

H I G H D Y N A M I C Newsletter

May 2024

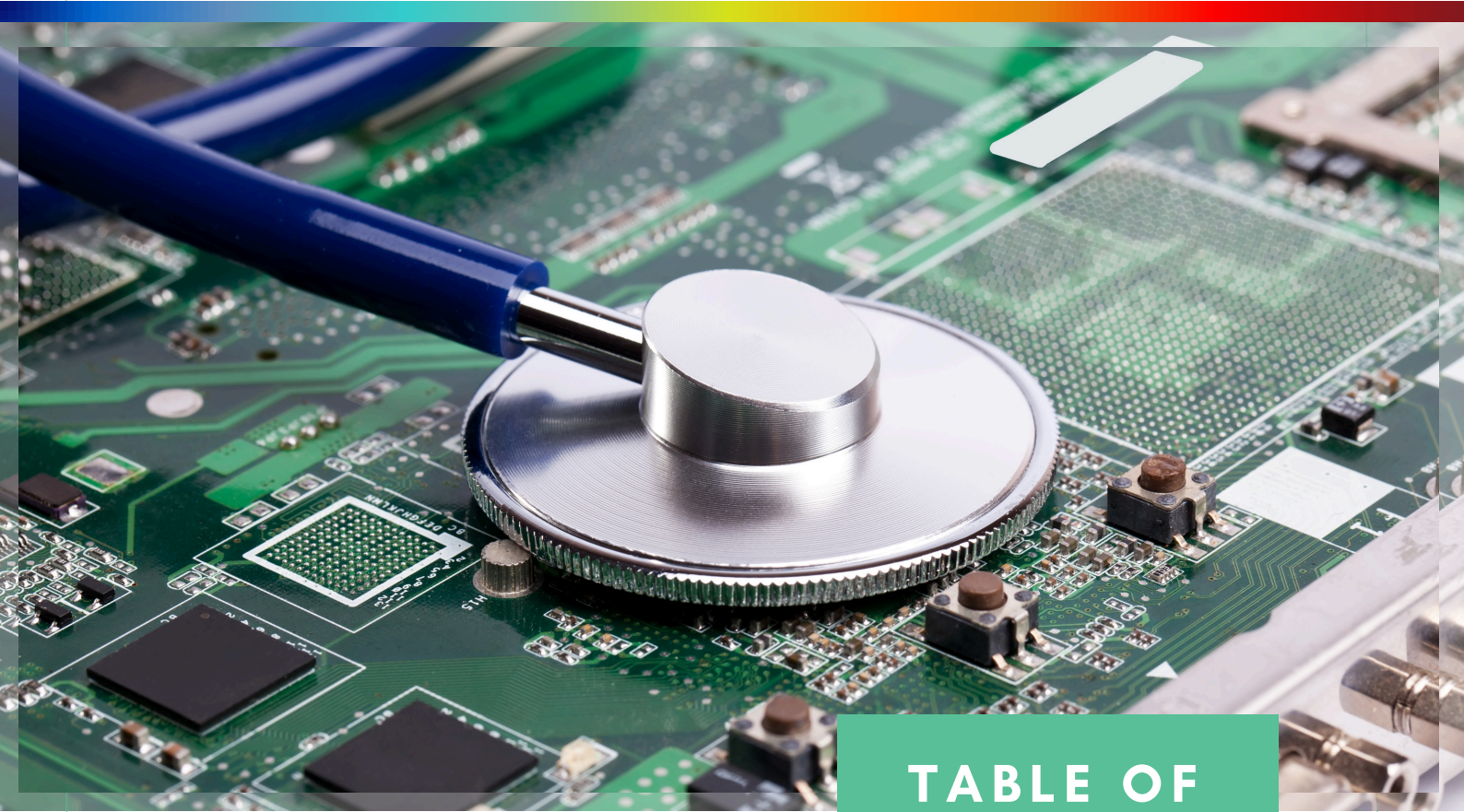
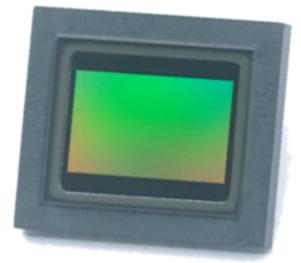


IMAGE SENSORS FOR MEDICAL APPLICATIONS

MEDICAL IMAGING SOLUTIONS

When discussing medical imaging, the possibilities are as vast as they are transformative. In this edition, we'll explore the contribution of Pyxalis in medical imaging and the possibilities we offer for your future projects.

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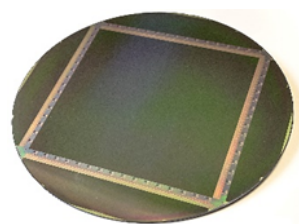
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Let's meet!

PYXALIS' SENSORS FOR MEDICAL APPLICATIONS

BEING ONE OF ITS PILLARS, HEALTHCARE HAS ALWAYS BEEN AN IMPORTANT SECTOR TO WHICH PYXALIS WANTED TO CONTRIBUTE.

Through different projects, PYXALIS has used its know-how and expertise to design custom image sensors that meet challenging customer requirements.

For **X-ray radiography**, PYXALIS has designed big image sensors up to 20cm x 20cm on a 12" wafer with a 190µm pixel for standard 2D lung, breast and bone radiography. PYXALIS' know-how in designing stitched sensors enables the proposal of big image sensors that can fit specific medical applications.



Other **X-ray sensors**, which PYXALIS designed, follow extreme linearity constraints and very low noise requirements in analog (<50 µV rms). For such applications where the sensor rotates to get a 3D reconstitution of an organ such as the heart, ensuring strict linearity constraints is mandatory for a faithful reconstruction.

These X-ray sensors involve 50 to 100 µm pixels used in indirect X-ray systems with scintillators and offer the possibility of mechanical die butting in addition to stitching. Specific Design-For-Manufacturing techniques have been used to ensure good yield despite the sensor's large size.



PYXALIS has also designed sensors for the **dental intra-oral and extra-oral** markets, offering the right compromise between the solution's cost and the required performance. This experience includes high frame rate, high resolution and 3D tomography sensors with pixels ranging from 12.5 to 50 µm.



For **endoscopy**, PYXALIS has developed a sensor in a Wafer Level Chip Scale Package, featuring very aggressive figures (300µm thickness including the window).

This sensor, embedding a $1.75\mu\text{m}$ pixel, was designed to meet the requested sensitivity and optimum response for such applications.

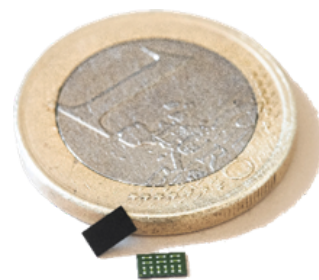


In addition to high pixel and analog performances, the capabilities of PYXALIS' Digital Design team offer a large flexibility in terms of system partitioning and business offer, with the ability to:

- Integrate on-chip sequencing, where the sensor is the master, or off-chip sequencing for lower cost solutions or system partitioning constraints.
- Integrate on-chip processing for image quality and any specific analysis algorithm.
- Offer both the sensor and the driving firmware if it makes sense for the customer.

PYXALIS can leverage on its experience in the design of sensors for such applications, to actively support customers in specifications' definition that perfectly match their needs.

To know more about us and our capabilities, do not hesitate to visit our website www.pyxalis.com or contact us via contact4business@pyxalis.com
We look forward to discussing with you!



PYXALIS ENLARGES ITS BUSINESS OFFER !

An increasing number of customers turn to PYXALIS not just for individual sensors, but also for comprehensive sensor solutions. This request often arises when customers want to focus on the core of their system, where added value is generated, so they ask PYXALIS for easy sensor integration in their system to reduce internal development costs and speed up the time to market. To do so, PYXALIS can offer:

- On-chip programming control with sometimes several operating modes (high speed, low noise, multi-sampling, HDR...) and processing capabilities (image correction, filtering, flipping, HDR processing, ROIs ...) depending on the sensor's architecture (stitched sensor pushes for off-chip processing) and on the customer's system's hardware partitioning (system processing vs on-chip processing).
- Firmware and Software available together with the sensor, to ease the sensor drive and off-chip image processing whenever needed, hence reducing the customer's burden to dig into datasheet information and code development.
- Dedicated proximity electronics including printed circuit boards, decoupling capacitors, regulators for power supplies management and other Integrated Circuits for handling specific functions.



GIGAPYX4600 sensor board: Top side with sensor (Left), Bottom side (Right)

For its customers' projects, PYXALIS not only relies on internal know-how, acquired by its system team throughout the development and usage of its own sensor validation and characterization platform, but also on work with external partners to issue both evaluation/demo kits showcasing its Commercial-Off-The-Shelf sensors for customer evaluation and the CREAPYX platform for pixel prototyping and evaluation.

Below are depicted the evaluation/demo kits proposed to customers by PYXALIS, for the HDPYX300, GIGAPYX4600, HDPYX1600-G and HDPYX330-G. An SDK (C++, Python) was also developed in-house, in addition to GENEPIX to ease the customer's evaluation.



HDPYX300 eval/demo kit



GENEPYX: GIGAPYX4600, HDPYX1600-G
and HDPYX330-G eval/demo kit

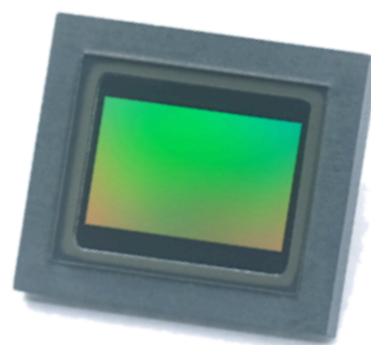
To know more about our capabilities in providing a sensor solution, do not hesitate to contact us via contact4business@pyxalis.com !

HDPYX 230-G: A RUGGEDIZED 2.3MP GLOBAL SHUTTER IMAGE SENSOR FOR YOUR LONG-LIFE PROJECTS

The HDPYX230-G is a 2.3 MP 1/2.5" ruggedized CMOS image sensor that uses a global shutter pixel with dual in-pixel memory to capture perfect HDR images. It is one of PYXALIS' commercial-off-the-shelf products that offers an interesting set of specifications such as low noise and high sensitivity and QE in NIR.

Some key performances/features

- 3.2 μ m pitch
- Linear Dynamic range up to 97 dB
- Single integration with 69dB of DR
- Saturation capacity (Full Well) 2 x 8.5 ke-
- QE 69% at 550nm and 19% at 850nm
- SNR Max 41.6dB
- Noise of 2.6 e- RMS (ambient temperature)
- Dark current of 29 e-/s (at 60°C)
- Frame rate 60 fps
- 8 Region Of Interest (ROI)
- Subsampling and binning up to 4
- MIPI CSI-2 output (4 lanes @800MHz)
- Plastic package IM2BGA 104 balls
- Power < 435mW



HDPYX 230-G

Thanks to its features, the HDPYX230-G can be suitable for many applications such as: Night Vision, Intelligent Transport Systems, Robotics, Surveillance, Industrial Endoscopy and more. The sensor exists not only in monochrome, but also in RGB+NIR, with the pattern depicted at the bottom left of this article.



NIR is a very useful source of information enabling many possibilities for: Agriculture (in order to check crop health), Medical applications (for safe visualization of subsurface blood vessels), Night and Low light vision (for color management), Defense (for camouflaged object detection)...The benefits of RGB+NIR in HDPYX230-G are well explained in the Whitepaper we have published and which is available upon demand.



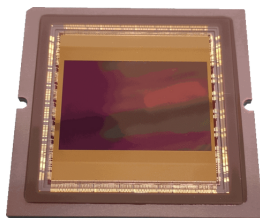
HDPYX230-G is in mass production.

Both customer samples and evaluation kits are available for product evaluation.

If you want more information about this sensor, you can visit our website: www.Pyxalis.com or you can contact us directly via contact4business@pyxalis.com.

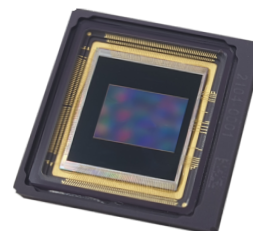
Discover some of our other sensors:

GIGAPYX 4600



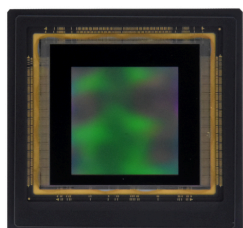
46 MP, BSI Rolling Shutter
High Speed HDR CMOS image sensor

HDPYX 330-G



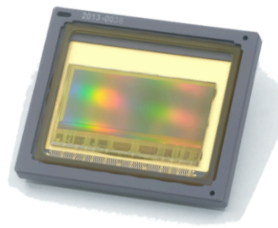
3.3 MP, Global Shutter
Low light HDR CMOS image sensor

HDPYX 1600-G



16 MP, Global Shutter
Low light HDR CMOS image sensor

HDPYX 300




3 MP, Global or Rolling Shutter, High
sensitivity HDR 120dB CMOS image sensor



AGENDA

LET'S MEET !

Q3 & Q4 2024 agenda 

It is important for us to move around and meet up face to face with the image sensor community members. Always insightful presentations & discussions in the end !



VISION - STUTTGART **8-10 October**

Join us at the Vision exhibition in Stuttgart as we showcase our innovative solutions amidst a gathering of industry leaders and visionaries.



MEMS & Imaging Sensors Summit - MUNICH **14-15 November**

Looking forward to seeing you in person!

YOU HAVE A PROJECT THAT NEEDS A CUSTOM IMAGE SENSOR DEVELOPMENT, A STANDARD CMOS SENSOR OR A COMPLETE SOLUTION ?

WE MAY HAVE A SOLUTION FOR YOU.



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**DON'T HESITATE TO CONTACT OUR LOCAL PARTNERS
IF YOU HAVE ANY QUESTION**

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