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Press Release

Industrial electronics: an enabler of the digital transformation

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- **Industry consumes 26 percent of all semiconductors in Europe**
- **SiC power electronics for high-voltage applications in factory automation**
- **Smart sensors reduce data transfers to the cloud**

Industry 4.0 is among the megatrends of the present day. Its goal is to digitalize and network production along the entire value chain using intelligent industrial electronics and the most up-to-date communication technologies. Leading actors in this disruptive transformation process will meet from November 15 to 18 at electronica 2022, where they will shed light on the most important trends at the likes of the IIoT & Cyber Security Forum and the Power Electronics & Embedded Systems Forum.

The triumph of industrial electronics began in 1941 with the invention of the first fully automated computer, Z3. In the third industrial revolution, which started in 1970, it formed the indispensable basis for every form of automation. And for the fourth industrial revolution, it is the key technology. That's because, in nearly every industry, it digitally bridges the physical world of machines, systems and devices, and the virtual world of the internet – all made possible by immense advances in microelectronics as well as information and communication technology.

Electronics for industrial use are also subject to the well-known permanent requirements, “faster, more economical, smaller, cheaper.” However, they also have to be robust and able to withstand years of cyclical stress around the clock.

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And moisture, vibrations, heat and the effects of chemical substances mustn't impede their function.

However, industrial semiconductors are incapable of competing in the overall nanometer race. According to the ZVEI, the German Electro and Digital Industry Association, they mostly remain in a range between 65 nm and 800 nm. Not only is this cheaper, it also increases robustness and long-term consistency. For comparison: Apple's next generation of processors for Macbooks and iPhones has arrived at 3-nm structures. The world's leading chip producers for industrial electronics will illustrate the state of the industry at electronica 2022 – among them, Bosch, Infineon, NXP, Renesas, STMicroelectronics, Texas Instruments, Toshiba Electronics and Vishay Intertechnology.

Power electronics from Europe

According to the ZVEI, industry accounts for 26 percent of semiconductor consumption in Europe. And power electronics makes up a large portion of that. Unlike “conventional” components, they can withstand extremely high currents and voltages when switching, controlling and converting electrical energy. This works better with silicon carbide (SiC) and gallium nitride (GaN) than with traditional silicon (Si). That's because these wide bandgap semiconductors are setting new standards in terms of switching frequency, efficiency, breakdown field strength, heat loss and size. For high-voltage applications in factory automation, this means a boost for energy efficiency and profitability. With Bosch, Infineon, Onsemi, Renesas, Rohm, STMicroelectronics and Vishay, the leading producers of power electronics are represented at electronica 2022. Furthermore, the Power Electronics Forum on Wednesday, November 16 from 10:00 to 13:30, will also deal with the trend of “Wide Bandgap Semiconductors”.

Sensory organs for industry

Automated production with flexible processes needs one thing above all else: data. Analyst firm IDC expects the volume of data generated around the world to increase to 163 zettabytes (ZB) by 2025. Companies are expected to account for

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60% of this data. This is because of the IIoT (Industrial Internet of Things) and its countless wireless and wired sensors. They indicate high demands for accuracy, working frequency range and robustness.

IIoT sensors are also often able to operate in real time and, in addition to recording actual measurements with integrated AI functions, they increasingly prepare and process signals on site (edge computing). This reduces electricity consumption and data transfers to the cloud. The MEMS tilt sensor IIS2ICLX from STMicroelectronics, for example, has a programmable machine learning core. Typical applications are industrial automation and structure monitoring by measuring weak, low-frequency vibrations.

Sensors for digital twins

Smart sensors also reduce the effort needed to create and operate digital twins by removing the cost- and resource-intensive transmission of raw data. The digital images accompany machines, systems and products over their entire life cycles. Typical applications include real-time monitoring and predictive maintenance.

For example, the digital twin for “Integrated Asset Performance Management” (IAPM) from Bosch, which received an award at the Microsoft Intelligent Manufacturing Award 2021, supports complex automation projects. The cloud-based solution collects machine-generated data and independently gives notifications about its maintenance requirements using IIoT. This reduces the need for raw material and energy for production companies – a highly desirable result especially today.

At electronica 2022, the IIoT & Cyber Security Forum will illustrate how industrial applications can be made even more intelligent thanks to concepts like Industrial IoT (IIoT), artificial intelligence (AI) and 5G.

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About electronica

electronica is the most important international meeting place for the electronics industry. The world's leading trade fair covers the entire electronics spectrum from components to systems, applications and services. The extensive supporting program highlights the automotive, embedded, semiconductors and wireless – and networks startups with the industry. In 2018, over 81,000 visitors and more than 3,100 exhibitors attended electronica, and 8,253 people took part in electronica virtual in November 2020. The next electronica will be held from November 15 to 18, 2022 at the Messe München Exhibition Center.

electronica worldwide

In addition to electronica, Messe München organizes electronica China, electronica South China, electronica India, the SmartCards Expo and electronicAsia. The network of electronics trade fairs also includes productronica in Munich, productronica China, productronica South China, productronica India and LOPEC.

Messe München

Messe München is one of the leading exhibition organizers worldwide with more than 50 of its own trade shows for capital goods, consumer goods and new technologies. Every year, a total of over 50,000 exhibitors and around three million visitors take part in more than 200 events at the exhibition center in Munich, at the ICM – Internationales Congress Center München, the Conference Center Nord and the MOC Veranstaltungszentrum München as well as abroad. Together with its subsidiary companies, Messe München organizes trade shows in China, India, Brazil, South Africa and Turkey. With a network of associated companies in Europe, Asia, Africa and South America as well as around 70 representations abroad for over 100 countries, Messe München has a global presence.