



**Design is not just what it looks like and feels like. Design is how it works.**

*Steve Jobs*

## CEO's Note

Dear Readers,

3D imaging is a hot topic these days in many industries. There are the ubiquitous consumer applications like gesture control for game consoles, TV sets and recently also for mobile handsets and tablets. But there's much more than that. Any application that involves vehicles or other mobile technical systems just craves for a good solution to scan the surrounding world. Take for example traffic safety or autonomous car driving. Or what about logistics where its all about handling goods and moving stuff around. Autonomous robots have the potential to go big as well in the next years. But that will happen only if they can rely on 3D information on the scene they are operating in. And this information must be precise and meet the high dynamic requirements of many of those applications. Exter-

nal boundary conditions like outdoor operation in bright sunlight pose additional challenges to these applications.

That's where our ESPROS Photonic CMOS™ semiconductor process technology really excels. It is the answer to these demanding 3D imager applications that are required to work under any condition. And a process technology that can handle 3D TOF imaging can handle other demanding imaging tasks as well. I would for example never have imagined that our technology can be used to build super fast mass spectrometers before a customer actually designed such an imager with us. This chip with an incredibly sensitive CCD pixel core and CMOS readout and data handling subsystems delivers a frame rate of up to 9 million frames per second! Try our ESPROS Photonic CMOS™ on your application – you'll be thrilled!

*Beat De Coi*

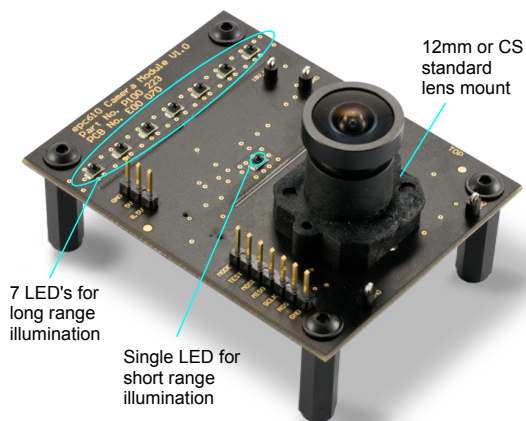
## New Evaluation Kits

epc's photonic chips are complex devices. Unlike commodity products, they cannot be ordered and used out of the box. In order to access the chip and its functionality, both a hardware and software environment is required. But who wants to invest in such developments with uncertain outcome? Certainly, evaluation kits are nothing new in the semiconductor business. Yet, our Evaluation kits are not just simple hardware environments that basically just electrically connect the chip to the outside world. There's much more to that.

with respect to their application. And they also serve as development platforms if application specific tweaking and fine-tuning is required.

The new epc610 Evaluation Kit is a significant upgrade from the former version. We opted for a completely new hardware design of the camera module. This module is based on our thorough background on TOF and incorporates the recent learnings from our customers.

A first novelty is an LED subsystem, which is optimized to illuminate the operation range in a more uniform way. Seven LEDs (Osram SFH 4059) are placed at the edge of the camera PCB. These LEDs cover the more distant operating range. Together, they deliver a high intensity, but due to the placement away from the receiver lens, their effect drops drastically at close range. This is where the single short range LED jumps in. Placed close to the receiver lens this single LED is much better suited to delivering light on to close objects, while its effect fades when the targets move further away. The result of this design is an illumination intensity with reduced peaks at certain distances. On signal level, this translates to a lower dynamic range that needs to be covered by the the detector system. Ask your sensor specialist and he will tell you why he likes that! With this design, the epc610 Camera Module works in a range from zero up to about three meters – depending on the target reflectivity.



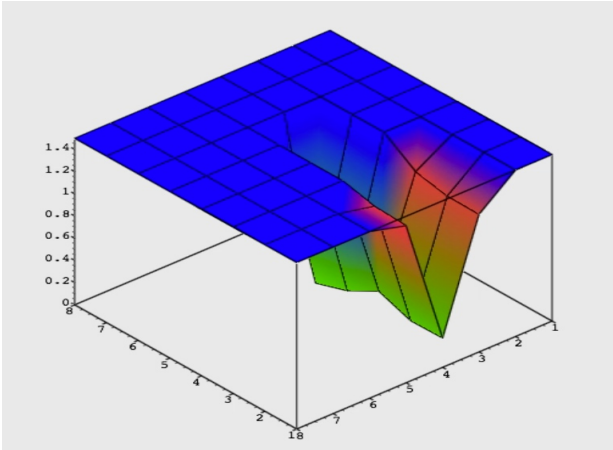
*The new epc610 camera module.*

We have recently invested in an upgrade for the epc610 TOF Evaluation Kit and added the new epc901 Evaluation Kit. They help our customers to efficiently test our devices

Another improvement is the possibility to use off the shelf receiver lenses. The camera board provides mounting interfaces for 12mm and CS mount lenses. We deliver the

camera with a 12mm lens which delivers a  $\pm 8.8^\circ$  field of view. If your application requires different optics, you will have at least a standardized lens mount to facilitate the adaption with respect to your application.

Last but not least, we designed the camera board with easily accessible measuring taps for the various signals and with solid ground connectors. Even larger probes can now be hooked up without any hassle.

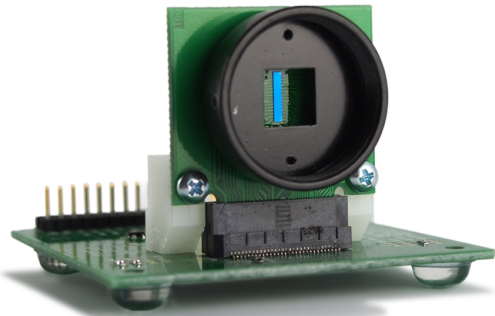


*epc610 Evaluation Kit GUI detail. The surface map shows the tip of a pencil about 40cm away from the camera lens.*

Our TOF Evaluation Kits are delivered with firmware and PC GUI software. The firmware incorporates a newly developed algorithm for the epc600 camera, which maximizes dynamic range while keeping frame rates high. It also compensates for various disturbance variables like temperature and ambient light. This algorithm can be used by our customers for direct deployment or as starting point for their own development. Our SDK is delivered with every kit and the theory and background of calibration and compensation is documented in our application Note AN09.

If you would like to see the new epc610 Evaluation Kit in action, please go to our website, where we have posted a [video](#).

A second and brand new development platform is the epc901 Evaluation Kit. While a line imager like the epc901 may be less complex in terms of functionality and system integration than a TOF chip, it still requires a hardware and a software environment to be operated. We already had the epc901 Chip Carrier Board and the epc901 evaluation Board in our lineup. These products do at least eliminate the need for hardware assembly. Yet, a host system is still required to operate the chip. To fill this gap, we expanded the functionality of our processor mainboard



*The epc901 evaluation camera system. The lens is removed in this picture and the epc901 line imager is visible.*

which is also used in our epc600 and epc610 Evaluation Kit. The mainboard now also accepts epc901 Evaluation Hardware and is delivered with appropriate firmware and PC software. For all customers who want a turn-key camera solution for the epc901, this new kit may be the way to go. The kit includes said mainboard, the epc901 Evaluation hardware boards and an industry standard lens with approximately  $90^\circ$  field of view. Firmware and PC operating software are certainly also included. Available in October 2014.

If you would like to learn more about our Evaluation Kits and the chips that are integrated, you may have a look at our website or just contact us by mail at

[info@espros.ch](mailto:info@espros.ch).

## New Multi Project Option

Chip prototyping can be an expensive and complicated business. Wafer processing, back end and assembly require specialized partners and the associated cost can quickly rise to prohibiting levels. Not so with epc. We created a multi project option with simplicity in mind. A design space of about 2.6mm x 2.6mm provides sufficient real estate to prototype even complex designs. And you

don't have to deal with different service providers in order to get your chip test-ready. As true one-stop silicon shop, epc will deliver your prototype fully processed and flip-chip assembled on a PCB carrier that can go right into a connector socket and you are ready to start testing. Ask us for details – we are looking forward to hearing about your requirements.

### Sales

<b>Worldwide</b>	<b>ESPROS Photonics AG</b> , 7320 Sargans, Switzerland, phone +41 58 411 0300, <a href="http://www.espros.ch">www.espros.ch</a>
<b>Switzerland</b>	<b>Ineltro AG</b> , 8105 Regensdorf, phone +41 43 343 73 00, <a href="http://www.ineltro.ch">www.ineltro.ch</a>
<b>Italy</b>	<b>Kevin Schurter SPA</b> , 20020 Arese MI, phone +39 02 30465311, <a href="http://www.schurter.it">www.schurter.it</a>
<b>Austria</b>	<b>Tecams Handelsagentur</b> , 2392 Sulz, phone +43 664 1206900, <a href="http://www.tecams.at">www.tecams.at</a>
<b>Israel</b>	<b>E.D.E Electronics Ltd.</b> , Netanya 42504, phone +972-9-8634000, <a href="http://www.ede.co.il">www.ede.co.il</a>
<b>Germany</b>	<b>Polytec GmbH</b> , 76337 Waldbronn, phone +49 7243 604-0, <a href="http://www.polytec.de">www.polytec.de</a>
<b>BeNeLux</b>	<b>Neumüller Elektronik GmbH</b> , 91085 Weisendorf, phone +49 9135 73666-0, <a href="http://www.neumueller.com">www.neumueller.com</a>

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