values are less than 80.

For spectroscopy it offers linear, HDR high dynamic range, SNR low signal to noise ratio.

For triangulation, the key parameter is a frame rate of up to 50,000 frames per second. Its sensitivity means only low illumination power is needed.

For further information please get in touch with us: sales@espros.com

Ruedi Freuler, Camera Design Manager

What is your job at ESPROS?

I'm the Camera Design Manager. I head up the cameras and platforms development team.

How long have you been working at ESPROS?

In August it will be one year.

What do you most enjoy about your job?

The challenge of unifying the many different disciplines, mechanics, optics, electronics and software. While all the time striving to fulfill the customer requirements, using professional processes and methods. We have a compact team of five specialists.

Where are you from and where do you now live?

I was born and raised in Winterthur but live in Greifensee also in canton Zurich. It's a beautiful setting on the lake. Wonderful for photography too, which is my passion.

What do you like to do in your spare time?

I've had a lifelong passion for photography and in recent years, I've become very interested in infrared photography, which actually has nothing to do with my job which is of course centered on IR cameras. But these are functional designed to detect and measure where as my hobby is creative.

I work a lot with Photoshop to edit my images. In fact visitors to my office are greeted with a panoramic IR image of the Glarner Alps. I'm very proud of that one. I also post to social media and have quite a few followers on Instagram. In summer I love to head into the mountains to hiking. And in winter too but to go skiing. Now that I have recently become a grandfather, my granddaughter now gets a lot of attention.



Ruedi with his camera on tour.

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