COVER STORY:
Small form factor trend conquers high-end industrial computing
Smart factories and connected supply chains are presenting many manufacturing companies with new security challenges. Malware, manipulation, sabotage, faulty firmware updates and counterfeit components are examples of digital threats that can bring entire production lines to a halt and may lead to significant costs and loss of image.

The tiniest security gap in a company’s infrastructure can lead to theft of data, intellectual property (IP) and process know-how. Safeguarding this sensitive information calls for tailored solutions that deliver end-to-end protection yet also strike the right balance between security performance requirements and financial constraints. ...

Manufacturers need powerful, reliable security technologies to secure communication between devices and machines within heavily networked infrastructures.

The OPTIGA™ product family offers scalable security solutions for a wide range of industries.

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Read more in the article starting on page 11.
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Dear Readers,

All experts agree about that the Internet of Things (IoT) will change the way we will live in future. And not only our private lives but also way we will work in future. The electronics industry is developing at the moment the preconditions. You’ll even realize this when you have a look at the content of this combined issue of ECE and B&S. Our cover story describes the necessary hardware components for IoT – powerful embedded computers. This also means that the small form factor trend has conquered the high-end industrial computing market.

Intel Xeon processors are now available as highly integrated and rugged BGA versions. This opens the door for a new category of embedded computing platforms: Server-on-Modules. Utilizing the COM Express specification for this new module class makes a lot of sense concludes the cover story. Read more at page 6.

And there is another precondition for the success of IoT and the Industrial Internet of Things (IIoT) – maximum security. This is not only a matter of software but also a matter of hardware. The article “hardware-based solutions secure machine identities in smart factories” starting at page 10 illustrates that security is a cornerstone of Industry 4.0. Secure cryptographic identification of machines and devices protects smart factories from manipulation and data theft. Hardware trust anchors implemented with dedicated security chips provide robust protection for security keys while lowering overall security expenses for device manufacturers. By using state-of-the-art microcontrollers and stand-alone security controllers such as the OPTIGA product family as example it is possible to implement a hardware-based trust anchor that protects the system software against attacks. The key to successful protection lies in the use of open industry standards that allow seamless connectivity across existing and new systems.

But hardware protection alone doesn’t solve the whole problem - it must be accompanied by security software to create secure systems. The article “Requirements for IoT and IIoT in the changing connected world” (page 14) describes the requirements and solutions to ensure safety and cyber security. It covers aspects including secure boot, firmware updates, licensing and know-how protection as well as new business opportunities for device manufacturers.

But how to make money out of the new business opportunities of IoT and IIoT? This explains the article “Flexible licensing models in the Internet of Things at page 18. It shows that the Internet of Things is turning engineering companies into software providers. Thus, securing intellectual property (IP) is especially important. License management plays a major role in this. New licensing solutions not only protect embedded software; they also entail new business opportunities. These include flexible licensing models such as pay-per-use, function and capacity-based licensing, software keys and subscriptions. This type of licensing requires constant changes, in order to meet the user demands. Therefore companies need to implement Licensing-Lifecycle Management as well.

You see there is a lot going on in the embedded industry and it’s up to you to come to the right decision to succeed in the connected world.

Yours Sincerely

Wolfgang Patelay
Editor
Small form factor trend conquers high-end industrial computing Page 6

The small form factor trend has conquered the high-end industrial computing market. Intel Xeon processors are now available as highly integrated and rugged BGA versions. This opens the door for a new category of embedded computing platforms: Server-on-Modules. Utilizing the COM Express specification for this new module class makes a lot of sense.

Hardware-based solutions secure machine identities in smart factories Page 10

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MicroTCA for highly sophisticated embedded computing applications Page 20

Besides high computing power, systems for high performance applications like data acquisition or imaging processing require high-grade availability and easy manageability. To provide these a commercial off-the-shelf system (COTS) is needed. MicroTCA meets these requirements while keeping the cost down and offering the best solution for highly sophisticated applications.

Energy-efficient architectures: economical, yet powerful Page 24

With modern ARM processor architectures, such as Cortex-A7, Cortex-A8 and A9, many functions are already integrated into the CPU. This way, cost-optimized systems can be generated in a simple manner.

How modeling helps embedded engineers develop applications for SoCs Page 33

This article explains how modeling helped a small team of algorithm and embedded software engineers design a motor control algorithm and implement it on a programmable system-on-chip (SoC).

Understanding and measuring power supply transient recovery time Page 37

Power supply transient recovery time is the specification of a DC power supply that describes how quickly the power supply will recover from a transient load condition on its output. This article describes how you can measure this feature easily and exactly.
SECURING THE
INTERNET
OF THINGS

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Small form factor trend conquers high-end industrial computing

By Christian Eder, congatec

The small form factor trend has conquered the high-end industrial computing market. Intel Xeon processors are now available as highly integrated and rugged BGA versions. This opens the door for a new category of embedded computing platforms: Server-on-Modules. Utilizing the COM Express specification for this new module class makes a lot of sense.

The 6th generation of Intel Core processors, formerly codenamed Broadwell and Skylake, now Intel Xeon, are manufactured in 14nm process and integrate the CPU and GPU on a small form factor, rugged BGA multi-chip module. While the Intel Core processors are well suited for any standard high-end applications ranging from industrial automation to medical, retail and gaming, the Intel Xeon processors aim for embedded, industrial and IoT server platforms. Areas of application include, for example, servers for medical image processing in stationary CRT, MRT and 4D ultrasound devices, as well as carrier-grade edge servers and industrial cloud servers with high packing density and/or minimum footprint.

The high graphics performance of the integrated Intel Iris Pro technology – useful in carrier-grade applications for content delivery platforms with real-time video transcoding of multiple streams and network functions virtualization (NFV) – will also work well in industrial applications to fulfill important situational awareness tasks, for example in autonomous vehicles or in vision-based industrial safety barriers. GPGPU-based applications can also be found in parallel deep packet inspection, content encryption and decryption and big data analytics. For server-based applications, the graphics engine delivers distributed clients a rich and responsive 3D performance for CAD, 3D modelling and video rendering.

Some of these applications are fit for 19-inch industrial server designs that were built on the basis of standard industrial motherboards such as ATX and its derivates. But most of the new embedded server applications are more space-constrained, demand a highly customized feature set and an extended longevity. So the time has come to define a server class of computer modules to be able to perform the required customization with limited effort.

A big advantage at this stage is the availability of the open standard COM Express Computer-on-Module specification which is hosted by the PCI Industrial Computer Manufacturers Group (PICMG). This specification delivers everything that is required to design high-end industrial embedded servers. The layer design of the boards is built for high levels of EMC compliance in harsh industrial environments. The two double-row SMD connectors are robust and offer 440 pins for numerous high-speed interfaces. In addition, COM Express is optimized for the high performance interfaces of standard computer technologies, and meets the highest ruggedization demands thanks to a stable connection to the application-specific carrier board. In many cases, it is specifically the high-end designs that rely on COM Express, especially when the standard feature set of the motherboards does not meet the design requirements or space is limited in the application.

So the only question is whether these new SOC server processors fit on the form factor. And yes, they do: the 125mm x 95mm sized COM Express Basic form factor fits for the new Intel Xeon generations as long as engineers don’t want to have 4 banks of DDR4 RAM which cannot be designed onto the modules. But everything that can be sufficiently served today with up to 32GB RAM is perfectly served with COM Express. That is a great advantage because embedded server designers can now utilize the entire ecosystem that has been built around this form factor.

Some people might raise the objection that they cannot use the entire I/O feature set of the new Intel Xeon processors. And yes, that is true. But on the other hand, standards are not built to fulfill everybody’s needs. They are better built in accordance with the Pareto principle to suit 80% of applications, because it reduces costs not to fulfill the needs of the last 20%. The 440 pins of the COM Express Type 6 specification offer a huge set of interfaces for that 80% of applications. In most cases, they will by far exceed the demands of high-end embedded, industrial and IoT edge
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**Device Management**
- Monitor data connection for quality and reliability
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**Data Management**
- Store data from clients in cloud database
- Interface to ERP systems
- Re-establish connection and collect buffered data if connection has been lost

**Management Portal**
- Access device information and sensor data via HTML capable browser
- Web APIs for customer specific application or mobile app development
- Download any kind of file to one or multiple devices, e.g., to perform over-the-air software updates
Embedded server designs built on the basis of Server-on-Modules can be as compact as 125mm x 95mm.

The conga-TS170: COM Express Basic module with 6th generation Intel Core and Intel Xeon processors offers server-class computing performance and up to 32GB of DDR4 memory.

servers. And for the carrier-grade and industrial data centre server class, it could be an idea to modify the setup of the display interfaces to provide even more high-speed I/O interfaces.

So why not use the same approach again to create a real server-class COM Express module? This would be a very attractive option compared to a full custom design. COM Express can definitely cater for all embedded server demands in a small form factor, either as a standard design or as a derivative with revised interfaces. In any case, from now on we will more often see this new category of Computer-on-Modules, which we want to call Server-on-Modules to exactly define the application area we see for this type of embedded computing platforms. There is no doubt that the small form factor trend has conquered the high-end industrial computing market.

What distinguishes Server-on-Modules? The answer lies in the nature of the processors themselves, the different interfaces they provide and the power and performance class they offer. On top of this, it is self-explanatory that elaborate Server-on-Modules will provide an extended availability of 7+ years and come with powerful server-class tools to manage distributed IoT, M2M and Industry 4.0 applications. So they are definitely a perfect fit for many internet connected appliances. Thanks to Intel vPro technology and an integrated board management controller with watchdog timer and power loss control, these modules are fully equipped for remote monitoring, management and maintenance tasks, right down to out-of-band management to provide the high reliability that is a must for all server technology.

The customer needs a special mix of communication interfaces and features to win in its specific market. In order to be able to react fast to new requirements the centrepiece of the devices is a COM-Express module. COM-Express consists of standardized computer modules that are plugged onto a customer-specific carrier board. The computer module contains the processor with all required peripherals and power supply. There is a wide choice of compatible COMs with different processors. COM manufacturers are specialized in the development and production of these application-ready, pre-configured modules. congatec works closely with processor manufacturers and is a recognized expert in COM development, manufacturing and support. The modules themselves are standardized, but a successful implementation depends on details like firmware, software, adaptation of operating system and design-in support. congatec modules meet the industry standards and include support for real-time operating systems and also all the necessary peripheral drivers. This concentration on core competencies cuts down development time and cost for customers. Utilizing the COM concept, customers are able to bring new products to market faster versus designing their own processor-based boards. It is possible to leverage the existing carrier boards for future generations of the product with very minimal modification.

The platform of Server-on-Modules comes with the latest 6th generation 14nm Xeon v5 and Intel Core processors. They feature a TDP of 25-45W, up to 8MB smart cache and super-fast 2133 DDR4 memory up to 32GB. These Intel Xeon variants additionally feature ECC memory. With ECC memory bit errors in the RAM can be automatically corrected, which significantly increases the reliability of the application.

This is relevant for applications that demand increased data integrity or that is exposed to radiation, like some medical imaging applications, for example. For energy-efficient 24/7 operation, the new modules support disconnected standby in place of the legacy S3 mode. With disconnected standby, switching from energy-saving sleep mode to full performance takes less than half a second; as a result, systems can go into sleep mode more frequently without affecting usability and responsiveness.

The integrated 9th generation Intel HD Graphics with Intel Iris Pro P580 scales the parallel processing capacities up to 72 execution units. This is three times more parallel execution power than the 24 execution units of the regular, already powerful P530 graphics provide. With a theoretical peak performance of more than 1 TFlOPi (1.152 x 1012 floating point operations per second) at a clock speed of 1 GHz, the Intel Iris Pro P580 is the most powerful integrated x86 graphics currently available. Developers of highly compact Server-on-Module based applications now have access to a new parallel processor class that previously would have required a dedicated graphics unit.

Besides this state-of-the-art version, all 9th generation Intel HD graphics support DirectX 12 for even faster Windows-10-based 3D graphics on up to 3 independent 4K (3840 x 2160) displays via HDMI 1.4, DVI or DisplayPort 1.2. For legacy applications, a dual-channel LVDS output and optional VGA are available. Thanks to hardware support for the decoding and now also the encoding of HEVC, VP8, VP9 and VDENC, it is for the first time possible to stream HD video energy-efficiently in both directions.

In addition to PCI Express Gen 3.0 Graphics (PEG), the choice of available I/O interfaces includes 8x PCI Express Gen 3.0 lanes, 4x USB 3.0, 8x USB 2.0, LPC and I²C. Non-volatile mass storage can be connected via 4x SATA 3.0, including RAID 0, 1, 5, 10 support. All major Linux and Microsoft Windows operating systems are supported, including Windows 10. A comprehensive set of add-ons for easier design-in – such as cooling solutions, carrier boards and starter kits – completes the offer.
**TQ: new flagship TQMx60EB with Intel “Skylake-H”**

TQ is relying on the latest Intel Core and Intel Xeon processors of the 6th generation. The COM Express Basic (Type 6) module TQMx60EB supports Intel Core i3, i5 and i7 dual-core and quad-core processors of the 6000E series with up to 3.5 GHz and 8 MB cache. In addition to this, versions are available with Intel Xeon quad-core processors of the E3-1500 v5 family for the high-end embedded computing area. Equipped with an extremely efficient graphic core (Intel HD 530 / Intel HD P530) and up to 32 GB DDR4 of main memory in dual-channel configuration, with the TQMx60EB, sufficient resources and system performance are available for demanding applications in the area of medicine, gaming, image processing, automation, simulation and data analysis.

*News ID 3987*

**Advantech: new RTX open standard form factor for rugged COM development**

Advantech, along with AAEON, Avalue, ARM, NXP and Texas Instruments announced their collaboration on a new open form factor: RTX (Rugged Technology eXtended). RTX is a compact and robust ARM-based Computer-On-Module (COM) specification for industrial applications, with 2.0 mm PCB thickness and four board-to-board connectors, it offers a solid and standardized platform with better anti-shock and anti-vibration capabilities. The 400-pin high I/O expandability, along with the wide-range power input and wide operating temperature range, makes RTX an innovative form factor for ruggedized applications.

*News ID 4095*

**Vecow: Skylake-S fanless robust computing system**

Vecow launches its expandable fanless embedded system with 6th Gen Intel Skylake platform, RCS-9000 Series Fanless Robust Computing System. Powered by Quad Core 6th Gen Intel Core i7/ i5/ i3 processor (Skylake-S), fanless -25 to 70°C operating temperature, all-in-one integrated features, multiple I/O connection, 3 SIM socket for WiFi/ 3G/ 4G/ LTE/ GPRS/ UMTS, 4 front-access SSD Tray, 4/2 multiple PCI/PCIe expansion, smart manageability, 6V to 36V power input with 80V surge protection, ignition power control, intelligent circus protection and trusted reliability in harsh environments, Vecow RCS-9000 Series Fanless Robust Computing System is your flexible choices for Machine Vision, Factory Automation, Robot Control, Automated optical inspection (AOI), Machine Automation, Industry 4.0 and any high-performance IoT applications.

*News ID 4098*

**ADL: long-life small form factor ATX power supply board**

ADL Embedded Solutions announced its 150W ADLPS35ISO-150 power supply board. It’s designed to meet the needs of high-powered Intel Core i5/i7 CPUs in space-constrained embedded systems by providing robust ATX voltages in a small 2” x 4” form factor designed for rugged, extended temperature use. The ADLPS35ISO-150 provides up to 500V of galvanic isolation from dirty power and unwanted transients and is tailored to work in conjunction with ADL Embedded Solutions’ advanced high performance SBC’s with more than enough headroom for inrush startup currents, and quiescent operation with multiple peripheral cards.

*News ID 4121*

**Abaco: VITA 42-compliant graphics board with 20-year chip set support**

Abaco Systems announced the XMCGA8 graphics board. Designed for customers requiring the ability to deliver safety-critical applications certified to DO-178 and DO-254 with long term support, it can provide an industry-leading four DVI ports, giving the XMCGA8 unique flexibility. The VITA 42-compliant XMCGA8 is available with the AMD/CoreAVI Radeon E8860 ‘Adelaar’ graphics processing unit, enabling it to deliver twice the graphics throughput of its predecessor, the XMCGA7 for which it represents a highly cost-effective upgrade that can deliver twice the performance/slot of its predecessor. The XMCGA8’s leadership is reinforced by its minimal thermal design power.

*News ID 4120*
Hardware-based solutions secure machine identities in smart factories

Dr. Josef Haid, Infineon

Security is a cornerstone of Industry 4.0. Secure cryptographic identification of machines and devices protects smart factories against manipulation and data theft. Hardware trust anchors implemented with dedicated security chips provide robust protection for security keys while lowering overall security expenses for device manufacturers.

The Internet of Things (IoT) is connecting more and more smart devices and machines to create smart factories (known as Industry 4.0 or Industrial Internet). Although these highly automated, decentralized factories promise greater efficiency and flexibility across production processes, they are also exposed to attacks from cyberspace as they rely on Internet connectivity. Software measures alone do not generally provide sufficient protection against these attacks. Hardware-based trust anchors are required to effectively protect smart factories. Infineon OPTIGA security controllers provide scalable security for embedded systems, thus protecting machines, data and intellectual property in smart factories.

Smart factories and connected supply chains are presenting many manufacturing companies with new security challenges. Malware, manipulation, sabotage, faulty firmware updates and counterfeit components are examples of digital threats that can bring entire production lines to a halt and may lead to significant costs and loss of image. The tiniest security gap in a company infrastructure can lead to theft of data, intellectual property (IP) and process know-how. Safeguarding this sensitive information calls for tailored solutions that deliver end-to-end protection yet also strike the right balance between security performance requirements and financial constraints. Manufacturers need powerful, reliable and scalable security technologies to safeguard communication between devices and machines within heavily networked infrastructures.

In this context, secured identities for machines provide the anchor for implementing any measures to protect electronic exchange and storage of data. As known from daily life where ID cards or passports are used for identification of humans, secured identities are used by machines to reliably identify each other. But even these secured IDs digitally stored on machines could become the subject of attacks and theft. Hardware-based security solutions based on security chips are the best way to efficiently protect machine identities as well as data and communication. Security controllers provide a greater level of security than concepts that are purely software-based as it is relatively simple to read and overwrite software.

Integrating security chips into all critical nodes helps to prevent unauthorized access to production networks and smart factories. Security chips continuously check component authenticity as well as data and system integrity to prevent manipulation. They are capable of verifying the authenticity of software updates and enable protection of remote access activities. Last but not least they offer robust protection against low-quality, counterfeit spare parts and repair tools. Chip solutions also provide cryptographic functionality such as public key cryptography and key management. Although these functions could be implemented in both software and hardware, for industrial applications, a hardware-based solution such as a dedicated security chip has clear benefits and can add real value for manufacturers.

Silicon manufacturers such as Infineon Technologies use highly secured, certified processes to personalize hardware trust anchors, i.e. to provide a secure identity to each security chip. This often includes a set of keys and certificates stored on the chip in order to allow other devices in the industry automation system to securely authenticate a remote device, to build up a secured connection, and exchange data in a protected way. Proper hardware anchors are security-certified components that are also equipped with measures to protect them against physical attacks. As such they offer protection during transit. In other words, a hardware anchor protection is so robust that it does not need special security measures to be shipped using cost-efficient logistics channels. This not only applies to shipping the security chip itself but, more
Zero-Drift Instrumentation Amplifier with Enhanced EMI Rejection

The MCP6N16 Instrumentation Amplifier provides superior DC performance including low offset voltage, low offset voltage drift, no 1/f noise and high common mode and power supply rejection. In addition, the device supports rail-to-rail operation on both the input and the output across an operating voltage range of 1.8V to 5.5V. Other valuable features include the closed loop gain being set via two external resistors maximizing the ability to control gain accuracy across temperature and the built in EMI rejection capability reducing errors caused from external sources of electromagnetic interference. The MCP6N16 Instrumentation Amplifier is ideal for interfacing to real-world sensors in applications monitoring temperature, pressure, strain, flow and vibration just to name a few:

- Ultra-high precision
- On-chip EMI filtering
- Low voltage/low current operation
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When an industrial automation system is set up, the computing and controlling components are equipped with a specific version of the relevant software package. After this point in time, the smart factory must be protected against unintended changes to the software as this could disrupt production, threaten plant safety and enable know-how to be stolen. At the same time, it must still be possible for software to be updated intentionally, for example, for maintenance purposes or to change certain features. Robust trust anchors also support this use case, for example by enabling a secured boot process. The underlying concept here is that code is only executed after its integrity has been verified in advance by the hardware anchor.

By using state-of-the-art microcontrollers and stand-alone security controllers such as the OPTIGA product family it is possible to implement a hardware-based trust anchor that protects the system software against attacks. The key to successful protection lies in the use of open industry standards that allow seamless connectivity across existing and new systems.

For many manufacturers, protecting their products against counterfeit is a top priority. With its OPTIGA Trust product family, Infineon offers a complete security solution comprising a chip and software for electronic accessories. The chip is based on asymmetric cryptography and is easily integrated into electronic accessories thanks to its compact package (2 mm x 3 mm) and turnkey set-up. In order to check whether or not a part is genuine, the host system sends a challenge (essentially a random number) to the chip in the accessory. The OPTIGA Trust subsequently generates a response using the chip-individual key. If successfully authenticated by the chip, the accessory or replacement part is accepted by the system and can be used without restrictions.

Following the same principle, the OPTIGA Trust E was specifically developed for protection of high-value goods in industrial applications. It features an I2C interface as well as an extended temperature range (-40 to +85 °C). This would be of benefit to manufacturers of wind turbines, for example, who would want to avoid damage to the overall system caused by counterfeit replacement parts. Both the OPTIGA Trust and the OPTIGA Trust E are delivered with code to simplify integration of the chip into spare parts.

Preventing counterfeit through authentication is just the first step in the process of safeguarding the overall system. Further security functions are necessary to protect application-specific information (e.g. customer data and intellectual property) and the overall operating procedure. The OPTIGA Trust P security solution comes as a security controller with a Java Card operating system and can be flexibly programmed for a wide range of applications. This in turn allows the applications to be managed in the field as OPTIGA Trust P supports a Global Platform specification.

The OPTIGA TPM (Trusted Platform Module) portfolio covers the broadest range of security requirements. These security controllers are based on the international standard of the Trusted Computing Group, an association of leading manufacturers from the IT industry. TPMs have already successfully proven themselves in computer applications, and this technology is now making its way into new networked systems and devices such as routers, industrial facilities and cars.

The members of the OPTIGA TPM family have been validated and security-certified according to the Common Criteria certification process. To permit easy integration into a system, the OPTIGA TPM family supports commercial and open source code for Windows and Linux, including derivatives and Infineon tools. The OPTIGA TPM family comprises a broad range of security controllers complying with the standards TPM 1.2 and TPM 2.0, which, depending on the application area, are available for various temperature ranges and offer different interfaces such as SPI, I2C and LPC.

One area where OPTIGA TPMs can be used in industrial applications is secured data transmission or storage. In such an application, the key factor is the combination of
secured hardware and software-based security mechanisms. The use of a TPM supports monitoring and/or protection of the system integrity. This security controller additionally permits reliable component identification, which only allows reliable and trustworthy components to communicate with each other.

For secured remote access, e.g., for system maintenance or software updates, the TPM controls access to the system by means of device authentication. The OPTIGA TPM also provides secured storage for secret keys and protects cryptographic operations. For typical applications such as for the SSL/TLS protocol, keys are stored in the secured store of the TPM rather than in the memory of the main processor and are only processed internally. This offers the advantage that the secret keys are protected against external security risks. In conjunction with TPM and security mechanisms such as encryption, the system code is also protected against manipulation. As a standardized component, TPMs come with a rich ecosystem of available drivers and software stacks allowing customers to easily integrate security with limited integration effort.

### Product News

- **Telit: IoT Executive Handbook 2016 to provide insights for decision makers**
  Telit gathers interviews and specialist articles relating to the IoT and its technological, economic and social impact in its recently published “Internet of Things Executive Handbook 2016”. The Handbook brings together articles by about 30 authors, including acknowledged industry leaders, founders of innovative start-ups as well as internationally renowned scientists, analysts, journalists and writers from USA, UK, Germany, the Netherlands, Australia, New Zealand, Israel, Korea and Switzerland.
  News ID 4083

- **Wibu-Systems joins TCG to leverage trusted platform modules as secure licensing elements**
  To further ramp up the versatility that characterizes its flagship technology, Wibu-Systems is joining the Trusted Computing Group (TCG) and offering CodeMeter as a secure licensing platform for all TPM users to monetize their business. As part of this, Wibu-Systems is also expanding its hardware compatibility lineup to include support for Trusted Platform Modules (TPM). CodeMeter features ever growing support on multiple fronts: an unparalleled range of hardware platforms, including PCs, mobile devices, embedded systems, PLCs, and microcontrollers, a matchless lineup of secure elements that spans across dongles, memory cards, TPMs, cloud, and software-based repositories, and full integration with all major operating systems used in offices and industrial environments.
  News ID 4119

- **AAEON: COM Express type 10 module with 6th gen Intel Core series CPUs**
  AAEON reveals the NanoCOM-SKU, the first COM Express Type 10 Module with the 6th Gen Intel Core Series ULT CPUs. Traditionally powered by SoCs instead of a full-fledged processor due to the limited area, which measures 84 x 55 mm, the NanoCOM-SKU, the latest entry to the company’s NanoCOM product line, greatly improves on that with an Intel Core i7-6600U CPU, along with a maximum of 4 GB of onboard DDR4 memory while drawing about 18W of power in full loading, a string of feats still unheard of in the embedded community. SKUs with other Core processors and RAM are also available.
  News ID 4107

- **DFI: EC700 series system integrates with IoT gateway software solutions**
  DFI joined Microsoft Azure Certified for Internet of Things, offering customers IoT solutions with hardware and software that has been pre-tested and verified to work with Microsoft Azure IoT services. Microsoft Azure IoT is an integrated tool to manage IoT applications which include cloud data storage, security system, and platform services.
  News ID 4106

- **Infineon: plug-and-play NFC security module for smart wearables**
  From fitness trackers and smart keys to chains, watches or wristbands – smart wearables of all kinds are increasingly including mobile pay-ment functionality. Wearable manufacturers are thus challenged to equip even the smallest of devices with security and NFC technologies. The solution lies in a unique NFC security module series launched today by Infineon Technologies in collaboration with Beijing-based MPS. This new plug-and-play solution significantly reduces design efforts for device manufacturers by bundling a high-end Infineon security chip with NFC antenna components and software on smallest PCB footprint. The smallest module of the series measures only 4mm x 4mm.
  News ID 4074

- **ADI enhances IoT sensing portfolio with SNAP sensor acquisition**
  Analog Devices announced the acquisition of SNAP Sensor SA, a privately held company based in Switzerland that specializes in highly innovative vision sensing technologies. The acquisition will advance Analog Devices’ leadership position in sensing and signal processing and build upon platform-level Internet of Things solutions such as ADI’s Blackfin Low Power Imaging Platform.
  News ID 4070
Requirements for IoT and IIoT in the changing connected world

By Oliver Winzenried, WIBU-Systems

This article describes the requirements and solutions to ensure safety and cyber security. It covers aspects including secure boot, firmware updates, licensing and know-how protection as well as new business opportunities for device manufacturers.

Manufacturers of IoT devices need to care about three things: security, security, and security. Consider this: security is required to operate and use IoT devices in the way they are intended, security is required to update and upgrade functionality and features in IoT devices while ensuring that they are not tampered with or hacked, and security is required to monetize features in IoT devices and implement new business models with benefits for both device manufacturers and users. The potential threats are increasing as more and more systems are becoming connected with each other making the integration of security mechanisms a must. A look at the evolution of devices nowadays into IoT devices reveals the benefits.

Table 1 shows the differences. Today, embedded devices are often stand-alone devices with set functionality. Device makers make a one-time sale of the device, and repair or maintenance revenue is optional. In many cases, an individual piece of hardware is used with no operating system or with an easy scheduling OS. This situation is changing: devices are becoming connected, and are being equipped with upgradable features, not unlike the popular app stores for smartphone applications. Using standard hardware and software platforms, development efforts can be reduced and the time-to-market shortened, which promises benefits for the device maker. Furthermore, selling devices at an early stage and with a basic feature set allows additional feature sales at a later point. With these new business models, recurring revenues can be realized. To enable these new benefits for users and makers, the three security challenges have to be solved.

More and more features are software-realized, using the same hardware and software platform. Increasing connectivity then needs a secure identity. The major threats are the following. Counterfeiting by copying software or rebuilding it with standard hardware and OS platforms. Reverse engineering to uncover the actual value-adding algorithms and implementing them without major development efforts. Undermining new business models by enabling all embedded software functions without buying the required licenses. Manipulating devices with faked firmware updates or manipulating existing firmware or configuration parameters, as well as manipulating complete systems with fake identities. The solutions for these challenges rely on the following methods.

Know-how protection: valuable intellectual property in application data and program code is protected via encryption. For performance reasons, symmetric encryption algorithms are used, such as the well-known AES. The required data is decrypted in the memory at runtime, while always staying encrypted on the disk or flash storage. A static analysis is made impossible without access to the plaintext data.

Product protection: creating counterfeit products by copying data or program code to a look-alike system will not work, as the encrypted data and program code cannot be decrypted on counterfeit products. Therefore cryptographic keys need to be stored with protection against cloning.

Flexible licensing: each software-realized feature is assigned a unique license, using different encryption keys. In addition to the encryption key itself, the maker can define how these keys and licenses and the features can be used. The new licensing options include pay-per-use models, time-based licensing, rental and subscription models, and many more. To use these licensing mechanisms and transfer the licenses to a device, license creation, administration, and deployment needs to be integrated in the vendor business process. This can rely on a form of appstore or user license portal with which the user can activate or return licenses himself and is billed accordingly.
Comprehensive RTOS and Middleware for Internet of Things (IoT) Development

**THREADX**
Real-Time Operating System (RTOS)

**USBX**
Host/Device/OTG USB Stack

**FILEX**
Embedded File System

**GUIX**
Embedded GUI Development Framework

**NETX**
IPv4/IPv6 TCP/IP Stack

**TRACEX**
Graphical Event Trace Tool

Try ThreadX for yourself today visit www.expresslogic.com for a free demo
Tamper protection: in order to avoid manipulation or cyber-attacks, the application data and program code is digitally signed. An anchor of trust is the root public key, which must be securely stored on the device. Digital signatures are created using asymmetric cryptographic means. First, the data or program code is hashed (a hash function is a function that maps data of any length to a character string of fixed length. It is also collision-resistant, or a one-way function or both. One example is SHA-256.) Second, this hash value is asymmetrically encrypted using the private key of the code signer. The public key of this code signer key is digitally signed by the root private key. The result is called a certificate, which is attached to the signature of the hash. By using these means, a public key infrastructure can be set up to allow different authorized parties to sign code and data. RSA or ECC (Elliptic curve cryptography) are established as forms of asymmetric encryption. The IoT device itself can then validate the signed data and program code. This makes sure that the data and program code have not been tampered with and that they have been created by an authorized party.

Device identity: connected devices need to be able to authenticate themselves and guarantee privacy by encrypted communication and authenticity by digitally signed communication. OPC UA is an excellent solution, but the secure storage of private keys and the execution of crypto algorithms in a secure and efficient way are again key.

Communication security: connected devices need to be able to authenticate themselves and guarantee privacy by encrypted communication and authenticity by digitally signed communication. OPC UA is an excellent solution, but the secure storage of private keys and the execution of crypto algorithms in a secure and efficient way are again key.

To achieve highest security for IP and tamper protection, a high level of security is required. Unlike the situation with software licensing in the desktop PC area, where attackers are mostly users trying to avoid license fees, the attackers in this new field are often found in organized crime, terrorism, secret services, or industrial competition. What all of these attackers have in common is that they have considerable financial resources for highly professional attacks. Therefore, to inspire trust and confidence in the user and safeguard the family jewels of intellectual property of the makers, cryptographic keys and calculations need to be produced in so-called secure elements. These can be a Trusted Platform Module, TPM, any other solutions like TEE or Trustzone, or an industrial-grade dongle like CodeMeter that contains a smart card chip with the highest security level, certified according to Common Criteria. Using any of the described secure elements makes it possible to develop a truly secure IoT device. The secure element will become an essential small and isolated part of the device.

Flexible storage for multiple licenses: like the apps on a smartphone, different data and applications need to be licensed on an IoT device. Either the secure element needs to be capable of storing many cryptographic keys and license options, like CodeMeter with its large secure key storage of more than 300kB, or external license files with the keys need to be handled and loaded into the secure element, as with TPM 2.0. To realize new business models, this is definitely a must for device makers, and it is not enough to store single cryptographic keys.

Communication security: connected devices need to be able to authenticate themselves and guarantee privacy by encrypted communication and authenticity by digitally signed communication. OPC UA is an excellent solution, but the secure storage of private keys and the execution of crypto algorithms in a secure and efficient way are again key.

The industry-proven CodeMeter technology made by Wibu-Systems is employed in several widely used systems. It allows developers an easy integration into their products and processes and comes with the following components.

Secure key storage is the heart of the technology, either with storage in an encrypted and digitally signed file bound to an existing secure element in an IoT device, or as hardware with a smart card chip. The libraries allow decryption and encryption (AES, ECC, RSA) as well as the storing of flexible license models.
Software integration: powerful and easy-to-use tools allow automatic code protection and offer a protection API. This is available for many operating systems, either without OS modifications using self-extracting protected code, AxProtector technology, or with operating system integration, ExProtector technology. Integration in OPC UA stacks makes implementation easy.

Back Office integration: key and certificate deployment, license deployment, and license administration is made easy with CodeMeter License Central. Customizable connectors using web services are available for use with ERP systems like SAP, CRM systems like Salesforce, or ecommerce applications.

The IEC61131 development tools Codesys, B&R Automation Studio or Rockwell Automation Studio 5000 allow the user to protect his project source code as well as the target code created for the runtime system. The developer can apply the protection by setting certain properties in the application build options. Further features, such as license management, are available when using the extended API to check for licenses.

Secure boot and a check of the signature of software components in the OS loader are integrated in Wind Rivers VxWorks, and similar mechanisms can be used with Linux OS as well as with Uboot, Grip, and UEFI bios.

OPC Unified Architecture (UA) is getting more and more established in many applications. It offers interoperable security functions in accordance with IEC 62541. The distribution of certificates to many networked OPC UA servers and clients and their secure storage is a major challenge for medium-sized applications. Wibu-System CodeMeter solution will integrate OPC UA in its components to make the interoperable use of OPC UA security mechanisms easier in practice.

The DAVE microcontroller developer tools from Infineon offer an integrated solution to sign and encrypt application code and store licenses in an XMC4000 microcontroller, bound to its chip ID with CodeMeter technology.

Kontron, one of the leading CPU board and module manufacturers in the world, has decided to embed a CodeMeter smart card chip on all new designs to make them IoT ready. The integrity of IoT devices can be ensured by using cryptographic methods in a clearly defined process and a secure hardware device for key storage and state machine. A secure implementation of symmetric and asymmetric encryption methods as well as hash functions and functions for signature validation allow the implementation of the proposed mechanisms. New business models can be realized on this basis.

### Product News

- **Maxim: transceivers provide ease of design and robust communication**
  Designers can achieve ease of design, high efficiency, and robust communication for industrial automation applications with the MAXI4853/MAXI4855 and MAXI4943/MAXI4949 family of highly integrated RS-485 transceivers from Maxim Integrated Products. Designers of industrial automation equipment require solutions that provide flexibility and high efficiency. The high integration of the RS-485 family of transceivers with integrated transformer drivers and low drop out regulator simplifies power and data isolated designs. The MAXI4943 isolated RS-485/PROFIBUS DP transceiver, as well as the MAXI4949 transceiver, each provide up to 80% efficiency at 150mA load. Available in full or half duplex isolated RS-485 transceivers, the family supports up to 5kVrms and allows for robust communication up to 25Mbps.

  **News ID 4019**

- **ARBOR: PC/104 SBC module with single-chip, quad-core Intel Atom E3800**
  ARBOR Technology announces the release of Arbor Em104-i230F PC/104 SBC Module. The SBC module is based on the new Intel Atom processors E3800 family. The PC/104 (96 x 90 mm) SBC Module offers a compelling entry price for this form factor, and the Intel Atom processors E3800 family features a low thermal design power from 6 watts to 10 watts. Innovations include a large L2 cache shared by multiple cores and a faster Intel HD graphics unit compared with the previous generation. This turns new applications into visual experiences.

  **News ID 4034**

- **Mouser: wireless connectivity kit with XBee modules**
  Mouser Electronics is now stocking the Wireless Connectivity Kit from Digi International. The Wireless Connectivity Kit offers designers a hands-on way to learn how to use XBee radio frequency modules for device connectivity and sensor networking. The new connectivity kit offers beginners and experienced designers and engineers alike the opportunity to easily incorporate wireless communications into their designs, enabling fast time-to-market, design flexibility, low development costs, and excellent range.

  **News ID 4033**

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**News ID 4033**

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Flexible licensing models in the Internet of Things

By Ansgar Dodt, Gemalto

Cross-linking of machines via the internet has grown tremendously in recent years. An increasing amount of intelligent software-based hardware is being deployed in industrial production. Engineering companies are therefore shifting their focus onto software development rather than hardware development, with the consequent need for license management.

The Internet of Things (IoT) is turning engineering companies into software providers. Thus, securing intellectual property (IP) is especially important. License management plays a major role in this. New licensing solutions not only protect embedded software; they also entail new business opportunities. These include flexible licensing models such as pay-per-use, function and capacity-based licensing, software keys and subscriptions. This type of licensing requires constant changes, in order to meet the user demands. Therefore, companies need to implement Licensing Lifecycle Management.

Certain licensing models are more suitable for the IoT than others. Licensing with physical keys like Smart Card Chips attached to control boards, which work just like the well-known dongles, limits the access employees have to certain machines or functions. However, software keys are more appropriate in the IoT because they are more cost-saving than chips or dongles. The latter need to be delivered, repaired, or possibly replaced if an employee loses the key.

Yet, the software is only as secure as its key. An example: if the keys are stored in software, they can be stolen or misplaced. It is for this reason that companies should put their trust in special platforms like Hardware Security Modules (HMS) when it comes to key management. Keys can simply be stored on and managed from the hardware, where they are better secured and can be more easily controlled than from software. With unified key management and built-in, granular security controls users can manage the encryption very accurately.

Function-based licensing is especially interesting for engineering companies that deliver the same device to customers with different requirements. This form of feature monetization enables integrating a software into the machine on which the functions are then unlocked. This allows a variety of products and at the same time doesn’t give the user the impression of paying for functions he doesn’t even need or use. Merely the functions that actually get used are billed. These can be offered in bundles according to what applications are in high demand. With this kind of flexible licensing vendors can easily increase their revenue.

Another option to choose from is pay-per-use licensing. With this model companies can also bill usage subsequently if it goes over the originally fixed amount. Usage-based licensing helps equipment manufacturers capture the actual use of their machine, as the data containing this information is forwarded to them. This helps capturing the exact way the user has utilized the machine – something that was not possible with traditional models, as only the access to software and not the usage could be restricted. An example: the use of a robot during an operation can be calculated afterwards, if it was used for more occurrences than originally planned. The software development also profits from utilization data as usage reporting functions can be activated. This provides information on which software functions were well-perceived by the users and which need to be optimized.

All these licensing models can be combined with one another. By licensing application functions separately, an-own license metric can be applied to each function. Thereby different combinations of licensing terms are possible for each deployment. Customer A would like a subscription-based core module, as well as a fixed number of licenses for different add-ons. Customer B on the other hand orders the same core module but on a pay-per-use basis. He would like to subscribe to the add-ons. Numerous combinations are possible: licenses, simultaneous use, pay-per-use, time-based licenses. The device sent to the customer is always the same.

Flexible Licensing requires continuous Licensing Lifecycle Management (LLM), as
most changes become necessary after the granting of a license. This means that plant manufacturers need to be able to react to their customers changing demands quickly. A user that originally booked 10 Gigabyte data volume in a capacity-based model might need 20 Gigabyte in the future. In order to process these customer bookings smoothly, companies need a tool that optimizes and automates (internal) processes. A good LLM-Solution offers the possibility of updating software remotely or easily adding and removing capacities and functions without the customer noticing a thing.

The IoT makes the development and protection of embedded software a challenge for engineering companies. Intelligent production also enables new business models, with which companies can increase their profits. This makes the IoT a great opportunity for plant manufacturers.

**Product News**

- **Mouser stocking Infineon’s XMC4700 Relax series evaluation kits**
  Mouser Electronics is now stocking XMC4700 Relax, Relax Kit for 5V Shields, and Relax Lite evaluation kits from Infineon Technologies. These kits are designed to evaluate the capabilities of the XMC4700 microcontroller and Infineon’s free-of-charge, Eclipse-based integrated development environment, DAVE. With the XMC4700 Relax, Relax Kit for 5V Shields, and Relax Lite kits, engineers can prototype designs for a variety of industrial and consumer applications, including automation, construction and agricultural vehicles, motor control, solar energy systems, and power supplies.
  News ID 4099

- **Infineon enables new high-performance FPGA development platform**
  Infineon Technologies announced that its Digital Point-of-Load DC-DC regulators with full PMBus capabilities are featured in the Kintex UltraScale development board. A key driver for the design flexibility of the board is the superior PMBus connectivity of the IR3806x family. Configurations can be stored in internal memory. In addition, PMBus commands allow run-time control, fault status and telemetry.
  News ID 4072

- **Mouser: NXP’s QN902x Bluetooth SoCs and Dev Kit now shipping**
  Mouser Electronics is now stocking QN902x ultra-low-power Bluetooth systems-on-chips and the QN9020 Bluetooth development kit from NXP Semiconductors. QN902x SoCs are highly integrated ultra-low-power, high-performance Bluetooth v4.0 Low Energy solutions for Bluetooth Smart applications such as sports and fitness wearables, human interface devices, and app-enabled smart accessories.

- **Vector Informatik: model-based E/E development of commercial vehicles**
  PREEvision software from Vector Informatik is now available. It provides users with expanded AUTOSAR support and the ability to develop network communication for commercial vehicles according to SAE J1939. When designing CAN FD networks according to SAE J1939, users will benefit from the simplified model-based E/E development for commercial vehicles such as trucks, buses, and construction and farm machinery.
  News ID 4032

- **Lauterbach offers Windows 10 aware debugging on ARM architecture**
  Lauterbach has announced that its TRACE32 development tool now supports Windows 10 aware debugging on the ARM architecture. Lauterbach’s TRACE32 is an integrated, universal development system that can be connected to most workstations and can contain any combination of instruments which may be required for microprocessor systems development, including debugger, tracing tool, logic analyzer, protocol analyzer and similar tools.

  Thanks to its extended MMU support, TRACE32 allows access to the complete virtual address space. This gives the developer the ability to switch to the context of any process and inspect its status at any time. This means that you can debug drivers and/or multiple applications simultaneously.
  News ID 4025

- **Keysight: new chipsets enable oscilloscopes with bandwidths above 100 GHz**
  Keysight announced a technological breakthrough for building highest-bandwidth oscilloscopes with the successful turn-on of chipsets that take advantage of Keysight’s Indium Phosphide semiconductor technology. The new chipsets will enable Keysight to deliver real-time and equivalent-time oscilloscopes in 2017 that offer bandwidths greater than 100 GHz with significantly better noise floors than what is currently on the market.
  News ID 4022
MicroTCA for highly sophisticated embedded computing applications

By Rüdiger Cölln, Pentair

Besides high computing power, systems for high performance applications like data acquisition or imaging processing require high-grade availability and easy manageability. To provide these a commercial off-the-shelf system (COTS) is needed. MicroTCA meets these requirements while keeping the cost down and offering the best solution for highly sophisticated applications.

Designers of embedded systems face two significant challenges. While performance and system stability requirements are constantly increasing, they have to deal with commercial limitations in parallel. Existing platforms like Industrial PCs, COM Systems or eNUC solutions are designed to deliver a certain computing power while keeping the product cost low. These systems, however, are definitely not the right choice for high performance applications such as data acquisition or image processing. In addition to high computing power, such applications require a high grade of availability and easy manageability. To cover these technical and commercial requirements a commercial off-the-shelf (COTS) system is needed.

COTS systems offer many of benefits to their users. MicroTCA is one PICMG standard and describes a modular standard for building high performance switched fabric computer systems in a small form factor. It has its origin from the open standard AdvancedTCA which was initially developed for telecom applications. MicroTCA preserves many of the important philosophies of AdvancedTCA, including basic interconnect topologies for high speed data transfer and the management structure to ensure a high grade of availability. Using open standards enables an application designer to concentrate their development on the application-specific part of their product. They don't need to worry about the infrastructure or environment of the system since this is already defined by the open standard specification.

The core specification, MTCA.0, defines the basic system, including backplane, card cage, cooling, power, and management. A variety of different sized AMC modules are supported, allowing the system designer to use as much or as little computing and I/O as necessary. By configuring highly diverse collections of processing and I/O AMCs in a MicroTCA shelf, many different application architectures can be easily realized. Because of its modularity and flexibility, the MicroTCA standard provides the best infrastructure and environment in almost all markets such as industrial control and automation, test and measurement, traffic control and transportation. Possible applications could be digital video and image processing, automation and machine control systems or electronic signal processing.

Another important function of MicroTCA is the Ethernet hub with the system management. Both functions are covered in the MicroTCA carrier hub (MCH) which typically occupies one full-size AMC slot or even two full-size slots in a redundant architecture. The MCH provides the central system management and delivers data switching and hub functionality for the various system fabrics including Gigabit Ethernet (GbE), PCI-Express (PCIe Gen 3), Serial Rapid I/O (SRIO Gen 2) and 10GbE (XAUI). Further to that the MCH is also able to provide a centralized clock distribution to all AMCs in the system.

With all the mentioned features and benefits MicroTCA is one of the best choices for high performance applications. Some applications, however, only require a low number of AMC slots. For these applications the MTCA systems which are currently available may be oversized and therefore not cost-efficient. In order to cover this demand Pentair, along with partner N.A.T., has developed the 2-slot MicroTCA system with an embedded MCH (eMCH). Both AMC slots can be used for payload boards whilst retaining the switch and enhanced management functionality. This system offers the comprehensive performance of MTCA and keeps the form factor and cost at a manageable level.

This MTCA system is designed to host two mid- or even full-size AMC boards. The card cage is fully EMC-shielded, so the slots could be used for any kind of different processor or I/O cards. The fact that this chassis is developed in accordance with the PICMG MTCA.0 (R1.0) specification guaranties full interoper-
ability with all modules which are compliant to the PICMG AMC.0 (R2.0) specification. This makes it easy for every embedded system designer to create the desired application without worrying about the system infrastructure including cooling, switching and managing.

Power supply is also part of this defined environment. The power modules (PM) are usually installed in specially designated slots in the chassis occupying valuable space. In this system the PM functionality is put on a mezzanine board behind the backplane, providing 12V and all the specified power management functions. The included power module supplies 150W, which is more than sufficient to serve the payload boards as well the embedded MCH and the cooling units. Having the power module mounted on a mezzanine card decreases the required space and consequently the cost as well.

One big issue in small form factor applications is heat dissipation. Cooling is one of the most important functions to avoid overheating and ensure a high grade of system availability. In fact, the ambient temperature does have an impact on the lifetime of the components in the system as well as on the AMC modules. Therefore the MTCA system is equipped with a powerful cooling unit, providing a free blowing air flow of more than 2m³ per minute. The integrated air filter protects the AMC against dust and dirt and can be replaced easily for service.

The speed of the fans is normally managed by the MCH. The MCH reads the temperature sensors on the AMCs and in the chassis, and then determines the optimal fan speed. The communication between MCH and cooling unit (CU) usually happens through the IPMB bus. This strategy, however, requires a powerful IPMC management processor on the CU with dual IPMB connections to the MCH. In order to meet the commercial challenge, Pentair uses a lower-cost implementation in their small 2-slot chassis. This CU uses a small processor with just a private I2C connection to the MCH. In this case, the MCH includes special firmware that treats the low cost CU as if it were a normal CU. From the user perspective there

![Figure 2. Backplane topology 2-slot MTCA with eMCH](image)

![Figure 3. NAT Embedded Micro carrier hub](image)
Another important function of the eMCH AMC is identified. Further the eMCH provides the clocking and a 1Gbit Base fabric to the systems front panel. That allows full management and fault isolation of the power supply, the cooling unit and of course the AMCs. Another highlight of this system is the embedded MicroTCA carrier hub. Why does such a small system need a MCH? For N.A.T. as well as for Pentair it’s very important to maintain their products within the standards of PICMG. So, the major goal here is to provide an attractive platform with regard to commercial and technical aspects and still keep the whole system compliant to the open standard specification. The eMCH supports and manages the AMC modules, the cooling units and the load sharing of the system. As soon as an AMC is inserted the MCH starts communication through the IMPI bus, reads the e-keying of the AMC and enables the power once the AMC is identified. Further the eMCH provides the clocking and a 1Gbit Base fabric to both AMC slots and a 1Gbit uplink through the systems front panel. That allows full management and fault isolation of the power supply, the cooling unit and of course the AMCs. The simple construction of the system makes it very service-friendly; individual components are easy to replace or maintain. The top cover can be removed or insert AMCs even during operation. The feature was originally required for high availability systems in the energy or telecom market. Even for systems in automation or transportation applications it may be important to replace an AMC without the need to shut down the system. Via SNMP or RMCP the MTCA system can be integrated in existing management architectures. The intended configuration can be set through NATView, which is a visualization and management tool for MicroTCA. The embedded MCH is fully compatible to all existing NAT MCHs, which maintains a clear migration path from a small system to a larger system in case the application grows and requires a larger infrastructure.

Another important function of the eMCH is hot swap ability. This allows the user to remove or insert AMCs even during operation. The feature was originally required for high availability systems in the energy or telecom market. Even for systems in automation or transportation applications it may be important to replace an AMC without the need to shut down the system. Via SNMP or RMCP the MTCA system can be integrated in existing management architectures. The intended configuration can be set through NATView, which is a visualization and management tool for MicroTCA. The embedded MCH is fully compatible to all existing NAT MCHs, which maintains a clear migration path from a small system to a larger system in case the application grows and requires a larger infrastructure.

is no difference in function or performance between the regular CU and the low cost CU.

Besides cooling and power supply, the backplane of the system is another important device with huge impact on performance. The common purpose of a backplane is interconnection between all devices, including but not limited to the AMC modules. A high data transfer rate requires sophisticated routing as well as test capabilities to ensure signal integrity. As mentioned already, MicroTCA offers different interface protocols for high speed data transfer. SATA, Fat Pipe and the Extended Fat Pipe for PCI Express, SRIO and XAUI are connected between the two slots and offer a data transfer rate of up to 64Gbs.

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Figure 4. 2-slot MTCA System with eMCH

Small universal cases with efficient heat dissipation are in great demand. While processor performance is increasing steadily, systems are becoming smaller and must also support the increasing heat dissipation requirements of different bus standards used in embedded and automation deployments.

News ID 3995

Pentair: small form factor cases for various board standards
Pentair offers customized cases with fanless (conduction) cooling based on the Schroff Interscale platform for the most common board standards: ATX, Micro ATX, Mini-ITX, Embedded NUC, Pico ITX, Raspberry Pi 2 Model B as well as Arduino. Small universal cases with efficient heat dissipation are in great demand. Pentair offers customized cases with fanless (conduction) cooling based on the Schroff Interscale platform for the most common board standards: ATX, Micro ATX, Mini-ITX, Embedded NUC, Pico ITX, Raspberry Pi 2 Model B as well as Arduino.

News ID 4002

Congatec: COM Express module with new AMD G-Series SOC
Congatec has expanded its COM Express portfolio with the launch of the new AMD G-Series SOC (called Brown Falcon). Compared to modules based on the previous generation of AMD Embedded G-Series SOCs, the new conga-TR3 with dual-core AMD GX-217GI processor provides up to 30% more graphics performance and 15% more overall system performance. Additionally, the AMD G-Series SOC supports faster and more power-efficient DDR4 memory, PCI Express Gen 3.0 for demanding customer-specific extensions as well as very powerful DirectX 12 graphics acceleration. This positions the new module as the first choice for many mainstream embedded applications. With a maximum configurable TDP of 12-15 watts, it is also ideal for fanless designs.

News ID 4017

Syslogic: fanless box PC for industrial automation
With its Compact M series, Syslogic is setting its sights on the automation market. Thanks to the quadcore processor from the Intel Atom E3845 series, the Box PC masters demanding control tasks and their visualization. And its interface allocation has been tailor-made to meet the requirements of automation specialists. For the first time, a Syslogic device features switchable COM interfaces. These interfaces can be configured as an RS232 or as an RS422/485 with galvanic isolation. The basic configuration also includes LAN, CAN, USB and Ethernet interfaces. Optionally, the device can additionally be fitted with WLAN, GSM, UMTS and LTE. Syslogic has expanded its COM Express portfolio with the launch of the new AMD G-Series SOC (called Brown Falcon). Compared to modules based on the previous generation of AMD Embedded G-Series SOCs, the new conga-TR3 with dual-core AMD GX-217GI processor provides up to 30% more graphics performance and 15% more overall system performance. Additionally, the AMD G-Series SOC supports faster and more power-efficient DDR4 memory, PCI Express Gen 3.0 for demanding customer-specific extensions as well as very powerful DirectX 12 graphics acceleration. This positions the new module as the first choice for many mainstream embedded applications. With a maximum configurable TDP of 12-15 watts, it is also ideal for fanless designs.

News ID 4017
IBASE: Mini-ITX for 6th gen Intel Xeon E3 and Intel Core processors

IBASE is releasing a new mini ITX motherboard, MI991, with a Socket H4 (LGA1151) socket and the Intel C236 chipset. System integrators can benefit from the MI991 equipped with space-saving compact configuration and rich I/O design for maximum flexibility. The MI991 supports up to three independent displays via Intel HD Graphics: DVI-D, HDMI, and DisplayPort, as well as DDR4 32GB limitation on two memory slots. It uses the more expensive Intel i211 controller instead of Realtek controllers for the motherboard alongside the Intel chipset i219 NIC device. Friendly features also include eight USB, four serial ports, four SATA III as well as two Mini PCI-E, a mSATA and a PCI-E(16x) expansion slot.

Portwell: ETX 3.0 module to extend legacy applications and lifecycles

Portwell announces the release of the PEM-E205VLA, an ETX 3.02 (95 x 114mm) computer-on-module based on the Vortex86DX3 processor. The PEM-E205VLA ETX module delivers optimized value and service levels by running multiple applications securely and reliably on virtualization-optimized platforms. Alongside of energy efficiency and legacy-interface support, the PEM-E205VLA is designed with powerful 32-bit multi-core processor technology and programmable graphics processing unit compatible with Microsoft Windows-based, Linux and many other popular 32-bit RTOS.

AAEON: secure small-scale networks with new gen processor

AAEON unveils the FWS-2260 network appliance, a table-top device meant to bring security to small-scale networks. Available in both dual and quad-core versions of Intel Celeron N3000 Series SoC, the device is a multi-purpose network appliance that empowers Intrusion detection/prevention, WAN optimization, network access control, load balancing, web content filtering, unified threat management, and wireless network security.

ARBOR: Broadwell COM Express Type 6 module supporting ECC memory socket

ARBOR Technology released the ARBOR EmETXe-i87M2 COM Express Type 6 Module with ECC Memory socket support. Built on Intel’s new 14nm process technology, the EmETXe-i87M2 is adopting 5th generation Intel Core i7-5700EQ 2.6 GHz processor, and supports the Intel Turbo Boost Technology, enable to increase increasing the CPU processing speed from 2.6GHz to 3.4GHz clock speed to deliver breakthrough CPU performance, excellent graphic capability as well as the enhancement in security and management functions, which make the module ideal for intelligent application in several market segments, such as medical, digital surveillance, gaming, digital signage, communication and defense.

SGET: 2.1 specification of multi-platform Qseven standard released

The Standardization Group for Embedded Technologies has released its 2.1 version of the Qseven standard. Qseven is a well-established, legacy-free standard for technology-independent small form factor computer modules which includes standardized thermal/mechanical interfaces. It has been well adopted in the market and supports x86 and ARM technologies in COM-compatible environments. For developers of small form factor devices this is a strategic and cost saving benefit, as the decision for one or the other hardware does not affect the mechanical design of the devices. This enables risk-free changes between the platforms and a wider scalability by means of cost, performance and specific features.
Energy-efficient architectures: economical, yet powerful

By Konrad Zöpf, TQ Group

With modern ARM processor architectures, such as Cortex-A7, Cortex-A8 and A9, many functions are already integrated into the CPU. This way, cost-optimized systems can be generated in a simple manner.

We are being required more and more to save energy, whether it is in the household using LED bulbs and energy-efficient appliances or in the automotive industry with electric drive units. In order to be able to develop devices that handle resources economically, the manufacturers of semiconductors are required to pay attention to energy efficiency with the development of electronic components. New standards have particularly been set in the area of CPU manufacturing in recent years. The aim is to reduce the power loss, save costs and increase the processing performance. Through the use of newly developed technologies, such as high speed and data throughput at low clock frequencies and low power loss, the future challenges for CPUs can be managed.

All chip manufacturers of various process architectures are working on these technologies and are virtually competing with one another to secure themselves market shares with their products: Intel focuses on the graphics performance in order to control several 4K displays. With the ARM CPUs, the focus is more on the peripheral units, so that barely any additional building blocks are required to realize a system. It is assumed that Intel will develop additional processors in the next few years on the basis of new technologies, in order to compete with ARM and others with competitive products. Conversely, it can also be observed that manufacturers that develop ARM-based CPUs are moving in the direction of the Intel performance class, in order to stand up to the competition and not lose any market shares to Intel.

Even if the two typical embedded architectures - ARM and Power Architecture - are still not able to keep up with the processing performance and integrated graphics performance of Intel, they are not only scoring points regarding the expanded temperature range and the very low maintained power loss. On the basis of chip surface, they offer significantly higher integration of the functionality and available interfaces in a single-chip solution.

ARM even has the highest performance per chip surface compared to the other architectures and is a leader in chip technology. Rapid further development is presently being observed with the ARM CPUs of several manufacturers: in respect of efficiency, in addition to the current processor cores with 32-bit architecture, such as Cortex-A7, Cortex-A8 and Cortex-A9, ARM will soon be offering processor cores that are based on a 64-bit architecture, such as Cortex-A53 or Cortex-A72. In spite of the increasing efficiency, they can continue to show a very good ratio between processing performance and power loss.

This advantage is being used by the ARM chip manufacturers and they are integrating the appropriate application-specific interfaces for virtually every market. A price-optimized and function-optimized derivative on the basis of various ARM processor cores is available for all industries, whether it is for the automotive industry, networking (figure 1), automation or control and regulation technology. In addition to this, it appears that enhanced power management functions are being integrated, in order to meet the market requirements even better with regard to saving energy.

With ARM CPUs of various manufacturers, many interfaces have already been integrated into the CPU, such as graphics, Ethernet, CAN, A/D converters, SPI and digital I/Os. This means that due to the versatility of the interfaces, most of the system requirements can be implemented without major additional effort. Through the variety of interfaces and the free selection of an operating system, the ARM processors are universally implementable. Driven by the good application support of the CPU manufacturers for various market segments, more and more devices are being developed on the basis of this architecture.

Figure 1. The TQMLS102xA module combines the ARM architecture in the form of the LS102xA Freescale processor, with the QorIQ communication technology. The integrated graphics controller supports applications with a display and touch screen.
For the ARM CPUs, the operating systems are being used which are specifically adapted to the processor type. Depending on the project requirements, a relevant operating system, such as Linux, Windows Embedded or a real-time operating system by Green Hills, QNX or Wind River or else Bare Metal, can be selected. The latter has the advantage that the user is provided with the optimum performance. With this, even complex control units can be realized with appealing graphics performance, which do without the overhead of an operating system.

The embedded specialists of TQ have taken advantage of the benefits of the ARM architecture regarding power loss, functional scope and price saving. On the basis of available CPUs, they have developed and planned new computer models in order to continue offering customers innovative produces. It is basically recommendable for customers to compare several architectures that come into question regarding an overall concept for a device to be developed, in order to be able to assess the advantages and disadvantages for a new system.

With regard to the space requirement and power loss in direct comparison to the processing performance, diversity of interfaces and chip size, the ARM architectures have a clear advantage over the other architectures (figure 2). Together with an operating system that is tailored to the architecture, price-optimized and function-optimized systems can be realized, which can be used efficiently.

ARM CPUs lead to a saving of energy costs, which should not be underestimated, due to the low power loss and an average service life of 10 to 15 years. Therefore, devices that have been developed on the basis of this architecture make a significant contribution in the direction of energy efficiency and environmental awareness.

![Figure 2. Strengths of the various processor architectures](image)

**Product News**

**SECO: gaming PC features AMD Embedded R-series SOC**

The best processor platform is of little value in high-end casino games though, if it cannot be easily integrated into applications. Therefore PSM Gaming developed the new G920 CHILI gaming system. It has been designed to meet the specific needs of high-end casino gaming and to fulfill all the international gaming standards and legal requirements. Operation is completely fanless. And that goes for each of the configurable performance levels - from 12 to 35 watts - of the new AMD Embedded R-Series SOC processors. OEMs can even integrate the maximum 35 watt performance of the AMD R-Series SOCs into their designs, and therefore offer players a new gaming experience of the highest quality.

News ID 4036

**congatec presents roadmap for SMARC 2.0, Qseven 2.1 and COM Express 3.0**

congatec announced at Embedded World that it fully supports the upcoming new SGET and PICMG Computer-on-Module specifications SMARC 2.0, Qseven 2.1 and COM Express 3.0. Modules complying with these standards are already in development and will be announced in time with the launch of the next processor generations. congatec will fully support the SMARC 2.0 specification.

SMARC 2.0 modules will become available for the full range of relevant processor technologies – from the Intel Atom processor to various ARM designs. congatec continues to support all current low-power processors for Qseven 2.1 designs as well.

News ID 4011
Unmanned robot controlled by an COM Express-based rugged handheld

By Norbert Hauser, Kontron

In critical environments, military and civilian task forces often use unmanned robots to scout the terrain and eliminate hot spots. Roboteam has developed the ROCU-7, an intelligent controller that easily does its job under even the toughest conditions, for these mission scenarios. Kontron’s COM Express mini module is a key element in this solution.

The specialists in the successful US television series The A-Team were the inspiration when Yosi Wolf and Elad Levy founded their company, Roboteam, in Israel in 2010. Their plan was to develop a specialized task force of unmanned robots in order to support soldiers in the field, and also to simplify the work of governments and civil defence authorities. But in this case, it is an A-Team made of electronics and iron. Today the company has 35 employees at its headquarters in Tel Aviv and a 10-member team in Maryland in the USA. As former members of a special unit in the Israeli army, the company founders were familiar with all the requirements that military operations demand when critical dangers have to be defused. Their objective was to develop modern unmanned systems that are easy to operate no matter how difficult the setting and that protect the lives of soldiers and members of the emergency services.

Today Roboteam develops and produces a variety of highly specific unmanned platforms and control units that can be used for defence, law enforcement or security missions. The robot solutions of the Israeli company are used for tactical military missions as well as for handling explosives or chemical, biological, radioactive or other hazardous substances. However the unmanned devices are also used to investigate tunnels and underground environments, as well as for search and rescue. Dozens of experienced engineers are steadily at work to develop unmanned systems that are as light as possible and rapidly available and that offer users a broad range of functions for different uses. Customers include the US military and the Israeli army, as well as governments, special military units from various countries, and SWAT teams and elite units all over the world.

Based on their own military experience and intensive talks with users, the company founders set clear priorities for the development of unmanned systems right from the start. The solutions that Roboteam offers should be compact and light-weight, as well as easy to operate. In addition, the application areas for unmanned robots also demand 3D representation, video communication and the necessary ruggedness for hard use in the field. Compliance with military standards is mandatory. From the very beginning, the development teams stressed the importance of an ergonomic product design and human-machine interfaces that conform to industrial standards. It should be possible to integrate the control units for the robots into any networks with different nodes. For its customers, Roboteam also stands for short production times, quick upgrades and good support. These quality standards that the manufacturer sets are also a challenge for its suppliers. Around three years ago, the developer team was looking for a small, flexible CPU that could easily be integrated into the new ROCU-7 control unit. After a short market analysis, they found what they were looking for at Kontron. This company developed the COM Express mini module in order to implement power-saving computer-on-modules with greater x86 performance on a credit card-sized footprint (55 x 84 mm). The ultra-compact module with COM Express pin-out type 10 satisfied all the requirements with regard to functionality and performance that Roboteam expected from an ultra-small embedded solution for the ROCU-7 control unit. In addition, the price-performance ratio and global customer support at Kontron fit the bill. Kontron COM Express makes a significant contribution to the flexibility and broadly diversified deployment scenario of ROCU-7, because it supports widespread commercial standards and also industrial standards. This makes it possible to use the controller in this especially critical setting. As a result, the systems keep working even when subjected to extreme temperature fluctuations and challenging environmental conditions such as extreme weather, severe dust formation or almost impassable terrain. The name ROCU-7 stands for Ruggedized Operator Control Unit and classifies a handheld with a 7-inch monitor. Roboteam also offers a version with a
5-inch monitor. An operator can control various unmanned systems with just one of the rugged handhelds from the ROCU-7 series, no matter whether the device is a terrestrial robot, an unmanned aerial vehicle (drone) or a system for use in water. The Windows-based handheld allows continuous control of all the units that are connected. This includes operation of the unmanned robot as well as control of its tactical mission. The rugged controller works with Windows 7 and has numerous standardized interfaces to various solutions. It is possible to control the entire mission management and carry out diverse independent actions.

For even more convenient usability, Roboteam equipped its rugged controller with a number of control elements. This includes joysticks, in addition to rugged switches that can also be operated with gloves. The unmanned units can consequently be precisely controlled and positioned at the site with pinpoint accuracy. The open interfaces make it possible to use the intuitive platform that Roboteam developed, along with complex external systems that users may be using. The COM Express modules support this deployment scenario because they have been specially developed for use in multi-touch display systems and consequently perfectly fulfil the specifications for the embedded solution that Roboteam was seeking for its controller. Roboteam didn't use any of the commercially available standard rugged tablets for the ROCU-7. Instead the company developed its own solution and used the best components on the market, such as the COM Express mini modules. This allowed designing smaller and more rugged units and equips them with exactly the control elements that the company had in mind. Individuality was also a key factor for the Roboteam developers when it came to the screen. The rugged controller monitor can also be easily read in bright sunlight and it even individually adapts to difficult lighting conditions. Its light components also support use at night. The unmanned unit that is to be controlled can be clearly and precisely identified on the highly specialized screen in all light conditions. This allows a clear look at the unmanned robot at all times in all environments. So-called starlight readable screens are an important tool, especially for use in tunnels or for underground surveys.

An important factor in selecting Kontron was the importance of light and compact designs for the Roboteam systems in order to simplify use in the field. The unmanned robot and ROCU-7 control unit together weigh a total of only around 16 kg. Task forces can carry the complete system on their backs across the terrain until they reach the point at which the robot has to enter the danger zone. This means that the soldiers do not have to go directly to the site of use in order to do their job. Instead, the munitions that are to be put in place are laid in the robot gripper arm. The robot then drives by remote control to the site and deposits the munitions as required. Once the robot has left the danger zone, the munitions can be set off from a distance. Consequently neither the soldiers nor the robot are endangered. Conversely, this also makes it possible to retrieve critical materials from dangerous settings and securely decommission them in order to protect those involved.

Figure 2. The COM Express mini module has now been working in Roboteam controllers for more than three years and has proven itself in all its missions.
**PRODUCT NEWS**

**ARBOR: Android-based patient infotainment terminal**

ARBOR Technology announce the availability of ARBOR M1860, an 18.5-inch patient infotainment terminal based on the TI OMAP 4470 Cortex-A9 CPU, to complement its growing line-up of patient healthcare products. With the introduction of the M1860, Android 4.1.1 joins Windows Embedded and Linux as the available operating systems for ARBOR’s patient infotainment terminals. This provides a valuable alternative for customers creating applications for various healthcare scenarios where the additional OS option may reduce development time and deployment cost.

*News ID 4079*

**Axiomtek: all-in-one Mini POS to shake retail world**

Axiomtek introduce the arrival of SHB140, a new 4.1.1 joins Windows Embedded and Linux as the available operating systems for Axiomtek’s patient infotainment terminals. This provides a valuable alternative for customers creating applications for various healthcare scenarios where the additional OS option may reduce development time and deployment cost.

*News ID 4079*

**Axiomtek: din-rail field controller simplifies IoT application deployment**

Axiomtek introduce the arrival of SHB140, a new PICMG 1.3 full-sized single board computer based on the 14nm 6th generation Intel Core processor in the LGA1151 package with Intel Q170 Express chipset. The high performance SHB-based CPU card supports PCI Express Gen 3.0 with data rates up to 8.0 GT/s and comes with two DDR4-2133MHz un-buffered DIMM sockets supporting up to 32 GB. Combined high-bandwidth PCI Express for frame grabbing and conventional PCI expansion for motion capture, the Intel Skylake SHB140 is an optimum solution for machine vision and smart factory automation applications. This high performance PICMG 1.3 slot SBC also features an integrated Intel AMT 11 and TPM 1.2 for higher security and easier maintenance.

*News ID 4076*

**Lanner: modular network appliance features Intel Xeon E3-1200 v5 series**

Lanner has unveiled its first Intel Xeon Processor E3-1200 v5 Series, based 1U modular network appliance NCA-5210, featuring DDR4 memory support and the I/O boosting, comprehensive Intel C236 Series chipset, and flexible LAN configurations. Built with Intel’s next generation 3-D Tri-gate transistors and the adoption of the E3-1200 v5 series comes with the promise to enhance processor performance, while lowering the TDP. A new socket type, LGA 1151, has also been released for the die-shrinking architecture.

*News ID 4056*

**Kontron joins Open Invention Network**

Kontron has become a community member of Open Invention Network (OIN). The Open Invention Network was founded over 10 years ago by companies like Google, IBM, NEC, Philips, Red Hat, Sony and SUSE to support organizations that build or use Linux-related technology. The cornerstone of OIN is a community of around 2000 companies and projects that fosters patent-aggression in the Linux System “no fly zone”. Every company in the OIN community pledges not to use Linux System patents aggressively against each other. This pledge acts as the starting point for a cultural norm for patent non-aggressions in Linux and adjacent open source technologies.

*News ID 4051*

**Axiomtek: din-rail field controller**

Axiomtek has released ICO310, the industry’s first field controller with PoE PD function. The ICO310, a robust din-rail Industrial IoT embedded system, supports low power Braswell Intel Celeron processor N3060 1.6 GHz dual-core or N3160 1.6 GHz quad-core with up to 8GB DDR3L system memory, delivering high performance and low power consumption at competitive price. The outstanding Braswell based embedded field controller offers complete expandability and full featured I/O, including two Gigabit LAN ports, two RS-232/422/485 ports, two USB 2.0 ports, two USB 3.0 ports, one VGA port, and one DIO interface. Two PCI Express Mini Card slots, one SIM card slot and three internal antennas are available for 3G/GPRS and Wi-Fi connections.

*News ID 4045*

**accede: compact modbus module for smart metering**

Smart Metering, also known as “Intelligent Metering”, is playing an increasingly important role in small and medium-sized applications. One example of this is consumption data recording in all sizes of residential complexes, commercial buildings and other commercial properties. Here, the Smart Metering is either integrated in the central building technology or it provides the measurement data to administration bodies or billing centres via the Internet as a standalone solution. In accordance with its nature, one of the core tasks of Smart Metering is naturally data acquisition and subsequent data transfer.

*News ID 4042*

**Pixus: double rail extrusions for rugged subracks**

Pixus Technologies now offers double rail extrusions with dual mounting. The rails provide the modular framework for electronics enclosures and feature mounting holes for a second screw, providing more stability and strength for a modular enclosure. The rails have been tested and used in German railway applications for high resistance to shock/vibration and the ability to handle extreme loads. The extruded aluminum rails come in front and rear versions and with various interfaces.

*News ID 4020*

**Hitex: TESSY V4.0 with full C++ support**

The new major version 4.0 of TESSY, the tool for automated unit / module / integration testing of embedded software, now provides support for the test of test objects written in the C++ programming language. TESSY is able to automatically create stub functions for called methods and can also test templates and derived classes. This offers a comparable comfort for the test of software written in C++ as for software written in C.

*News ID 4018*

**Toradex: embedded computer based on NVIDIA Tegra K1**

Toradex announces its latest embedded computer based on the powerful CUDA capable NVIDIA Tegra K1. This new embedded computer or System on Module will further extend the portfolio of Toradex’s ARM-based SOM families. Apalis TK1 is ideal for building high-end embedded products, which needs advanced performance or supreme graphics, along with high-speed connectivity interfaces, mostly targeting applications in vision, and GPU-accelerated parallel processing. The Apalis TK1 is pin-compatible with the existing Apalis SOMs based on NVIDIA Tegra 3 and NXP i.MX 6Quad/Dual processors. Connectivities of Apalis TK1 include USB 3.0, PCIe, SATA, GPIO, CAN, PWM, I2C, SPI.

*News ID 4015*

**Trenz: system-on-module based on Xilinx Zynq UltraScale+ MPSoC**

Trenz Electronic has launched the TE0808 UltraSoC+ high-performance, industrial grade system-on-module delivering a host of advanced technologies packed into an extremely compact 52 x 76mm form factor. The TE0808 UltraSoC+ delivers the advanced levels of performance demanded by next generation multi-tasking embedded systems in the automotive, broadcast, communications, industrial, medical, mil/aero, and T&M markets.

*News ID 4035*
This article describes the requirements for mass storage devices used in industrial environments like Industry 4.0 and the emerging Internet of Things.

Through the recently launched SATA III series (2.5” SSD, M.2, mSATA, SlimSATA and CFast), ATP initiates the concept of Synergy 1+1 > 2 to bring out the Preventing, Reporting and Analyzing mechanism by integrating hardware, firmware and software for mission-critical industrial applications. As a result, the all-inclusive solution to power loss/failure protection, data integrity, health status management and long term reliability is the key to sustainable network operations.

Uninterrupted and sustainable performance is typically imperative for the network of control systems and manufacturing-related instruments for automation application. The entire Power Protector Control System (figure 1) with integrated supporting features in ATP SATA III drives, comprising a patented hardware design, special firmware and customized software (Event Log and S.M.A.R.T. Tool), is designed to supply sufficient power for the coverage (controller/DRAM/flash) and to ensure stable power condition. Proactively monitoring capacitor health and functionality could avoid the risk of a malfunction condition affecting the entire operation of the Power Protector Control System. The capacitor-charging identification mechanism explains the process and the corresponding measures taken once capacitor charging fails during power-on and during operation.

ATP adopts Power Cycling RDT with test pattern and event log features to identify root causes and to fine-tune for reliability of the whole Power Protector Control System. In addition, with the advantage of analysis capability by recording abnormal events (e.g. unstable power signal, high/low temperature operation, firmware update failure, etc), it is able to trace and investigate real issues and problems.

Industrial applications in automation industry demand both read and write-intensive optimization to achieve above-average reliability and endurance. Decreasing the possibility of flash storage life deterioration is key to sophisticated data management and preservation. S.M.A.R.T. Tool combined with a proprietary firmware algorithm can alert with an early warning to prevent wear-out and spare block exhaustion. To satisfy diverse real-world applications, ATP SATA III products undergo a comprehensive portfolio of simulation tests to optimize efficiency and reliability. Furthermore, S.M.A.R.T. Tool supports a variety of operating systems including Windows and Linux.

Comprehensive services, stability, and accredited product quality are all fundamental to the high level of reliability and long-term product life cycle required by the automation industry. One challenge of industrial automation applications is frequent small-file (e.g. log file) write operations accessed randomly resulting in high write amplification. Consequently, the endurance and service life of memory is negatively impacted. To solve this problem, optimization of the workload is the answer. ATP SATA III drives provide a variety of over-provisioning percentages. Higher over-provisioning allows random write operations to perform effectively and improves write amplification. Furthermore, the company evaluates WAF & DWPD (Drive-Writes-Per-Day) to simulate product life according to customer-specific workload requirements. Total Cost of Ownership (TCO) consists of the costs of product validation, field return, and replacement. The SATA III products of the company pass extensive validation processes (e.g. compatibility/function tests with customers’ host systems and industry standard) for reliability in harsh outdoor environments.

To successfully sustain operations in integrated networks across the automation industry, solutions to various use cases have to comply with existing and potential challenges. The goal of ATP’s SATA III SSDs feature set is not just to supplement existing industrial automation requirements, but to achieve Synergy with the Preventing, Reporting and Analyzing mechanisms of Industry 4.0. In addition, the technology and customized testing criteria of the company guarantee outstanding performance and longevity and underpin optimal solutions for mission-critical applications moving forward.
Power analyzer software for testing switching power supplies with scopes

By Wolfgang Bartels, Rigol

A power analyzer software in combination with oscilloscopes allows to set up small test systems, which represent a reasonably priced alternative for measuring switching power supply parameters during the development phase.

Switching power supplies are commonly used in both the electronics and consumer industry. For example, you will find switched power supplies in TVs, computers, halogen illuminations and in many other consumer devices. Various parameters of these power supplies have to be measured and compared with limits during the development and production phases. All built-in switching power supplies must be compliant with the European standard IEC61000-3-2. As with EMI testing (CISPR-Norm), there is a split between pre-compliance test (mostly during the development phase) and compliance test (certification).

Rigol is now able to offer a very competitive pre-compliance test solution for the EMI field as well as a solution for the power analysis. The test system consists of special PC software, an oscilloscope, as well as a current probe and a voltage probe to connect to the test object. There are three areas of measurements implemented in the software: 1) measurements at the input including power quality, harmonics (IEC61000-3-2) and in-rush current; 2) measurements at the switch including switch loss, safe operating area, and modulation; 3) measurements at the output which means output analysis of the switching power supply. An example is described below, the measurement of harmonics and the harmonic current.

Before starting the measurements two steps are necessary. 1) Demagnetization and zeroing of the probes, to ensure the accuracy of the measurement. 2) Correction of the time lag between current and voltage measurement channels (channel deskew). Since a time delay between the voltage and the current probes can occur (channel 1 and channel 2 on the oscilloscope) causing inaccuracy, calibration is required. With the calibration RPA246 adapter and the Ultra Power Analyzer software calibration can be performed automatically. For this purpose, a pulse signal is simultaneously recorded with the voltage probe and the current probe and the time difference between the two detected signals determined on an oscilloscope. These values are stored in the software to use for later measurements. They can be saved and reloaded the next time you start, otherwise the offset calibration must be performed again.

The voltage/current supply of the adapter RPA246 correction is provided with an oscilloscope or a PC via a USB cable. There are two connection options (one large and one small current loop), depending on which current probe is used (maximum cable diameter and maximum measuring current). As already mentioned, the most important measurement tasks which are needed for testing switching power supplies are integrated in Ultra Power Analyzer software. For this purpose, you will find among other things a graph, online help, and how or where the probes must be connected for the selected measurement. Figure 1 shows a configuration example for the measurement of input parameters, such as power quality, harmonics or in-rush current. The user can activate the display of the graph by setting tips on or off.

Once all the preparations are done and the test set-up is fixed, you can begin to perform the measurements. Depending on the selected measuring, some parameters need to be supplemented. The measurement of harmonic currents requires additional information as follows. 1) Mains frequency, which is important as the basis of the assessed harmonics. 2) Definition of the test object class by IEC61000-3-2. The standard test is divided into four different classes of objects (A to D). Each class must be evaluated according to different limits. By selection of the class, the software limits are adjusted automatically. 3) Type of the measured harmonics: even number (x2, x4, x6..), odd (x3, x5, x7..) or all harmonics of the fundamental wave. 4) Display: representation as a measurement, a curve (FFT) or as a bar graph. When selecting bar chart the actual measurements are shown (green) and the limits of the standard are shown (blue). 5) Definition of the window function. It may
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The results of the harmonic currents are shown both as a table and as a graph. The table shows the numbers of harmonics (odd/even/all), the standard stored limit values (h (Arms/%)), the measured value of the corresponding harmonics (Meas (Arms/%)) and the PASS/FAIL evaluation listed. In addition, the total harmonic distortion (THD) is displayed (up to the 40th harmonic). The graph (selection: bar graph) shows the current measured value and the limit of the corresponding type (A to D) is shown in the spectrum. For a better and closer look zoom in on the graphical view. After the measurements, all data and results can be exported, also an automatic test report can be generated.

The software package Ultra Power Analyzer together with the Rigol oscilloscopes DS/MSO2000/DS/MSO4000 and DS6000 etc and the corresponding probes provide a complete solution for measuring switching power supplies, and offer a first insight regarding the performance in the standard limits of IEC61000-3-2. The package is optimized for preliminary tests of switching power supplies during development. It is also aimed at manufacturers of electronic household, audio/video and communication products. For example, to measure the built-in switch mode power supplies (in-house development or externally bought) and for the determination of the parameters of the final product, such as in-rush current or power consumption.

Nowadays, also end customers of consumer electronics begin to question and critically analyze these parameters during the purchasing procedure. Therefore well prepared and complete data sheets should be an ideal tool for manufacturers to promote the product. As with EMC pre-compliance testing during the design phase, the costs for certification and the time to market can be reduced with this new test solution. Thus Rigol helps to improve the product quality.

Figure 1. Configuration example for the measurement of input parameters

Figure 2. Ultra Power Analyser Screen on an oscilloscope shows the harmonic currents both as a table and as a graph as well as additional parameters.

Product News

Ansys: simplify ICDs for faster embedded avionics systems design

Controlling the thousands of signals that are transmitted every second aboard an aircraft is one of the most complex and critical jobs of today's avionics engineers. Designing a well-integrated systems architecture that is reliable enough to ensure consistent aircraft performance and passenger safety, and capturing all the details of that complex architecture in Interface Control Documents (ICDs) is no easy task.

ST: free software tools for STM8 microcontrollers

STMicroelectronics has extended incentives for designers to choose its STM8 microcontrollers for economical computing tasks in the smart devices that support modern work and life. The latest move by ST, working with Cosmic, means all the software tools that designers need to build, debug, and fine-tune STM8 applications are now available free of charge. The free Cosmic C-compiler for STM8 (COS-C-COMPLIER) is unconstrained and complete, and supports all variants of the STM8 family including the largest 128KB devices.

SEGGER: protect Embedded system data with emFile RAID 1

SEGGER adds RAID 1 support to their emFile embedded file system, providing next level data protection. RAID 1 (Redundant Array of Independent Disks level 1) is a storage technology, that protects against media failure by duplicating the data in the system to create a complete mirror image. RAID 1 further hardens a file system against data loss caused by hardware failures such as uncorrectable multi-bit errors or complete failure of a NAND device. It does this by maintaining a mirror image of the data which can be substituted when such errors happen.
How modeling helps embedded engineers develop applications for SoCs

By Mark Corless and Eric Cigan, MathWorks

This article explains how modeling helped a small team of algorithm and embedded software engineers design a motor control algorithm and implement it on a programmable system-on-chip (SoC).

Programmable SoCs such as Xilinx Zynq SoCs and Altera SoC FPGAs, which combine programmable logic and microprocessor cores on the same chip, have given design teams new platforms for algorithms deployment in a wide range of applications, including embedded vision, communications, and control of motors and power electronics. These design teams typically include two categories of engineers: algorithm engineers, responsible for conceptual development and elaboration of math-based or rule-based algorithms, and embedded engineers, responsible for refining the algorithms and implementing them in software or hardware on the embedded device.

Algorithm engineers commonly use modeling early in the development process to gain confidence that their algorithms are functionally correct for their application. Embedded engineers, on the other hand, don't always see the benefits of modeling. However, when these teams do not work closely together, the result can be late error detection, causing project delay; excessive resource use; or compromised functionality due to inadequate design and test iterations.

We set out to see whether modeling could help both algorithm and embedded engineers create a more efficient and collaborative design process. We wanted to focus on modeling algorithm components that we could explore using simulation. We would use simulation to help us make partitioning decisions, use simulation and code generation to balance functional behavior with implementation resources, and automate integration and deployment of the generated code and hand code to make more efficient use of lab time.

We proposed a workflow that would be a mix of code generated from models and hand code. Throughout the article we will refer to the hand-coded portion of the design as the reference design. We would begin with models provided by the algorithm developer and iteratively elaborate the models by adding implementation details. At each iteration we would simulate system behavior to ensure the functional correctness of the algorithm models, implement the algorithms with code generation to obtain code that behaved like the model, and then automate integration with our reference design to ensure a repeatable process to get to hardware implementation.

For this case study we decided to design a velocity controller for a permanent magnet synchronous motor using a field-oriented control (FOC) algorithm, and then to deploy it to a Zynq-7000 All Programmable SoC Intelligent Drives Kit II. We chose motor control because it is an application where algorithm engineering and embedded engineers often need to work together. We chose the Zynq Intelligent Drives Kit II because it was readily available and offered the I/O support we required. The Zynq Intelligent Drives Kit II is a development platform used by engineers who want to test motor control algorithms running on a Zynq Z-7020 SoC device. Based on the ZedBoard development board, the kit includes an Analog Devices FMC motor control module and a 24V brushless DC motor equipped with a 1,250 cycles/revolution encoder. Because we wanted to test motor control algorithms under a range of operating conditions, we used the Zynq Intelligent Drives Kit II with an optional dynamometer system.

After selecting the hardware platform, we reviewed an initial system simulation model provided by the algorithm engineer and identified additional algorithm components that would be required for deployment to the SoC. The model included a controller algorithm for a motor based on data sheet parameters. This algorithm consisted of an outer velocity control loop regulating an inner current control loop using FOC. Although this model captured the core mathematics of the controller, it did not take into consideration the effects of peripherals (such as ADC, encoder, and PWM) or algo-
algorithm components required for other modes of operation (disabled, open loop, and encoder calibration). We worked with the algorithm engineer to identify which algorithm components to model and decide whether to implement those components on the ARM or the programmable logic on the SoC.

We elaborated the initial system model to include the new algorithm components. To enable system simulation we created lumped parameter models of existing peripherals that interact with the motor model. For example, we had existing HDL code for the encoder peripheral that we planned to reuse in the deployed design. The encoder peripheral reads a stream of digital pulses at 50 MHz and translates them into count signals read by the controller algorithm at 25 kHz. If we directly modeled this pulse stream, we would introduce 50 MHz dynamics in the system model and significantly increase simulation time. Instead, we created a lumped-parameter model of the encoder which converts the ideal rotor position from the motor model into the encoder counts signal seen by the algorithm components. Modeling at this level of fidelity enabled us to simulate startup conditions required to test the Encoder Calibration component as well as introduce position quantization effects to test the Velocity Control component while maintaining reasonable simulation times.

We chose to implement algorithm components on the ARM if they required rates of a few kHz or less. The constraint of a few kHz rates was set because we planned to run a Linux operating system on the ARM. Algorithm components requiring faster rates would be implemented on the FPGA. We wanted to implement algorithm components on the ARM whenever possible because we found that design iterations were faster on the ARM than on the FPGA. It was easier to target the algorithm to the ARM core because it supported native floating-point math operations. Most FPGAs perform floating-point math inefficiently, so targeting programmable logic requires the additional step of converting algorithms to fixed point. In addition, we found the process of compiling C code for the ARM was generally faster than compiling HDL code for the FPGA. We used simulation to determine whether algorithm components could be executed at rates slow enough for the ARM or if the FPGA was required. For example, the algorithm engineer initially proposed an encoder calibration routine that ran at 25 kHz, which would have to be implemented on the FPGA. We used simulation to test whether we could run the encoder calibration component at 1 kHz, found that we could, and decided to implement it on the ARM.

Once we had functionally correct models with the desired component rates, we grouped all components intended for C code generation into an algorithm C model and all components intended for HDL code generation into an algorithm HDL model. We then iteratively added implementation details to the models and generated code until we felt it would fit within an acceptable amount of memory and execute at the component rate. We used Embedded Coder to generate C code from the algorithm C model and generate a report summarizing the calling interface and estimated data memory usage. While reviewing the report we realized that all the data types were double-precision floating point. We applied these data types to the model, used simulation to verify the
behavior was still acceptable, and then generated the improved code. At this point we felt confident that the code was suitable for implementation on the ARM.

We implemented the algorithm HDL model as fixed point since fixed-point operations consume fewer resources on FPGAs. To achieve this, we worked with the algorithm engineer to identify and bound key signal ranges in the design (current, voltage, and velocity), then used Fixed-Point Designer to define fixed-point data types that would ensure calculations did not overflow. We used HDL Coder to generate code and a summary report. We reviewed the resource estimation section of the report to identify math operations that seemed unexpectedly large. For example, our initial selection of word lengths resulted in several multiplications of two 34-bit numbers, which we felt would needlessly consume FPGA resources. We were able to identify this issue in the resource utilization report, reduce the precision in the model, use simulation to verify functionality was still correct, and then generate the improved code. We used Xilinx Vivado Design Suite to synthesize the code and verify that it met timing requirements.

Once we had a candidate algorithm implementation, we were ready to integrate it with our reference design. We started by manually integrating the generated C function with our hand-coded ARM embedded project and integrating the generated HDL entity with our hand-coded Vivado project. However, we realized that if we always performed the integration manually, we would need to be involved in every design iteration in the lab. One of our goals in using this workflow was to enable the algorithm engineer to automate the integration and deployment process in the lab. We used the HDL Coder Support Package for Xilinx Zynq-7000 Platform to register our hand-coded Vivado project as a reference design. We were then able to automate integration of the generated algorithm HDL code with our hand code, build a bitstream, and download it to the FPGA. We used the Embedded Coder Support Package for Xilinx Zynq-7000 Platform to automate the integration of the generated algorithm C code with a Linux operating system, build an executable, download it to the ARM, and interact with it from Simulink. The support packages provided the AXI interconnect that enabled communication between algorithm components in the ARM core and programmable logic.

During the initial system setup it was essential for the algorithm and embedded engineers to work together in the lab. As the embedded engineers, we had to set up the deployment configuration and work with the algorithm engineer to verify basic functionality. Once the system was set up, the algorithm engineer could independently iterate on the design using Simulink as the primary interface to the SoC. The algorithm engineer tested the deployed controller and determined that it did not deliver the expected response. Comparison of the simulation and hardware results showed that we had incorrectly calculated the mapping of ADC count to current. The algorithm engineer created additional tests to better characterize the torque constant of the motor and improve the correlation between simulation and hardware.

The high correlation between the simulation and hardware test results gave us confidence that we could make design decisions at the model level and reduce lab time further. For example, at one point the motor was spinning in the lab but became uncontrollable under certain conditions. We theorized that the issue was related to an overflow in the fixed-point velocity calculation implemented...
on the FPGA. We reproduced the issue in simulation and identified a flaw in the initial assumptions about the maximum speed of the motor. We were able to debug and resolve the issue in simulation, and only used lab time to verify the change.

The workflow described here enabled us to work more efficiently with the algorithm engineer. Through simulation we assessed the effect of algorithm partitioning on system performance and verified that the encoder calibration component could be moved from higher-rate programmable logic partition to the lower-rate ARM partition. Simulation also allowed us to make decisions that conserved implementation resources while maintaining functional behavior, such as reducing word length of math operations in the programmable logic, or converting data to be passed through the AXI interconnect from floating-point to fixed-point data types. Finally, our prototype testing in the lab helped us identify errors in mapping ADC count to current, and enabled our algorithm engineer to run further testing to characterize the motor’s torque constant. Overall, the workflow supported a close collaboration between us and the algorithm engineer, producing a more efficient implementation while economizing on lab time.

**Product News**

**ETAS brings new Eclipse-based ASCET version to market**

Tool chains in the automotive sector comprise a host of individual tools. These tools must all be coordinated with one another, which poses a major challenge not only for the manufacturers of the individual tools, but also for the managers and users of the tool chain. Demand is high for a standardized and largely automated tool chain that minimizes “frictional losses” and facilitates the certification required for safety-critical functions (ISO 26262/IEC 61508). This is precisely where ETAS comes in, providing a consistent and automated solution. The latest version, ASCET V7, is based on Eclipse, the open-source platform for software development, and has just been released.

News ID 4043

**NI: testbed to deliver new network infrastructure to support the future of IIoT**

NI announced a collaboration with the Industrial Internet Consortium (IIC) and industry leaders Bosch Rexroth, Cisco, Intel, KUKA, Schneider Electric and TTTech to develop the world’s first Time Sensitive Networking (TSN) testbed. These organizations aim to advance the network infrastructure to support the future of the Industrial Internet of Things and Industry 4.0. To support new digital capabilities, more reliable and secure access to smart edge devices is needed. Standard network technologies must evolve to meet the demanding requirements of these next-generation industrial systems and improve the way we operate our machines, electrical grids and transportation systems.

News ID 4060

**SEGGER: embOS for MicroEJ opens embedded systems to Java programming**

SEGGER’s real time operating system embOS is now supporting MicroEJ’s platform, thus opening the world of ARM Cortex-M based embedded applications to Java developers. The package provides a complete Java platform, including a Virtual Machine and other components.

The virtual machine is a 32-bit processor that manages the Java threads. It is executed as a task controlled by SEGGER’s embOS kernel, thereby combining all advantages of both ANSI-C and Java languages on a single embedded target. Developers can focus on their Java applications and do not need to have any deeper knowledge of ANSI-C.

News ID 4089

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**CadSoft Computer showed the current EAGLE version 7.5.0 at Farnell’s booth on the embedded 2016 in Nuremberg.**

EAGLE 7.5 was introduced as a maintenance release in November 2015.

It offers improvements such as a Table of Contents in the Library Editor, for example. This helps managing Devices, Symbols and Packages in the libraries.

The customers could experience the newest developments in the EAGLE eco system. To extend EAGLE’s design capabilities we partnered with leading technology partners to allow for example a 3D data export from EAGLE and many more.

It is now possible to generate proper 3D STEP data that can be used in mechanical drawing systems. On the CadSoft pod, visitors could tell that it is only a matter of a few minutes to have the board data exported, matched to the 3D STEP models and calculated. The data set can be downloaded or directly opened in Autodesk’s design software Fusion 360, for example.

Another great feature is the integration of EAGLE with PCESim from Felicitas, a powerful simulation tool in the newest version 3.0. With this interface, configuration of the components can be done in EAGLE directly by using the PCESim dialogs. It is a really neat combination of these two powerful software solutions.

See our homepage to learn more about EAGLE and get a free trial!

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Understanding and measuring power supply transient recovery time

By Bob Zollo, Keysight Technologies

Power supply transient recovery time is the specification of a DC power supply that describes how quickly the power supply will recover from a transient load condition on its output. This article describes how you can measure this feature easily and exactly.

With an ideal power supply operating in constant voltage, the output voltage would remain at the programmed value regardless of the current being drawn out of the power supply by the load. A real power supply, however, cannot maintain its programmed voltage when the load current rapidly rises. In response to a rapid rise in current, the power supply voltage will droop until the power supply regulation feedback loop brings the voltage back up to the programmed value. The time it takes for the value to get back to the programmed value is the load transient recovery time. See figure 1.

Note that if the load current transient is not a fast transient, but slowly rises or falls, the power supply regulation feedback loop will be fast enough to regulate and maintain the output voltage without any visible transient. As the current transient edge speed increases, it exceeds the ability of the power supply feedback loops to keep up and hold the voltage constant, resulting in a load transient event.

The power supply transient recovery time is measured from when the load current transient begins to when the power supply settles down and again reaches the programmed value. But the programmed value must be specified within a tolerance band. Thus, power supply load transient recovery time is specified as the time required reaching a tolerance band of some percent of the programmed value, some percent of the rated output or even a fixed voltage tolerance band. Figure 2 shows some examples of power supply transient specifications. Looking at the Keysight N7952A power supply, you can see that the transient recovery time tolerance band is specified as 100 mV. If the output voltage is 25 volts, when measuring transient recovery time, you must measure how long it takes the power supply to recover back to within +/-100 mV around 25 V.

Let’s look at an example application where DC power supply transient response is important. When testing power amplifiers (PA) used in mobile devices (such as cell phones or tablets), it is very important for the DC bias voltage into the device under test (DUT) to remain at a fixed and stable voltage. If the voltage were to fluctuate or change during the test, the proper test conditions are not maintained and the resulting RF power measurements on the DUT will not be correct.

In this case of the PA, the situation is exacerbated due to the current profile. The PA transmits in pulses, and therefore pulls current from the DC bias in pulses. These pulses have fast edge rates and therefore present significant load transients on the DC bias. Each time the PA pulses on, it draws high current, which drags down the DC bias power supply. The power supply will recover quickly, but during the time the power supply is responding to the transient, its voltage is not at the desired value for the test. Once the power supply recovers, the PA will then be operating under the right test conditions and the RF power measurements can be properly made.

With billions of PAs being manufactured and tested each year, test throughput is critical. If the power supply recovers slowly, it adds test time to the PA and therefore slows down manufacturing test throughput. PA manufacturers, therefore, look for fast recovery power supplies to ensure they can achieve maximum manufacturing test throughput. They look to the transient recovery time specification to determine which supply will be best for their application. So, the power supply vendor needs to be able to accurately measure power supply transient recovery time in order to present the best possible specification for the PA manufacturers.

The challenging part of measuring load transient recovery time is determining when the voltage enters the tolerance band. While the average voltmeter can easily measure if the DC output voltage is within the tolerance band, the average voltmeter is a slow instrument and will not be able to sample fast
AC coupling. This could make it difficult to zoom in on the tolerance band, but a scope would be a more reasonable tool to try to zoom in on the tolerance band. For power supplies that have a wider tolerance band, scopes can be used to make these measurements. In fact, Keysight Oscilloscopes offer built-in power analysis software that makes transient response measurements via turnkey operations. The highest performance scopes, with 10 or 12 bits of resolution, have more flexibility and more advanced front ends, allowing them to make these measurements even for narrow voltage tolerance bands, but these scopes are both expensive and not as common on the average lab bench.

For power supplies with narrow voltage tolerance bands, a high performance power quality analyzer, though, can make this measurement – provided it has single shot measurement capability. Single shot measurement is needed because the transient is a single shot event triggered by the rising edge of the current. Alternatively, if you can generate a repetitive load transient, such as a square wave where the current jumps between high and low current values, you can use a power analyzer without single shot measurement to capture the repeated transient event. High performance power analyzers have better than 0.1% vertical accuracy, 16-bit resolution and digitization speeds of 1M samples/second or more. This combination of fast digitization and accurate voltage measurement allows you to easily measure power supply load transient response and to identify when the narrow tolerance band is reached. Since a power analyzer can directly measure voltage and current without probes, you can quickly setup this measurement to trigger from the rising edge of the current and then measure the voltage recovery time.

A scope would be a more reasonable tool to use, as it can easily capture and visualize very fast transients. The average scope, though, typically has 1-3% vertical accuracy and 8-bit resolution. Therefore, the average scope struggles to provide enough vertical accuracy and resolution to precisely locate where the DC output voltage reaches the narrow tolerance band. By putting the scope in AC coupling, you try to zoom in on the tolerance band, but error will be introduced as the post-transient DC offset within the tolerance band is reached. Since a power analyzer can directly measure voltage and current without probes, you can quickly setup this measurement to trigger from the rising edge of the current and then measure the voltage recovery time.
The real costs of failed design collaboration

By Ben Jordan, Altium

This article explains in detail the need to change the engineering world of our fathers, so as to keep pace with the challenges of the future and be able to design the next generation of connected electronic products.

All over the world, engineers are tasked with designing ever denser, smaller, and smarter products. To design something that is small and powerful requires a design process that is tightly aligned across all engineering domains. There are a number of product design trends underway – below are just a few that are directly impacting how engineers work together:

Look at the news any day of the week, and you’re bound to see a new story about self-driving vehicle technology. This surge in sophisticated electronics introduces a need for a workflow that tightly integrates the electrical and mechanical sides of the design process. Not only do engineers have to deliver a finished product, but they need to deliver one that adheres to the strict safety requirements for human transportation.

We’re nearing a future with growing dependency on connected products where every product we interact with will transmit some form of data. What was once considered a dumb product, like a light bulb, will transmit data about its current state. Forgot to lock your house? Do it from your smartphone, while you’re at work. The way we interact with the basic physical objects in our world is going to change in a big way as electronics becomes integrated into everyday household products.

With the release of the Apple Watch, wearable technology has finally entered the realm of mainstream technology. And with this surge in interest comes an even greater demand on design processes. Not only are these devices small, they also are flexible, and PCBs need to accommodate this with rigid-flex sections.

Despite the reality of the changing product experience, the same tired design practices that focus not on collaboration, but on treating everyone involved in the design process as an isolated specialist, are employed day in and day out. In many ways, companies are still clinging to the ideals of the industrial era of engineering, when what is needed is quite the opposite. We’re still relying on the same technology that was introduced decades ago, such as interchange file formats. We know these well because many packages of data are tossed back and forth between electrical and mechanical design teams. In goes the intelligent and complex design intent of a PCB into a black box, and out comes a basic board shape that communicates zero design intent to the mechanical designer. This process occurs every single day, in every engineering workflow. STEP files, IDF, DXF – the design intent gets crammed into these boxes and sent out to other engineering teams. And what happens when they get it? They have to tweak the data before it ever works. Spending hours trying to adjust that PCB or mechanical data before it’s in a usable state.

Linear design processes. Companies are still trying to survive on the industrial engineering era’s design methods. Assembly lines worked great, back in the days when products were static and standalone, and thus each part of the design process was easily replaceable. We wanted more, and the design processes delivered. Now engineers are building intelligent products that communicate, yet design teams don’t. We design our particular aspect of a design with our specialized knowledge, pass it down the line, and forget about it until there’s a problem.

Unmanaged communication methods. Trying to explain the complexity of a PCB in a disconnected series of one-way communications like an email thread is wildly inefficient. How has this ever worked? Even worse, sometimes an email isn’t received on time. Maybe that needed revision to the placement of a component was buried somewhere in our inbox. All the while, we keep on designing, with our communication methods trying to catch up, but more often holding us back.

The true costs of failed design collaboration.
Everyone involved in the electronics design industry is familiar with these approaches, and we're all guilty of relying on them every single day. Every week, countless hours are spent patching the holes in design workflows, fixing mistakes, working overtime and maybe even weekends because of them. Yet the engineering industry as a whole has done little to respond. Next year there might be a better interchange file format, but that's entirely missing the point. We're all part of this problem, and we are becoming all too familiar with the real costs of our failed design collaboration processes. First: missed time to market and budgets, with design revisions slipping through the cracks and prototype costs skyrocketing from failed communication processes. Second: wasted time and productivity with designers having to manage multiple revisions that could have been solved the first time with a properly implemented collaboration system. Third: product experiences that are compromised during the design phase based on budget and time constraints vs. being iterated to perfection. The pain is clear, the wasted time is ever-present, and the one thing we all want to know is: what are we going to do about it?

I'll say it again: We don't need another interchange file format. If you've been raised on old-school engineering tools like most of us have, then you've been forced to accept interchange file formats as a part of life. But this method of design is flawed, and it completely ignores the real needs of true design collaboration. What is needed are intelligent design tools that allow for communication between one another. Intelligent tools that don't require engineers to shove data into a box and pass it along. With these tools, there are no boxes – there is no data translation. In this collaborative engineering process, data is being shared and transmitted instantly between design platforms, across a diverse range of engineering domains. To achieve this, our design tools have to change first, in big ways. Here's what's needed: Bi-directional data synchronization. These tools need to share data seamlessly, without requiring any kind of interchange file formats. What does this mean in a practical scenario? Being able to commit changes between design environments, and have those changes instantly transmitted to our fellow engineers. It can be as simple as this if I move a component on a board it's going to possibly affect the mechanical enclosure that my MCAD engineer designed. The only way to efficiently keep the MCAD engineer in the loop about this change is to push the change to his design environment. Allow him to see the revision in his own workflow, so he can adjust his design accordingly.

Not only does data need to be shared, we need to be able to add the human element of communication into the mix outside of the unmanaged channels that we rely on. Within our design platforms, we need a connected and universal communication environment that allows us to clearly articulate the design revisions that have been made and share those details with others involved in the design process. What does this look like in a practical application? Like the example, an engineer makes a change to the component placement on a PCB, and not only is this change pushed to the mechanical designer environment, but the electronics engineer is also able to include a detailed note of exactly what was changed, and most importantly, why it was changed. This is the way forward for effectively communicating design intent.

As our tools evolve to provide us with the data synchronization and commenting abilities that are needed, it's also necessary to work on the design workflows. As engineers, we need to develop a holistic understanding of the entire design process, and understand how our specialized applications will affect the entire product workflow. Simply put, we need to begin working in parallel on our designs. Not only will this enhance our ability to communicate, but it will make our design process that much more efficient.

We need to start developing these solutions now. It won't happen overnight, and it's going to be a slow transition. But the reality is that technology is just going to become more complex. Products are going to keep getting smaller, thinner, and faster than we could have ever imagined. Do we really want to be relying on interchange file formats 10 years from now? Trying to communicate layers upon layers of complexity in a chain of emails and translated file formats? We don't. We need something more intelligent, and we need our design tools to finally catch up to this information-rich era of technology in which we all live.

### Product News

**Rohde & Schwarz: verify compliance of embedded multimedia card interfaces with RTO oscilloscopes**

Rohde & Schwarz expands the functional range of its R&S RTO oscilloscope with the new R&S RTO-K92 eMMC compliance test software. The software option offers automated embedded multimedia cards (eMMC) interface compliance tests in line with the current JEDEC standard version 5.1. It not only covers the HS200 speed class, it is the first to offer compliance testing for HS400.

*News ID 4048*

**Segger brings J-Link to Atmel Xplained evaluation kits**

SEGGER’s J-Link is now available on Atmel’s low cost Xplained evaluation platforms, as an on-board debug probe. SEGGER is excited to bring the proven reliability and outstanding performance of the J-Link line of debug probes to the Atmel Xplained evaluation platform. The Atmel Xplained evaluation kits provide an on-board, single chip debug solution called Atmel EDBG for which SEGGER now has released an upgraded firmware to give the users the capability to convert their Atmel EDBG to a J-Link OB. The firmware has been developed in close cooperation with Atmel and can be downloaded from the SEGGER website, free of charge.

*News ID 3992*

**eCosCentric introduces eCosPro 4.0 RTOS**

eCosCentric announced a major release of the eCosPro real-time operating system. The new 4.0 release of the eCosPro Developer’s Kit delivers improvements to the development tools, marks a change to 64-bit native host tools, includes the latest Mars version of the Eclipse IDE, consolidates run-time enhancements and delivers full-featured evaluation copies of key eCosCentric middleware.

*News ID 3999*

**DDC-I: small footprint version of Deos safety-critical embedded RTOS**

DDC-I announces the availability of a reduced footprint implementation of its safety-critical, DO-178C-certifiable Deos real-time operating system. The new small footprint RTOS targets NXP’s ultra-reliable MPC 56XX and 57XX family of microcontrollers, which are optimized for safety-critical applications such as powertrains, engine management, motor control, body.

*News ID 4124*

**Lynx: secure bare-metal networking and advanced cloud-based threat detection**

Lynx Software Technologies unveiled the LynxSecure 5.3 Separation Kernel Hypervisor at Embedded World, and announced a powerful new capability that extends the principle of domain separation to the network connection. At the same time, in partnership with Webroot, they revealed real time cloud-based threat detection for guest operating systems hosted by LynxSecure.

*News ID 4013*
Toshiba: ARM Cortex-M3-based MCUs for motor control and consumer devices

Toshiba Electronics Europe has announced a range of new microcontrollers based on the ARM Cortex-M3 core. The M3H microcontrollers are the first product group from the new TXZ family and are the first Toshiba MCUs to be fabricated with an embedded flash memory process based on the 65nm logic process. Products in this group are well suited for use in a variety of consumer and industrial applications, such as motor control, consumer AV devices and office automation equipment.

News ID 4125

ATP furthers supports Micron legacy DRAM modules

ATP has expanded support of Micron SDR/DDR1 modules by adding further selected legacy DRAM modules specifically for customers using AMD Embedded/Geode platforms. This shows ATP's continued efforts from the partnership with Micron, including the license agreement instituted in August 2015. Micron published the EOL of all SDR/DDR modules last year, and closed the Last DDR1 modules by adding further selected flash memory process based on the 65nm logic process. The new product lineup comprises a total of six new devices with pin counts from 80- to 100-pin and on-chip flash memory capacities from 128 to 256 KB. The RX24T Group enables simultaneous inverter control of multiple motors with a single chip and are ideally suited for permanent magnet AC motor control in a variety of applications. In addition, Renesas plans to deliver a 24 V motor control evaluation kit, that can support both the single-motor control RX23T and the multi-motor control RX24T.

News ID 4084

Socionext develops and demonstrates single-chip 8K video decoder

Socionext introduced a first single-chip SoC which can process decoding of 8K resolution HEVC video. Hardware makers will be able to utilize their existing digital TV SoCs in combination with the SCH801A to quickly and easily develop 8K TV sets and significantly accelerate the move of 8K TVs into the market. "8K" means an ultra-high definition format of digital video with 33 million pixels, 16 times as many as that of "Full HD" which is widely available today. In Japan, test broadcasting of 8K is scheduled to be launched in 2016, and the start of the full service will follow by 2018, delivering a super-realistic image enabling a completely new viewing experience.

News ID 4081

DCC: acquisition of Maxwell to expand space solutions capabilities

Data Device Corporation has entered into an agreement to expand its space market capabilities and product offering with the planned acquisition of the microelectronics group from Maxwell Technologies. Maxwell is a leading developer and manufacturer of innovative, cost-effective, space-qualified microelectronics solutions for satellites and spacecraft.

News ID 4122

Arrow introduces ARIS IoT development platform

Arrow Electronics has announced the introduction of ARIS, a ready-to-use Internet of Things hardware and software platform that enables users to get their IoT applications up and running quickly with the Renesas Synergy development framework. Arrow developed the ARIS board in conjunction with the Italian design house Reloc.

The Renesas Synergy Platform helps accelerate IoT designs by making it easier and quicker to start development with a fully qualified and optimized combination of hardware and software that encourages innovation and product differentiation. The combination of the Arrow ARIS board and Renesas Synergy software platform elements enables developers to reduce time to market and decrease the total cost of ownership of a product over its lifetime.

News ID 4080

Maxim: transceiver IC keeps heat away from lasers

Manufacturers of SFP28 modules for data center and radio fronthaul applications can now use TO-cans enabled by the industry’s first transceiver IC, which is shipping now from Maxim Integrated Products. Maxim’s SFP28 transceiver allows module manufacturers to avoid a driver inside the transmit optical subassembly (TOSA). This keeps heat away from the sensitive laser, simplifies production, and improves yield. Maxim’s SFP28 transceiver also includes advanced digital eye tuning capabilities that enable use of low-cost TO-can based optics. The SFP28 module can simply be designed in the same way as an SFP+ module using TO optics, one transceiver IC, and one controller IC.

News ID 4065

ADLINK: new open modular architecture for industrial cloud computing

ADLINK introduced Modular Industrial Cloud Architecture (MICA), a new industrial IOT architecture for commercial off-the-shelf platforms featuring a design aimed at optimizing performance, cost and space requirements for the next generation of industrial IOT solutions. ADLINK’s MICA industrial-grade platform is designed to support the native virtualization requirements for software-defined networking and network function virtualization, while integrating a wide range of the latest hardware acceleration technologies to boost the processing of network packets and video streams. All this functionality is offered on an open, modular computing architecture, allowing users to redefine resource allocation for cloud computing applications.

News ID 4052

TI: wideband RF phase-locked loops with integrated voltage-controlled oscillators

Texas Instruments introduced the industry’s highest-performance phase-locked loops with integrated voltage-controlled oscillators. Delivering the lowest phase-noise performance in the industry, the LMX2582 and LMX2592’s single-chip architecture helps designers achieve a level of performance previously possible only through several discrete devices. These new wideband devices support output frequencies of up to 9.8 GHz, allowing a single device to support various frequency
bands in end applications including test and measurement, defense, microwave backhaul, satellite, and wireless communications equipment.

News ID 4029

Conrad: latest gen energy-efficient cooling units from Rittal
Conrad Business Supplies has begun stock¬ing a new range of cooling units from Rittal. The Blue e+ range provides far higher levels of energy efficiency than current cooling solutions and the units have been designed to offer improved flexibility, safety and ease of instal¬lation. Testing of the range has demonstrated energy savings of up to 75%, which, combined with an increased service life, ensures great cost-effectiveness for the user.

News ID 4021

NXP drives NFC innovation with new connected tags and reader solution
NXP Semiconductors announced how its Near Field Communication solutions can drive innovation for embedded systems designs in smart home, access management and home banking as part of the company’s vision to drive a new era in NFC. The company released its NTAG 1IC, which extends the family of connected tag solutions that combines passive NFC with an NFC interfaces well known for enabling NFC commissioning, simple “tap-to-connect” communica¬tions between smart devices to the home network.

News ID 4012

TQ: IoT Edge Gateway ODM solutions
TQ has been showcasing in cooperation with Gemalto a modular gateway solution as a basis for individual, customized products to enable “Secure IoT.” TQ is hereby concentrat¬ing on topics such as processor technology, hardware and systems integration for ODM products. Gemalto, a leader in digital security, enables back-end services, security and industrial-grade global mobile connectivity on 2G/3G/LTE networks. This combination offers an optimal basis for Enterprise IoT and Industry 4.0 solutions and brings together the world of M2M and IoT.

News ID 4010

Advantech, ARM, Bosch Sensortec, Sensirion, and TI cooperate for M2.COM IoT sensor platform
Advantech, along with ARM, Bosch Sensortec, Sensirion and Texas Instruments announced the collaboration of a new Internet of Things (IoT) sensor platform called M2.COM; which has been unveiled at Embedded World 2016. The IoT era brings new opportunities to tradi¬tional industries and drives business evolution for the next-generation of products and services. To enable a diverse range of IoT applications, and to standardize different plat¬forms and technologies, an open platform for IoT sensors and sensor nodes was established by sensor makers and module makers for more efficient IoT development. By joining M2.COM, participants will define and drive the leading platform to empower the Internet of Things.

News ID 4003

EKF: 7-port Gigabit Ethernet switch with 802.1 audio video bridging
EKF presents the SL1-COMBO, a 7-port Giga¬bit Ethernet switch on a peripheral slot card for CompactPCI Serial systems. The onboard Marvell 88E6350R GbE switch is selfmanaged and provides a rich feature set. While 5 GbE ports are wired to associated RJ45 front panel jacks, the 6th GbE port is in use for backbone communication via the CompactPCI Serial connector P6.

News ID 4111

DFI: Pentium/Celeron processor N3000-based COM Express Compact
DFI introduces its latest COM Express Type 6 module powered by the Intel Pentium/Cele¬ron Processor N3000 Family – BW968. When compared to previous generations, the latest Compact supports 3 independent displays up to 4K x 2K with a lower 4-6W TDP, and it targets cost-effective applications, includ¬ing entry-level gaming, banking, ticket machine, and digital signage. With more and more requirements for multiple displays, the Intel Pentium/Celeron Processor-based module is equipped with 3 independent displays (support up to 4K x 2K) to provide stunning graphics performance for superior visual computing in edge devices like gaming machine and digital signage.

News ID 4039

Kontron: strategic partnership with Wibu-Systems for augmented IoT security
Kontron announces a multi-year partner¬ship with Wibu-Systems, an innovative secu¬rity technology leader in the global software licensing market. As a result of the technolog¬ical and business framework agreement, Kon¬tron customers will benefit from augmented security and new monetization opportunities for their IoT products. Embedded security is critical for successful IoT deployments. With this partnership, Kontron will offer comprehensive end-to-end security for the lifecycle of its products and create a trusted environment for its customers.

News ID 3997

Vector Software announces VectorCAST/Analytics
Vector Software announced VectorCAST/ Analytics, providing an easy to understand web-based dashboard of software code qual¬ity and testing completeness metrics, enabling users to identify trends in a single codebase or compare metrics between multiple codebases. Software projects fall into two categories: maintenance of legacy applications and development of new applications. Each presents a unique challenge. Legacy applications are often under-tested and overly complex. Understanding where to start is the biggest challenge to improving quality. With new development, the challenge is often release readiness -- how much work has been done and how much remains to be done.

News ID 3991

WIN Enterprises: compact-size COM Express module with 6th gen Intel Core processor
WIN Enterprises announces the MB-73440, a compact-size COM Express module with Type 6 pin-out type. The unit supports a wide range of Intel 6th Generation Core i7/i5/i3 and Celeron SoC processors. The module features up to 32GB non-ECC Dual channel DDR4 at 2133/1867 MHz, on board SATA SSD (optional), 4K graphics, two DDI channels, one LVDS, supporting up to 3 independent displays. The MB-73440 comes with GbE, 2x SATA 6 Gb/s, 4x USB 3.0 and 8x USB 2.0, 5 PCIe x1 (Gen2, configurable to x2, x4) and supports TPM 1.2/2.0.

News ID 4102

Altium: integrated documentation solution for PCB design tool
Altium is scheduled to release a new docu¬mentation workflow available exclusively in their PCB design platform, Altium Designer 16.1. Draftsman provides PCB designers with a unified documentation solution with custo¬mizable drawing views, documentation templates, and a fully complete design to documentation workflow in Altium Designer 16.1. Engineers interested in learning about all of the new features in Draftsman can view the Altium Designer 16.1 Coming Soon website.

News ID 4101

More information about each news is available on www.Embedded-Control-Europe.com/magazine
You just have to type in the “News ID”.
Rohde & Schwarz showcases oscilloscope portfolio, featuring Scope Rider and RTO2000 at Sensor+Test

For the second time Rohde & Schwarz will be exhibiting at Sensor+Test trade fair. On show will be the R&S Scope Rider, the first handheld oscilloscope for mobile use offering the functionality of a lab instrument. It packs five test instruments into a compact format: a lab oscilloscope, logic analyzer, protocol analyzer, data logger and digital multimeter. Its robust design makes it perfect for mobile installation and maintenance work. The fully insulated instrument meets measurement category CAT IV requirements and can be used to perform measurements at the source of low-voltage installations up to 600 V.

News ID 4113

IDT expands power portfolio with digital PWM controller

Integrated Device Technology strengthens its offerings of power management products with the introduction of a high-performance dual-phase digital power controller that can help customers optimize, monitor and control high-power supply systems. The second-generation ZSPM1363 digital PWM (pulse-width modulation) controller delivers high performance and excellent transient response, making it ideal for addressing the growing demands in the telecommunications, server, storage, FPGA and infrastructure markets.

News ID 4097

DDC: 3.3V radiation tolerant MIL-STD-1553 transceiver/transformer device

Data Device Corporation introduces a new +3.3V version of our radiation tolerant SPACE-PHY Dual MIL-STD-1553 Transceiver/Transformer Device. SPACE-PHY, now available in both 3.3V and 5V versions, is a completely integrated MIL-STD-1553 physical layer in a single package, including dual transceivers and transformers, and is designed to connect with IP incorporated in an FPGA or custom MIL-STD-1553 protocol ASIC.

News ID 4096

Renesas and MicroConsult announce training collaboration for Synergy platform

Renesas Electronics Europe and MicroConsult announce their agreement to collaborate on the provision of customer training courses for Renesas’ Synergy Platform. Renesas Synergy is a complete and qualified platform with fully integrated software, a scalable family of microcontrollers, and unified development tools to speed embedded system developers’ time to market as they innovate new products for IoT device applications. At the heart of the Synergy Platform is the Synergy Software Package which is qualified, supported, warranted and maintained by Renesas.

News ID 4115

Teledyne LeCroy: WaveRunner 8000 oscilloscopes add OneTouch gesture control

Teledyne LeCroy introduces the WaveRunner 8000 oscilloscopes with bandwidths from 500 MHz to 4 GHz, which deliver an extensive toolbox coupled with a superior user experience to expedite solving debug problems. WaveRunner 8000 has the industry’s widest and deepest collection of tools, making it unbelievably powerful. WaveRunner 8000 marks the debut of the next-generation MAUI advanced user interface, bringing enhancements to the oscilloscope industry’s premier UI. The addition of OneTouch to MAUI makes measurement setup incredibly easy, speeding up dramatically the time to insight into complex signal abnormalities.

News ID 4103

IAR: optimized development tools for new low-power, multi-market MCUs from NXP

IAR Systems announces tool support for NXP Semiconductors’ recently launched LPC541xx family, a series of low-power, multi-market MCUs. IAR Systems is able to provide early support in the complete C/C++ compiler and debugger toolchain IAR Embedded Workbench for ARM, giving developers access to one single toolbox in which all components integrate seamlessly.

News ID 4094

Swissbit: X-60m2 Series M.2 SSDs cover capacities from 30 to 480 GB

Swissbit has released a new product series of M.2 SSD modules. The SATA III durable SSDs use MLC flash memory together with special hardware and firmware features to obtain the maximum possible endurance, data retention and performance from MLC technology. Compliant with the latest SATA III (6.0 Gb/s) interface specification, these drives meet the requirements of today’s industrial, network/communication and automotive applications.

News ID 4093

Avalue collaborates with Microsoft to accelerate IoT solutions

Avalue has joined Microsoft Azure Certified for Internal of Things, ensuring customers get IoT solutions up and running quickly with hardware and software that has been pretested and verified to work with Microsoft Azure IoT service. Microsoft Azure Certified for IoT allows businesses to reach customers where they are, working with an ecosystem of devices and platforms, allowing for faster time to production.

News ID 4091

Diamond: DC/DC power supply family targets rugged networked applications

Diamond Systems announced the extension of its line of Jupiter-MM-5000 high-efficiency, high-precision family of DC/DC power supply modules. New intelligent members of this rugged power supply family offer up to 218W of +5VDC, 12VDC, and +3.3VDC power in either the compact PC/104 form factor or PC/104-Plus form factor and an advanced system controller for complete software control of all power supply functions.
■ Toshiba: IP subsystem for implementing 10 GbE on custom LSI platforms

Toshiba announced the immediate availability of an IP subsystem that has been developed in conjunction with MoreThanIP, a provider of telecom solutions. The solution is designed to easily implement a 10 Gigabit Ethernet interface subsystem into a system LSI. The IP subsystem consists of a 10 Gigabit Ethernet MAC, PCS and high-speed SerDes for custom LSI platforms, including ASIC and Toshiba’s FFSATM.

News ID 4082

■ IPETRONIK: measurement and analysis solutions for automotive at Sensor+Test 2016

IPETRONIK will again be appearing at this year’s SENSOR+TEST trade fair in Nuremberg exhibiting their new hardware and software products for research, test and development requirements. The products on show range from the latest version of the IPEmotion measurement software with new acoustic analysis functions to the latest data logger system, comprising M-LOG V3 and COMgate V3, for high-speed and secure remote data transmission through to the IPEmotion smart fleet management system.

News ID 4123

■ FTDI: compact dual and quad channel hi-speed USB interface ICs

To provide engineers with a greater breadth of IO options and also address demands to conserve board real estate, FTDI has announced new versions of its FT2232H and FT4232H devices. These configurable USB 2.0 Hi-Speed (supporting 480Mbps/operation) ICs are now available in 56-pin VQFN packages, which complement the 64-pin LQFP package format.

News ID 4118

■ DDC: radiation tolerant complete MIL-STD-1553 solutions

Data Device Corporation introduces two new +3.3V completely integrated radiation tolerant MIL-STD-1553 terminals that include transceivers, transformers, protocol and memory. Total-Space ACE offers full BC, RT, MT, and RT/MT functionality to interface directly to a host processor, while the Total-Space RT is an RT only terminal ideal for interfacing with systems without a host processor, such as FPGA and simple logic. Both versions feature an extended -55 to +125°C temperature range, and 300 Krads TID (Total Ionizing Dose) and >85 MeV SEE (Single Event Effects) radiation hardening, required for the extreme environmental

News ID 4110

■ Aitech: 5th gen Intel Core i7 in 6U SBC for custom-tailored designs

Aitech Defense Systems has integrated the latest Intel 5th generation Core i7 processor into a rugged 6U VME SBC that allows existing, legacy platforms access to the latest in high performance data processing. The new C164 features quad-core processing at up to 2.6 GHz and 6 MB of last level cache.

News ID 4105

■ Mouser: SmartBond DA14583 dev kit for sensor-based IoT designs

Mouser Electronics is now stocking the SmartBond DA14583 Internet of Things sensor development kit from Dialog Semiconductor. Merging cutting-edge Bluetooth Smart hardware, sensors, and sensor fusion software, it enables the world's lowest power 12 degree-of-freedom wireless sensor module. Highly integrated into a plastic dongle, the kit cuts system size and cost and includes all essential hardware and software to speed creation of advanced IoT devices.

News ID 4073

■ Corelis debuts new version 8.3 Boundary-Scan Tool Suite

Corelis announced the availability of version 8.3 of its ScanExpress Boundary-Scan Tool Suite. The new software update features an enhanced user interface for ScanExpress Viewer, test and programming support for e.MMC components in 4-bit configurations, and improved scripting support, plus numerous improvements spanning the complete suite of ScanExpress software applications.

News ID 4077

■ Microchip: low-profile SA power module for telecom, industrial and SSD applications

Microchip announces an integrated switching power module designed specifically for height-constrained telecom, industrial and solid-state drive applications. The new MIC45404 comes in a thermally-enhanced package that incorporates inductors and passive components into a single, moulded power converter. The slim 10 x 6 x 2 mm package saves space in customers' designs, simplifies board design, and eliminates concern over passive components that may introduce unexpected electromagnetic interference.

News ID 4075

■ Conrad: enhanced range of C-Control microcontrollers for hardware and software solutions

Conrad Business Supplies has begun stocking a new and updated range of C-Control microcontrollers designed in-house by the Conrad Technology Centrum (CTC). The new solutions offer improved user interfaces and greater customisation options. The flagship product for the C-Control PRO family, is the C-Control AVR32-Bit MCU. In addition to the updated and improved web server functionalities, the product now comes with an easy-to-use programming software called ‘Grape’ which allows simple implementation of ideas using a graphical flowchart. During graphical programming, graphic symbols are displayed together with the relevant ‘C’ Code. This permits accurate control over system communication and makes it an ideal tool for fast familiarisation with the higher programming language ‘C’.

News ID 4073

■ Digi-Key to present part selection efficiency and optimization

Digi-Key Electronics has been invited to present and discuss with attendees how the company’s intensive focus on technical data, relevant content and updated design tools are helping design engineers with their entire Power design process. The industry session, ISO1, titled ‘Aiding Design Excellence’, will take place Tuesday, March 22nd | 8:30 a.m. – 11:55 a.m. at the 2016 Applied Power Electronics Conference (APEC) in Long Beach, CA.

The company offers customers and engineers valuable-added services including a variety of low-cost and professional EDA tools; reference, article and video libraries that offer ‘how to’ videos such as Another Geek Moment and Product Training Modules; online technical support; extensive BOM tool; and more.

News ID 4069

■ DDC: SWaP-optimized, scalable compact rugged avionics interface computer

Data Device Corporation introduces the new BU-67125W Compact Avionics Interface Computer (AIC-RC), offering a completely customizable, off-the-shelf solution, that can be optimized for specific application requirements, and enable faster time to market. The AIC-RC combines best-in-class performance from Intel’s embedded computing architecture, with DDC’s avionics data networking expertise and custom I/O capabilities, to deliver unmatched avionics connectivity computing in a small form factor, deployable, rugged enclosure. mPCIe and I/O expansion modules support a wide range of I/Os. Remote Access allows easy access to 1553/429 connection via Ethernet network.

News ID 4068

■ Qt: long-term supported release adds cross-platform High-DPI functionality

The Qt Company announced that Qt 5.6, the latest version of its cross-platform application and user interface (UI) development framework, is available for download. Qt enables the rapid creation of high-performance, efficient and beautiful applications that run natively on multiple platform screens, whether desk-
top, mobile or embedded. Qt 5.6 delivers a significant level of new functionality that will assist both application development and device creation. This includes cross-platform full support for Windows 10, High-DPI capabilities, and fully leveraging the Yocto Project for embedded software stack builds. Qt 5.6 is a Long-Term Support (LTS) release, which means that users can develop with it secure in the knowledge that the version will receive continued support.

News ID 4064

**Xilinx:** 25G, 50G and integrated 100G RS-FEC solutions accelerate customers’ design

Xilinx announced the delivery of its most flexible and comprehensive Ethernet portfolio for data center interconnect, service provider, and enterprise applications. Xilinx’s comprehensive IP portfolio includes 25GBase-CR/KR, 50GBase-CR2/KR2, 100GBase-CR4/KR4 IP and the newly introduced integrated 100G Ethernet MAC and RS-FEC IP. As the portfolio’s newest addition, Xilinx’s integrated 100G Ethernet MAC with integrated RS-FEC built into 16nm UltraScale+ devices offers 80% power reduction and significant logic savings versus an FPGA soft IP implementation.

News ID 4062

**ST:** low-power electric motors can now dissipate even less power

STMicroelectronics has expanded its Intelligent Power Module portfolio with the introduction of the SLLIMM-nano 2nd series, adding higher power levels and new package options that are especially suited to increasing the efficiency and reducing cost. The new SLLIMM-nano devices suit compressors, pumps, and fans in domestic appliances such as refrigerators and washing machines, and any low-power motors working up to 20 kHz in hard-switching circuits in an application power range up to 200W.

News ID 4061

**Microsemi:** new secured FPGA production programming solution

Microsemi announced the availability of its Secured Production Programming Solution (SPPS) for its FPGAs. The new solution securely generates and injects cryptographic keys and configuration bitstreams into Microsemi’s FPGAs thus preventing cloning, reverse engineering, malware insertion, leakage of sensitive intellectual property such as trade secrets or classified data, overbuilding and other security threats.

News ID 4059

**Gooee and EnOcean partner on self-powered wireless lighting control solution for IoT**

Gooee has partnered with EnOcean to integrate Bluetooth Low Energy based self-powered wall switch devices into the Bluetooth Smart Mesh stack; the primary communication protocol in Gooee’s enterprise IoT ecosystem. The collaboration will result in the first EnOcean-powered wall switch device integrated into the new Bluetooth Smart Mesh protocol, the next evolution of the low power communication protocol that becomes available at the end of 2016.

News ID 4058

**AAEON: next generation SoC debuts on EMB-BSW1 industrial motherboard**

AAEON brings more to its EMB Mini-ITX Industrial Motherboard product line with the next generation SoCs, the Intel N3000 product family. As its name suggests, the EMB-BSW1 utilizes the latest iteration of Intel’s SoC products that was geared specifically towards mobile devices. In addition to enhancements brought on by the new chips, which include improved power consumption, thermal, and performance, the board itself carries a number of features to aid its designed purpose of digital signage, ATM, and POS applications.

News ID 4057

**Xilinx demonstrates 56G PAM4 transceiver technology**

Xilinx has developed a 16nm FinFET+-based programmable device running 56G transceiver technology using the 4-level Pulse Amplitude Modulation (PAM4) transmission scheme. Recognized by the industry as the most scalable signaling protocol for next-generation line rates, PAM4 solutions will help drive the next wave of Ethernet deployment for optical and copper interconnects by doubling bandwidth on the existing infrastructure. Xilinx is introducing and demonstrating 56G technology innovation now, ahead of general PAM4 availability, to help educate and prepare providers and ecosystem members to make this transition.

News ID 4054

**ROHM:** synchronous boost DC/DC converter IC prolongs battery life in/portables

ROHM has recently announced the avail-
ability of a compact, high-efficiency, high power synchronous boost DC/DC converter IC optimized for single-cell battery applications. Many of today’s portable devices (i.e. smartphones and tablets) are driven by single-cell Li-ion batteries that deliver an output of approximately 4.2V at full charge. However, when connecting to interfaces requiring 5V output, such as USB, HDMI, and audio amps for speakers, a DC/DC converter is needed to boost the voltage. At the same time, longer battery life along with greater efficiency are demanded in a smaller form factor.

News ID 4053

Beckhoff: multi-core oscilloscope for “big data” applications
With TwinCAT Scope, measuring applications are as simple as could be, even for “big data” applications: support for multi-core processing also enables the acquisition and display of very large quantities of data. The software oscilloscope is fully integrated within the TwinCAT control architecture and enables the simple graphical display of signal curves using the charting tool.

News ID 4049

Toshiba: three-phase brushless motor driver with sine wave drive
Toshiba Electronics Europe has announced a three-phase brushless motor driver IC that achieves high efficiency and minimal noise at a wide range of rotational speeds without any need for complicated phase adjustment. The TC78B016FTG is optimised for use in the small fan motors found in home appliances and industrial equipment.

News ID 4047

Fujitsu extends industrial mainboard portfolio based on AMD G-Series SOC
The Mini-ITX board family D3313-S further grows with the sixth version of the board. The D3313-S6 is equipped with a powerful Quad-core SoC with 2.4 GHz and is particularly suitable for use with graphics-intensive applications, for example in the field of digital signage and medical technology. As an industrial motherboard the product is designed for 24/7 continuous operation and an extended temperature range from 0 to 60 °C.

News ID 4044

Janz Tec: individual Industry 4.0 solutions especially for mid-size companies
Janz Tec offers integral Industry 4.0 solutions from one source: controls, Industry 4.0 gateways, infrastructure, data storage, data security and ERP integration. The goal of intelligent networking of people, machines and work pieces worldwide and in real time can become reality with the help of Janz Tec systems and with the interwoven expertise of the Janz Group. Janz Tec offers the “Industry 4.0 workshop” and the concept “Industry 4.0 as a service” for usage-oriented individual concepts demanded by mid-size companies.

News ID 4038

Kithara: version 10 of RealTime Suite released
Kithara Software has released version 10 of the RealTime Suite, which introduces a variety of important changes for the real-time extension. For the first time, the real-time system can be utilized on high-performance computers with NUMA architecture. This results in high scalability of processing efficiency as well as memory upgrades of development platforms.

News ID 4037

News ID 4040

ARBOR chosen by Incheon Airport to manage flight information system
Incheon International Airport is one of the largest and busiest airports in the world. On average, there are 1,600 daily flights that are displayed in the information express terminal in Incheon International Airport. The core requirement of industrial computers for the flight information system is high-performance, stability, quality and business continuity for quick and accurate flight information services provided to travellers. To build and sustain such an enormous computing system, the simplicity and durability of the IPC is the first priority.

News ID 4016

Abaco Systems: ‘event analyzer’ – development tool maximizes performance
Abaco Systems announced AXIS Event-View, an innovative software tool designed to enable customers to reduce the complexity, time and cost of developing, testing and debugging sophisticated multi-processor, compute-intensive embedded applications while maximizing their performance. Event-View, previously available as part of Abaco’s complete AXISPro software development environment, is now offered as a standalone tool for the company’s range of single board computers, signal processing boards and integrated systems.

News ID 4017

ETAS: scalable ECU network in-the-loop
To manage the increasing testing required in the time available, despite ever shrinking development cycles, and to maintain cost control over the long term, software testing is now being done long before the test vehicles are ready. One key to this is Hardware-in-the-Loop (HIL) testing. In recent years, ETAS has been continuously expanding the possibilities for this kind of virtual testing, even beyond individual ECUs: NETWORK-LABCAR is one solution for testing highly connected ECUs in-the-loop.

News ID 4018

Kithara Software has released version 10 of the RealTime Suite, which introduces a variety of important changes for the real-time extension. For the first time, the real-time system can be utilized on high-performance computers with NUMA architecture. This results in high scalability of processing efficiency as well as memory upgrades of development platforms.
**Portwell: COM with superior legacy features**
Portwell released the PEM-E205, an ETX 3.02 computer-on-module based on the Vortex86DX3 processor. The PEM-E205 ETX module delivers optimized value and service levels by running multiple applications securely and reliably on virtualization-optimized platforms. Alongside of energy efficiency and legacy-interface support, the PEM-E205 is designed with powerful 32-bit multi-core processor technology and programmable GPU compatible with Microsoft Windows-based, Linux and many other popular 32-bit RTOSs.

**News ID 4100**

**Maplesoft: Maple 2016 offers advanced problem-solving for math, science, engineering**
Maplesoft announced a major new release of Maple, the mathematical software that makes it extremely easy to analyze, explore, visualize, and solve math problems. With Maple 2016, Maplesoft offers important new abilities to educators, researchers, scientists, and engineers that allow them to solve more problems, more easily, than ever before.

**News ID 4031**

**Advantech: 18.5” multi-touch open frame touch monitor**
Advantech announces the release of IDS-3118W, a 18.5” multi-touch open frame touch monitor. IDS-3118W is specifically designed to meet “end users’ needs” in terms of ID design, operating interface, and installation. The product features a wide viewing area (16:9), a more intuitive operating interface with P-cap touch technology, and simpler installation; making it the best choice for multiple embedded applications such as KIOSK, HMI, etc.

**News ID 4030**

**Infineon: multimode flyback controller meets needs of mid- to high-end LED lighting designs**
Infineon Technologies launched a multimode flyback controller IC for LED applications. It can shorten ‘time-to-light’, lower component counts and reduce operational and standby power consumption. Designed to meet the performance and efficiency demands of mid-range to high-end LED designs, the IRS2982S provides a versatile controller solution that can meet the needs of a wide variety of interior, outdoor, office and industrial lighting schemes.

**News ID 4028**

**Mouser: custom-programmable 9-axis motion sensor**
Mouser Electronics is now stocking the BMF055 9-axis motion sensor from Bosch Sensortec. Featured as one of EDN’s Hot 100 Products of 2015, this System-in-Package MEMS sensor is part of Bosch Sensortec’s Application-Specific Sensor Node (ASSN) family. The device combines an accelerometer, a gyroscope, and a magnetometer with an ARM Cortex-M0+ processor from Atmel’s SAMD20 microcontroller family. Integrating three sensors with a powerful ARM microcontroller, the BMF055 is an ideal solution for designers looking to develop advanced application-specific sensor fusion algorithms, add sophisticated motion sensing capabilities, and replace multiple discrete components in their Internet of Things designs.

**News ID 4027**

**DDC: cost optimized, scalable 32 channel ARINC 429 PMC/XMC**
Data Device Corporation introduces the new DD-40002X high density 32-channel ARINC PMC and XMC boards, offering advanced functionality, with programmable and fixed I/O configurations. The DD-40002X is designed to support maximum data throughput on all channels, while also providing DMA for low CPU utilization, error detection, and label filtering per channel.

**News ID 4024**

**AAEON brings 6th Gen Intel Core to Mini-ITX**
August 2015 brought the launch of the 6th Gen Intel Core CPUs. AAEON incorporated this new technology into the Mini-ITX form factor with the EMB-Q170A, EMB-Q170B, and EMB-H110B industrial motherboard. Using the S-variant of the processors, all three boards benefit from the new chips’ native support for more advanced memory, namely the DDR4 memory, and 4k media content support, for upgraded graphical as well as general performance.

**News ID 4023**

**IBASE: rugged in-vehicle digital signage system with wide-range DC power input**
IBASE Technology has announced the SE-602-N designed as an outdoor and in-vehicle digital signage system with a wide range DC power input of 7 to 36V. Based on 5th Generation Intel Core processors, the SE-602-N is built to withstand continuous vibration and wide operating temperature range of -40 to 75°C that makes it suitable for outdoor and automotive signage applications.

**News ID 4009**

**nanotron: low-cost exclusion zone solutions for operator safety**
As part of its joint initiative with Decawave to simplify how developers utilize UWB location-awareness nanotron Technologies announces the market launch of its new swarm bee ER location sensor. In the product name the suffix ER stands for Enhanced Resolution and signifies Micro-Location with UWB achieving 10 cm location accuracy. The new product belongs to nanotron’s family of swarm bee modules. All of them utilize the same common swarm API and target the growing market for autonomous smart items. Smart items combine wireless data communication capabilities with location-awareness and serve as a platform for sensors and actuators.

**News ID 4008**

**Silicon Labs reduces design time using Cadence mixed-signal low-power flow**
Cadence Design Systems announced that Silicon Labs used a Cadence mixed-signal low-power flow to reduce overall design time, significantly speeding time to market. Silicon Labs adopted the flow for its new Blue Gecko family of wireless SoC devices that provide ultra-low-power Bluetooth Smart connectivity for IoT applications.

**News ID 4007**

**congatec appoints Technagon as sales technology partner**
congatec has appointed design services company Technagon as sales technology partner to strengthen its portfolio of customer-specific system design & manufacturing services for point-of-sale and ticketing systems, vending machines and systems, digital signage and eMobility applications.

**News ID 4005**
The Internet of Things brings together physical things with the virtual world of the Internet. The IoT links together networks, sensors, machines and devices, and enables a multitude of new business opportunities, products and services.

The conference will take place on May 12, 2016 in Nuremberg/Germany. It will run parallel and in co-operation with the SENSOR+TEST show, at the show ground conference centre (NCC Ost).

The Conference Programme will run from 10h00 to 17h00. There will be up to 3 parallel conference tracks with technical Presentations about:

- Technologies, Solutions & Applications
- Hardware, Software & Services

The Conference Programme will be structured into different Sessions about following topics:

- From the Sensor to the Cloud
- Tools & Software for IoT Designs
- IoT Solutions for Industry 4.0, Smart Buildings & more

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