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Embedded Hardware: Everything Standard?

You might think that everything about hardware for embedded systems is available from the shelf. Reach in, develop housings and circuit boards and you only have to take care of the software afterwards. True and false. The readily available solutions, be it processors, memory, power supplies, communication interfaces, sensors, cameras or displays, almost always make it possible to implement your system without major hardware innovations. But that alone does not give you a competitive advantage.

If I can do what everyone else can do with the hardware, my software alone must provide the competitive advantage. On the one hand, this is a really strong order for the software developers, on the other hand, there are always use cases where we have to make the most of everything that the hardware can do - not off the shelf - so that we can get the system with the software it contains to work under these conditions. Be it performance, installation space or reliability requirements, or the desire to make a system impossible to copy, or only at disproportionately high expense: Know your possibilities to realize more than just the shelf solutions with the hardware!

Power supply

...and every day the groundhog salutes? Surely the basics and specialties of classic power supply design will be presented again, or the economical use of available energy in system design will be practiced in a whole workshop. Seemingly common topics are systematically presented and refreshed, and new methodical approaches are shown. And even if many of the techniques have been known for a long time: new engineers are always coming up, for whom a look at the compact consolidation of these topics and the profound experience of others can be very helpful.

But there is more: Embedded systems are becoming smaller and smaller and their areas of application more and more distributed. In more and more

NÜRNBERG MESSE

cases, energy must come from other sources: Batteries have to last very long, data transmission technology has to serve as a power source (or energy supply as a communication channel, both sides are creative), wireless energy transmission becomes a requirement for moving or non-contacting components, or the energy comes from the environment and has to be converted to electrical in the first place. Here the hardware engineer should know his physics. Lectures on this topic for one day!

Memory

With the availability of economically justifiable semiconductor memories in the capacity range of hard disk drives, a big step towards miniaturization and robustness of systems was made: No more housings in the enclosure for the drives and no more mechanically moving parts. Today, mass storage can also be integrated into the PCB, no special treatment in the mechanical design is necessary. But we also know the shadow in this light: The number of write cycles is limited depending on the storage technology, the aging of the components is statistical and faster than with hard disks. So special attention has to be paid to the memory architecture and the household with the write cycles of the individual cells. Memory is a focal point of the next embedded world conference.

Processor architectures

The range of classic microcontrollers is large and offers a lot up to multiprocessor cores. Here the shelf is filled. It is possible to access the offerings of the major suppliers, who are represented with interesting innovative topics in the application-related subject areas of the embedded world Conference. The RISC-V architecture has a certain special position. As an open source project, it offers the possibility of having its hardware completely disclosed on the one hand, and on the other hand to participate in the further development of own product ideas in an open community. There are only a few limits for the realization of ideas due to the possibilities of today's FPGAs. From the processor core, I/O circuits, data converters to specialized co-processors, many things can be accommodated on a single chip. Despite open-source fundamentals, this is an effective protection of your own designs against all too easy copying. A

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separate session is dedicated to the architecture of the RISC-V architectures in the hardware topic area.

All this is rounded off with contributions that present interesting applications from various fields. From hard disk controllers to motor control systems to sensors in clothing, there is a lot to see. So: the visit is worthwhile again.

embedded world conference
These hardware-related topics are also the focus of attention at the world's largest leading exhibition and the embedded world Conference taking place in parallel in Nürnberg from 25-27 February 2020. In a total of 26 lectures in four specialized sessions, experts will provide answers to the above questions over two whole days.
The program of the embedded world Conference with over 250 lectures is available at **www.embedded-world.eu**.

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