

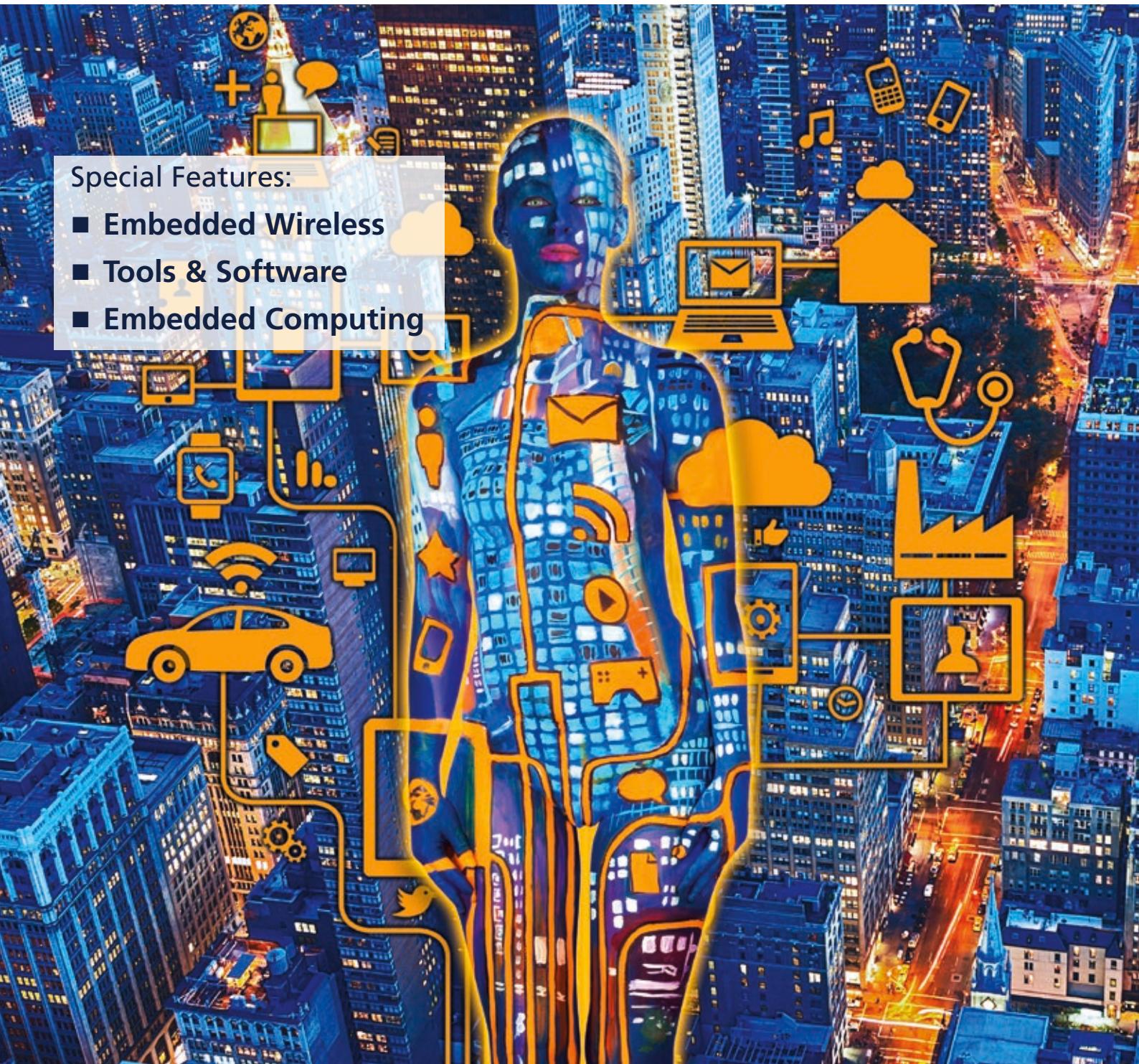
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October 05/15

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Dear Readers,



There is no doubt – the Internet changed our behaviour and therefore our daily life since it started approximately 20 years ago. During this period – I would like to call it the first step – the Internet developed to an universal information platform, knowledge base, and distribution channel. Nowadays if you need information about any topic you search in the Internet and you will get it with just one click. If you want to buy a specific product – you'll find it in the Internet - mostly for a lower price. But there was still the interaction of humans needed. And the wireless communication enabled us to access the internet from nearly any place in the world at any time we like. But now it seemed that we are at a turning point and will do the second step into the Internet of Things (IoT) in which no human interaction is needed any longer. The connected devices will talk to each other undependable mostly via wireless links.

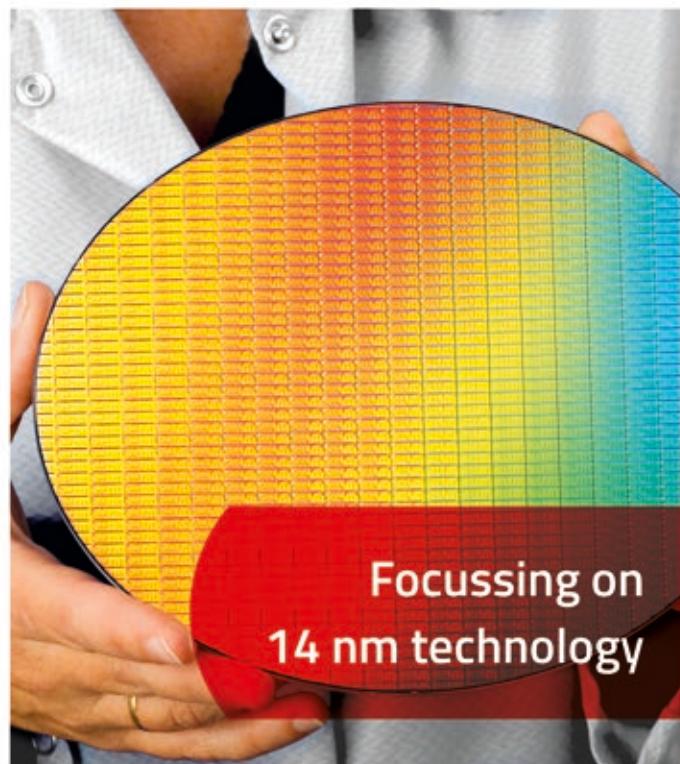
Our cover story starting at page 6 shows that the Internet of Things is not a real new thing but an optimal combination of still existing technologies. The disciplines of sensor technology, data preparation and data processing, data output, actuator engineering, connectivity and security come together in the Internet of Things. The terms IoT and the very closely related Industry 4.0 are now widely recognised in the industry and a starting point for further discussions. IoT applications will affect any of the traditional market segments like automotive, consumer, healthcare, high-rel, and renewable energies, and the industrial area is also supported with applications such as M2M and Industry 4.0. Communication between machines (M2M) has been already an important area for decades. However, the Internet, with its infrastructure and the increasing spread of products such as PCs, tablets, smartphones, and new semiconductor products, has not only shaken up the market completely but also permitted totally new approaches to solutions in areas which were not previously relevant at all.

But what about security? Current manufacturers are still developing products using old and entrenched supply chain, engineering, and QA processes that weren't designed for the complexities of highly-connected smart devices nowadays. Likewise, engineering teams are utilizing an increasingly diverse set of suppliers and relying on third-party software where possible to save developer time, all while trying to satisfy the business and market thirst for these new capabilities. Unfortunately, many software development teams treat security as an afterthought, running only basic checks, if any, during their QA cycle. But there is a solution. The GrammaTech article starting at page 14 introduces CodeSonar, a binary analysis technology which provides developers with the ability to evaluate, check, and inspect third-party code, and provides businesses with more options within their supply chain, enabling them to utilize software from new, innovative companies that might not have an established reputation. When source code is available, you can use CodeSonar in mixed source/binary mode, analyzing complete applications.

And if you run over the pages of this issue you'll find more useful information about the ongoing activities in the IoT. Enjoy!

Yours Sincerely

*Wolfgang Patelay
Editor*



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The Internet of Things is a paradigm impacting our daily life for good or bad. IoT software needs security by design, therefore it is a business imperative. Manufacturers must evaluate the cyber threats and level of exposure of IoT devices, implementing all necessary design checks and countermeasures against the accelerating set of menaces.		
Digital signatures: fighting firmware hacking and hardware cloning	18	
		
In the age of the IoT, firmware attacks are becoming an increasing danger. Digital signatures can protect embedded applications against hacking and prevent the cloning of hardware.		
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The new Intel Pentium and Celeron SoC processors (codenamed Braswell) are impressive with their massive plus in graphics and more balanced overall performance. But why is this high level performance necessary on a 4-watt Scenario Design Power and what makes these new top-class low-power systems so special?.		



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IoT: classic and also quite different

By Thomas Staudinger, EBV Elektronik

This article shows that the Internet of Things is not a totally new technology – it is based on already existing technologies which are now combined to create the ubiquitous connectivity of anything.



Strictly speaking, the Internet of Things (IoT) is not a new venture for EBV Elektronik. EBV has, for many years, been working on topics which are now specific to IoT or directly associated with it, but which were not classified as IoT before the term was coined. The disciplines of sensor technology, data preparation and data processing, data output, actuator engineering, connectivity and security come together in the Internet of Things – and EBV has been continuously active in all these areas for over a decade. The terms IoT and the very closely related Industry 4.0 are now widely recognised and a starting point for further discussions.

One of the main strengths of EBV for many years has been its ability to combine these individual areas and from this combination develop new potential for its clients. For some years, this has found expression in the segments on which EBV has focused: on the one hand, the classic market segments including the automotive, consumer, healthcare, high-rel and renewable energies segments and, on the other hand, the technology-driven FPGA, identification, LightSpeed and RF and wireless segments. Two examples from the healthcare market segment clearly show the extent to which technology is used in it: A diabetes management system essentially consists of a blood glucose meter, an app on a smartphone

and a patient database in the Cloud. At intervals throughout the day measurements of the blood sugar level are recorded and transmitted to the smartphone by Bluetooth Low Energy (BLE). The patient can use the associated app to document other things such as food intake. They also receive advice and recommendations via the app about correct diet and fluid intake. The data are bundled together from the app and transmitted in encrypted form to a patient database. Professional medical personnel can then access these data and provide the patient with appropriate advice and notifications, such as about the insulin dosage to be given. This system can also be supplemented by an automatic or semi-automatic insulin pump, attached to the patient body.

Another example from the area of personal health and fitness is the activity tracker or activity monitor. Numerous versions of these are now commercially available, from simple step counters to complex sports watches, which measure the blood oxygen saturation and heartbeat of the user. There are differences in the features and the precision. Most devices have one thing in common, namely a BLE connection to a smartphone, an associated app and/or an interface to the most popular fitness and running apps. The data are usually sent by the smartphone to the Cloud in unencrypted form. By private arrange-

ment these data can then be seen by friends. In these applications, unlike in the medical application, no great value is placed on data security, since it is up to the users to decide whether or not to share their data publicly.

The industrial area is also supported with applications such as M2M and Industry 4.0. One important area is NFC – dual interface programming of motors (motor control unit) by mobile NFC. Applications of this type are to be found in the Industry 4.0 area, where displays and touchpads on machines are being replaced by tablets. Also of interest is the networking of electrical energy storage devices and the newly planned business models of the energy suppliers. For example, one of these business models enables energy storage devices to be filled from various renewable energy sources (solar, wind, bio, hydro...) several times a day (up to 3 times) and for the energy to be accessed at peak times each day. The smart meter gateway and the smart meter are absolute necessities for this. Such a model is particularly appropriate in Germany for the owners of solar power systems which have come to the end of their feed-in compensation period, as they will now achieve a faster return on their investment in their energy storage devices with this model. In Germany there are already 60,000 compensation schemes for private homeowners which are due to expire in



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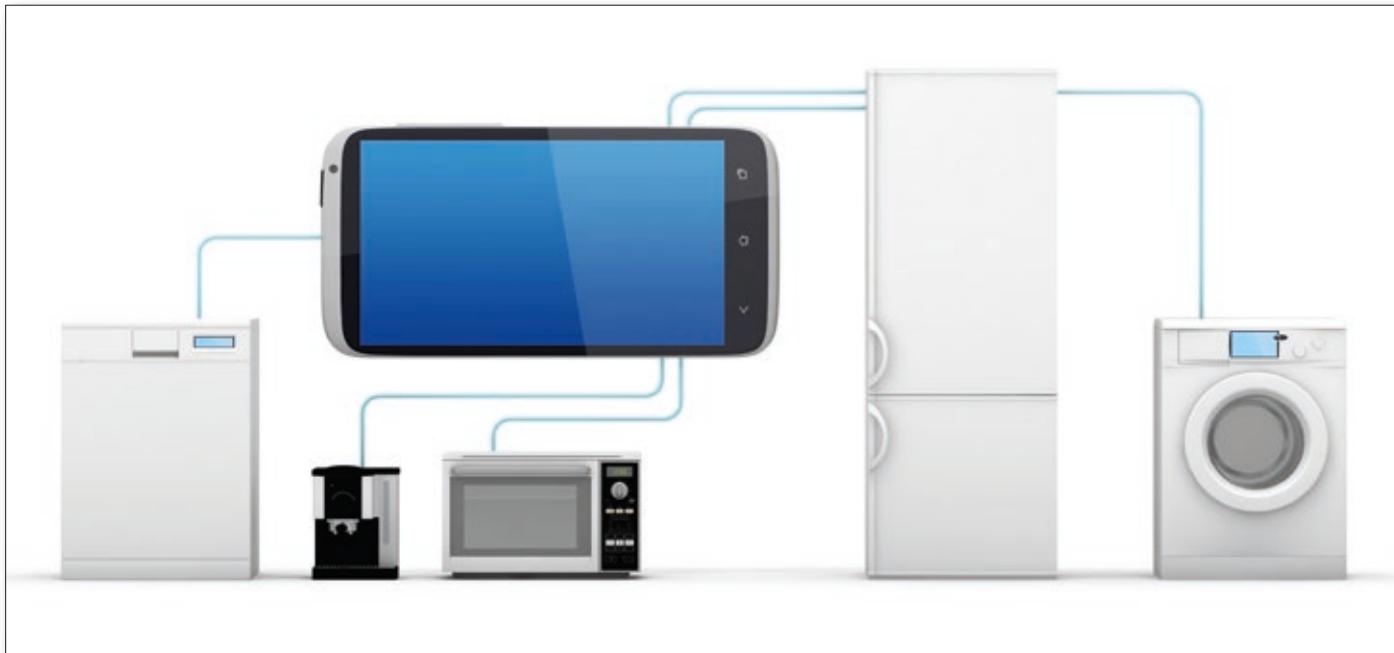
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For all information, design know-how and application support please contact your local partner of EBV Elektronik, the leading specialist in EMEA semiconductor distribution, or check under ebv.com/titan.

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2018. Since these installations are all still functioning well and generate electricity at the cost of their upkeep it is advantageous to install a storage device.

Communication between machines (M2M, machine-to-machine) has been an important area for EBV for decades. However, the Internet, with its infrastructure and the increasing spread of products such as PCs, tablets, smartphones and new semiconductor products, has not only shaken up the market completely but also permitted totally new approaches to solutions in areas which were not previously relevant at all.

One good example of how EBV Elektronik is driving interdisciplinary thinking with networked solutions is the science magazine *The Quintessence*, where EBV has been reporting on new ways of using these technologies in special issues since 2007. The company articles in *The Quintessence* always look at the bigger picture in order to generate inspiration for new products by interlinking different categories of items and talking about work that crosses various areas. The most recent issues, for example, have looked at sensor technology, the Internet of Things, cyber security, Cloud technology and Industry 4.0, while the next issue will be devoted to smart systems.

As EBV has already been working in the areas which are now known as the Internet of Things or Industry 4.0, more than 120 EBV field application engineers (FAEs) and other specialists view these terms more as catchphrases which are often overemphasised in the press in order to have public appeal. It is much more important to make developers and decision makers clearly aware of the importance of the IoT in

their own professional (and also private) environments, so that they can leverage its growing potential in the best way possible. Thus, EBV always asks itself a single fundamental question: how can we help our customers to develop a solution that is smart, has a permanent data connection with the outside world and enables secure communication? In short: it is about being smart, secure and connected everywhere.

With its market matrix technology, EBV Elektronik already has a very good initial approach to determining which technology can provide what added value to the corresponding application, in order to achieve a competitively viable product. With the IoT, however, the challenges facing EBV clients also change, when, for example, an existing autonomous device needs to be connected to the Internet or to a Cloud solution. This connection also brings with it new requirements. For example, a wireless module in combination with the corresponding software solution may provide the desired connectivity, while an appropriate security solution may provide the corresponding data security for authentication and data exchange.

EBV customers know their core products inside out – these are often autonomous devices – and the customers are often world leaders or hidden champions in their sector. However, as far as RF technology and security are concerned, in many cases these companies have had little or no involvement until now, so that in many instances they do not have enough of the appropriate resources in-house to meet the challenges of the IoT. This is where EBV Elektronik comes in, as it has a particular strength in its ability to assist these customers with appropriate resources and specific know-

how, in bringing their new product to market as soon as possible. At the same time, EBV explicitly addresses the security risks which arise with the data transmission, for at the end of the day an appropriate security solution can always be found using suitable semiconductor components and appropriate software.

In principle the IoT connects different markets which have existed until now as essentially isolated solutions, in the same way that the Internet networks together stand-alone computers and PCs. This has blurred the lines that used to separate many applications from each other. In this way, the previous sharp divisions between many applications are softened. Good examples of this include sportswear that can now contain sensors or pieces of furniture with built-in recharging units for wireless charging of mobile devices. Typically, the sportswear or furniture manufacturers were previously not electronics specialists, so they require suitable partners to implement the electronics functionality for them while taking into account characteristics of the corresponding solution from all possible angles. EBV shows these companies the possibilities offered by the technologies and provides introductions to suitable partners who are able to address the individual requirements of the corresponding area of business or solution in an appropriate way. For example, EBV Elektronik helped a major sportswear manufacturer to incorporate a pulse rate sensor in outerwear and pressure sensors in running shoes. These applications often require a flexible board for the semiconductor connection.

Similarly, there are watch manufacturers with a very long tradition and an excellent name in the market who are now beginning to market

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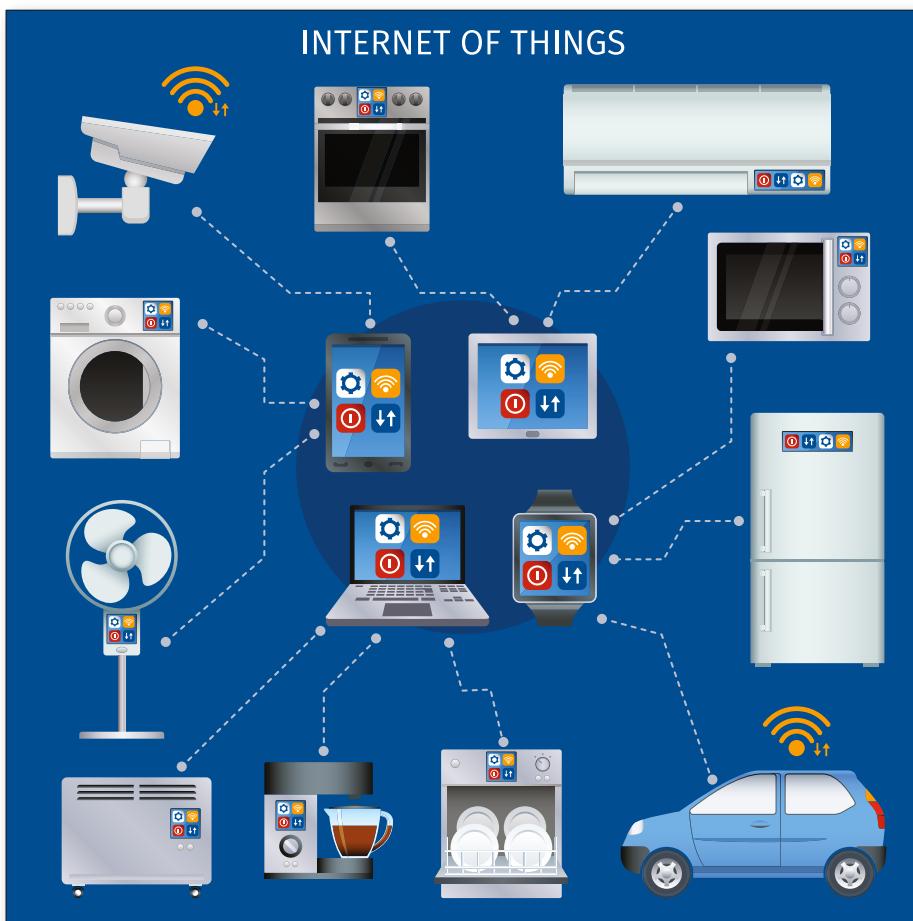


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a smartwatch, in order to prevent classic electronics suppliers such as Apple, Samsung etc. from taking away their livelihood and in order to secure their place in this future market segment. In these cases, EBV becomes involved in what is akin to matchmaking by introducing these new customers to other customers who have the expertise to help them with the implementation of the application.

Start-ups also have very clever ideas but often the hardware for these businesses is only a standard product which they need to implement their business idea. Often these businesses are primarily distinguished by their software and services, by the connection to the Cloud and/or by the underlying data processing. EBV has already helped various start-ups to bring their products to market – sometimes even by brokering a contact with a potential financial backer or investor or with an appropriate manufacturing partner. Again, EBV can often provide start-ups with vital logistical support, such as for the organisation of software updates or for the outsourcing of gateway, server and/or Cloud services. In Europe too, the IoT provides clever start-ups with a very good chance of realising their ideas – even (but by no means only) in the areas of wearables, personal healthcare, fitness sensors and trackers. In Central Europe EBV has a team of seven people which deals

solely with start-ups and in 2014 identified a good 400 customers.

Sometimes there are no appropriate semiconductors for the particular market or the desired design. One reason for this might be the fact that this market moves or changes too quickly; however, it might also be that the classic semiconductor manufacturers feel that a market or a field of application is not attractive. Under its EBVchips programme, EBV Elektronik is able to create a solution relatively quickly for applications that were previously not covered. Two of the products which come under EBVchips are not pure semiconductors but wireless modules, known as Vesta and Maia, for special applications. Vesta and Maia provide developers with a platform that they can use to bring a software-configurable product with Internet connection to the market relatively quickly. While Vesta is a sub-GHz module for IP500 mesh networks, Maia is a sub-GHz module which EBV delivers with approved stacks for M-Bus and OMS.

Sensors, which capture the status quo of various quantities, constitute an important element of the Internet of Things. EBV Elektronik is fully equipped with its very wide range of sensors. An intelligent pre-processing of the sensor data directly at the sensor permits a significant reduction in the data

volumes transmitted over the RF interface. This reduces the workload of the frequency band used while reducing the power needed for transmission. It is precisely in such cases – where sensor data are to be captured in the field, possibly pre-processed and then transmitted onwards – that low power design is often a very important topic. One good example of this is a battery-operated temperature sensor which transmits its data over an RF connection to a computer. The smaller the energy requirement for the switching, the longer the sensor system is able to operate without a battery recharge and the lower the maintenance cost will be. Above all, the low power microcontrollers produced by Atmel, Freescale, NXP and STMicroelectronics, which contain an ultra-low power processor core from ARM, now enable astonishingly long battery lifetimes.

The data processing is followed by actuator control, so the EBV programme includes a wide range of motor drivers for the regulation and control of motors and also offers many possible solutions for smart lighting. Smart lighting involves intelligent lighting solutions – including the control of brightness and colour temperature.

The catchword Industry 4.0 refers to a high level of networking in the manufacturing area. One relatively new aspect in this area is predictive maintenance. Here, sensors identify potential wear and tear and alert operators in good time, before a breakdown, that maintenance and/or a replacement of parts is required. EBVs involvement with Industry 4.0 is no longer limited to the purely technological implementation, but extends to answering questions such as: How do I work with that? What does it mean? Who are the players? What are the repercussions?. Consequently, the challenge for EBV is to bring the discussions with its customers to a higher level and to help them to adapt their processes, supplementing product-related advice with the business element.

New possibilities are also arising in the areas of home automation and the connected car. In a house, for example, most light switches could be dispensed with if sensors were able to detect where people were. These sensors also provide valuable input for the efficient control of heating. At the same time, German car manufacturers are assuming that by the year 2020 at least every second new vehicle will be a connected car, i.e. a vehicle with a permanent Internet connection.

In the medical area the IoT allows new forms of patient monitoring. Appropriate sensors on the patient's body and a smartphone in their pocket can continuously monitor certain vital

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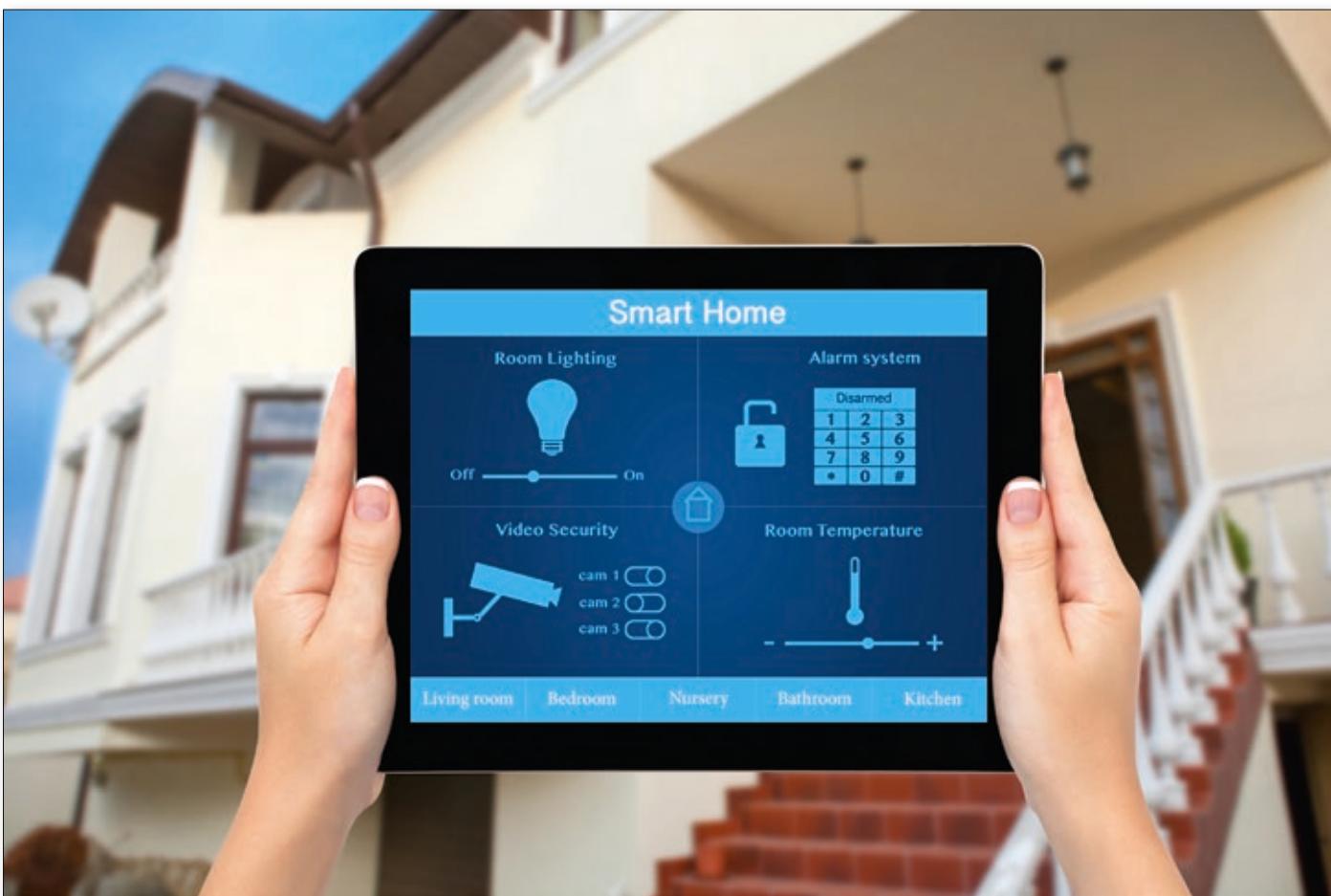


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parameters in everyday life, without them needing to be in hospital or to visit a doctor daily. In such applications the IoT not only provides for a much higher quality of life but also reduces the treatment costs at the same time, so that the improvement in the quality of life is also of interest from the purely financial point of view. This type of patient monitoring system primarily uses BLE and Wi-Fi for data transmission.

While EBV provides its customers with the necessary technical support in connection with the IoT, the support also extends far beyond purely technical aspects. It begins with information about the possibilities offered by the IoT, continues with technical seminars with specific manufacturers on applications and/or vertical markets and extends to consultancy services which can sometimes even lead to a radical review of the business model. For example, one of its customers had previously developed and manufactured compressors but now sells compressed air as a service: instead of selling its customers a machine, it now provides them with air with a well-defined, permanently available quality and specification. Making use of the previously mentioned predictive maintenance in the framework of the IoT and the resulting reliability, by virtue of offering a service, this customer is now able

to create much more value. Of course the EBV customers themselves determine their business models, but with the right questions EBV experts are able to trigger interesting discussions about relevant points.

Although EBV core business is very clearly semiconductor distribution, the company has also been investing in software support for some time. This means one EBV employee is solely concerned with the investigation and qualification of the software of potential and existing partners, so EBV is able to involve qualified third-party suppliers in order to facilitate the fastest possible implementation of the customer solution. It has already certified some 20 companies whose software is specially tailored to IoT applications. The spectrum ranges from engineering services and software houses to Cloud partners.

Data security is a sensitive but extremely important topic. EBV increases the awareness of its customers for this topic by asking questions like: have your products already been copied? During an analysis of competitors, one of our customers discovered that a certain device, albeit with an outwardly different appearance, was an exact copy of its own product. How high is the risk that people will access the data, manipulate them or

pass themselves off as authorised to access the data and tap into them? The level of demand for security and identification products is currently accelerating massively: while up to about a year ago EBV only received three or four queries per year about ID and security solutions, it is currently receiving between 15 and 20 queries per month.

As far as the topic of identification and security is concerned EBV has all the market leaders on its product line card, including the manufacturers Atmel, Infineon, NXP and ST. Depending on the application, even a small crypto-component can have a large effect, and sometimes complete security solutions with key management etc are also required. In this area too EBV works with corresponding partners such as the Fraunhofer Institute for Applied and Integrated Security (Fraunhofer AISEC) in Garching near Munich. EBV FAEs are specially trained in security and help developers to recognise the potential dangers and work through the corresponding issues. Since very few medium-sized companies have the resources to create their own secure server infrastructure, collaboration with the appropriate specialists in the field is an absolute must in this area in order to ensure the long-term success and the survival of the business. ■

■ **home2net: secure cloud access with a RJ45 micro module**

home2net celebrates the world premiere of its super-compact micro-module web@ctrl-mm for secure and easy cloud access. web@ctrl-mm is a cloud connected I/O controller and complements the web@ctrl family. With physical dimensions of 42 x 20 x 16 mm only it neatly fits on almost any kind of OEM Device replacing an "ordinary" RJ 45 Ethernet connector.

[News ID 3247](#)

■ **Telit: Pan-European connectivity solution for IoT**

Telit announced the introduction of a Pan-European coverage with enhanced performance, one roaming price for all operators. Features include seamless roaming across Europe as well as Russia and Turkey; In addition, value-added services that allow customers to remotely manage and troubleshoot their deployment (e.g. roaming steering control by the end customer) are offered, thereby improving serviceability and transparency to their end customers.

Service bundles include module plus SIM, module plus SIM plus value-added services, and a bundle that extends connectivity to the Cloud. When new projects are created, signif-

icant benefits are obtained when the full offer is utilized. These services are agnostic and available for customers that use a third-party for their connectivity.

[News ID 3288](#)

■ **ADLINK debuts Intelligent IoT Gateway Starter Kit based on Intel IoT gateway**

ADLINK has released its new Intelligent IoT Gateway Starter Kit. The IoT Gateway Starter Kit combines ADLINK's MXE-202i intelligent IoT gateway, based on Intel Atom E3826 processors, ADLINK's EdgePro IoT device & sensor management application, one light sensor and corresponding siren output, Modbus TCP module, and accessories, all utilizing industrial open standard protocol with security function powered by Intel® IoT Gateway.

[News ID 3366](#)

■ **Sierra Wireless: IoT platform combines cloud, hardware, and managed connectivity services**

Sierra Wireless announced an integrated service platform that combines cloud, Internet of Things hardware, and managed connectivity services to support worldwide deployments. The new IoT Acceleration Platform is unique in that it provides global multi-operator coverage by combining Sierra Wireless and third-

party network operator SIMs, all managed from a single unified connectivity platform.

[News ID 3397](#)

■ **Arrow to host seminars covering all aspects of IoT**

Arrow Electronics announced plans for a wide-ranging and all-embracing set of seminars on the Internet of Things across Europe. The IoT in Focus tour will encompass locations in Germany, France, UK, Sweden, Denmark, Poland, Austria, and Switzerland and cover connectivity and embedded applications, system integration, big data and the cloud

[News ID 3406](#)

■ **Mouser: enhanced Internet of Things applications site**

Mouser Electronics announced the introduction of their updated Internet of Things Applications site. Mouser's updated and enhanced Applications site brings together the two evolving technologies critical for IoT: wireless connectivity for interconnecting embedded systems, and smart sensors. Combined with recent advances in low power microcontrollers, these new "things" are being connected to the internet easily and inexpensively, ushering in a second industrial revolution.

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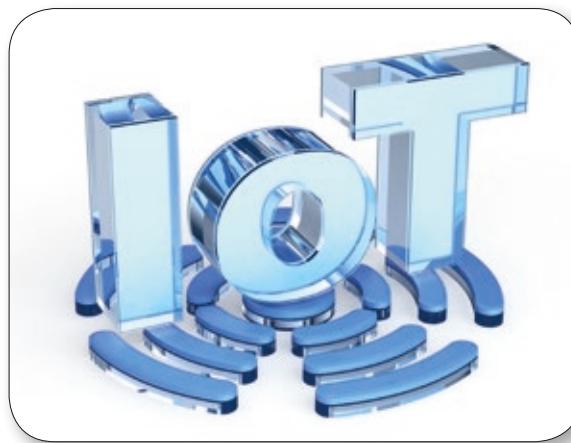
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The needed impact of the IoT on software engineering

By Marc Brown, GrammaTech

The Internet of Things is a paradigm impacting our daily life for good or bad. IoT software needs security by design, therefore it is a business imperative. Manufacturers must evaluate the cyber threats and level of exposure of IoT devices, implementing all necessary design checks and countermeasures against the accelerating set of menaces.



Powered by the forces of the cloud, connected endpoints, wireless technologies, and big data, the Internet of Things (IoT) evolution is forming a perfect storm. This single, transformative force is bigger than anything in the history of the tech industry, fuelling an unparalleled consumer-oriented features race, expected to advance at an incredible rate over the next decade.

And why not? Vendors are racing to claim a piece of the predicted 8.9-trillion-dollar IoT market by 2020, made up of more than 50 billion IoT devices spanning nearly all markets – automotive, energy/utilities, home appliance, consumer electronics, medical, education, manufacturing, and more. Although very exciting to the consumer, this race for IoT superiority also brings to light a significant dark side.

Current manufacturers are still developing products using old and entrenched supply chain, engineering, and QA processes that weren't designed for the complexities of highly-connected smart devices nowadays. Likewise, engineering teams are utilizing an increasingly diverse set of suppliers and relying on third-party software where possible to save developer time, all while trying to satisfy the business and market thirst for these new capabilities. Unfortunately, many software

development teams treat security as an after-thought, running only basic checks, if any, during their QA cycle.

This confluence of drivers – the lack of a security-first engineering philosophy, the increased use of third party software, and the continually growing time-to-market pressures from business executives complacent about IoT security – will continue to put us in an ever-increasing tough spot, ripe for cyber criminals and nation states looking to exploit these connected devices and networks. These software vulnerabilities have already put consumer safety and privacy at risk, increasing corporate liabilities, eroding trust, and in some cases, shutting down critical public and industry services.

The fact of the matter is that nowadays smart devices are anything but smart. One recent study found that 70% of the top 10 IoT smart devices are vulnerable to exploitation. The daily onslaught of news reports regarding new devices, appliances, and systems that have been hacked includes stories that are quite terrifying, such as hackers remotely taking control of an automobile through its wireless hot spot connection and successfully commanding brakes and other critical systems. So how do we evolve manufacturing processes to better protect our next-generation

IoT devices? It starts with a sound plan that includes next-generation software assurance and a security-first methodology. Teams need to rethink how they deliver software quickly – with security, safety, and quality in mind from design to deployment. To do this successfully, teams must leverage new tools that help them more efficiently analyze the software they are developing – including both source and binary code.

New levels of software integrity can only be achieved if teams are able to eliminate both accidental coding errors and intentional design-in vulnerabilities, through efficient analysis techniques suitable for actual highly complex applications. Teams can start by: mandating the use of source code analysis across their development teams – during development, quality assurance, and security auditing, utilizing binary analysis for third-party code analysis, and developing with a security-first philosophy.

As IoT applications become more feature-rich, with additional elements of internet-connectivity and device intelligence, the risks of built-in security vulnerabilities are increasing. Despite this trend, awareness of the risks associated with insecure code is still low among IoT developers and QA teams, and not a priority with most management teams.

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Figure 1. CodeSonar static-analysis tool for source and binary have the ability to detect vulnerabilities before products are shipped, dramatically reducing security threats and corporate exposures

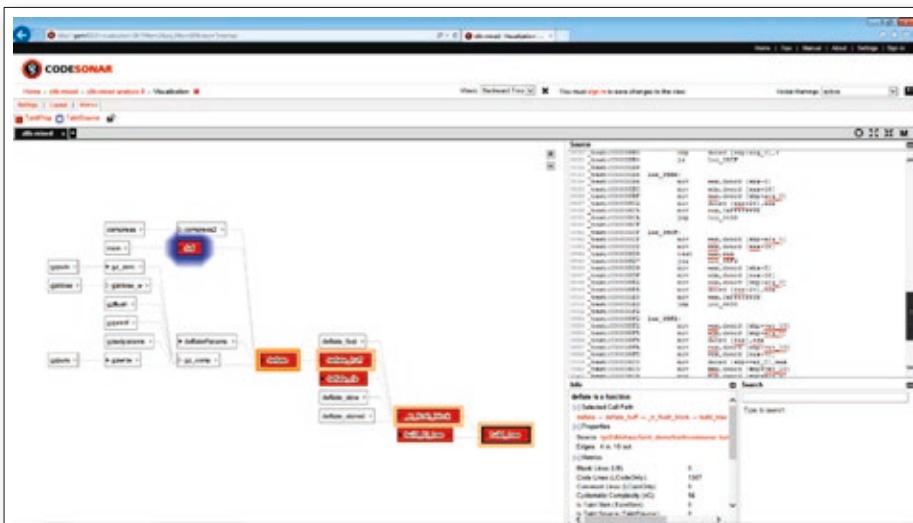


Figure 2. The precision of CodeSonar taint analysis capabilities has substantially increased, which includes new tainted buffer access and indirect function call checkers

Modern static analysis tools are popular because they have proven to be effective, they are simple to introduce, and they can be used by development, QA, and security audit teams. Furthermore, in contrast to traditional dynamic testing, the code analyzed is never executed, so there is no additional test case development overhead and static analysis can be applied very early in the development process. When programmers use static analysis as soon as code is written, bugs and security vulnerabilities can be found and eliminated even before the unit testing or integration testing phases begin. The earlier a defect is found, the cheaper it is to fix; this cost saving is a major advantage of automated static analysis.

Fortunately, static analysis tools for source and binary have the ability to detect vulnerabilities before products are shipped, dramatically reducing security threats and corporate exposures that cost organizations several millions

of dollars. We've seen this numerous times in the recent news, for example with Toyota's unintended acceleration issue estimated to cost \$3 billion in addition to the brand's first black eye; with the potential safety hazards arising from the recently-hacked Uconnect vulnerability of the Jeep, affecting over 470,000 vehicles; and with the recent hacking of several SCADA systems, most notably the Stuxnet exploitation, used to attack and destroy industrial equipment.

It's simply unacceptable for development teams today not to provide the added level of software assurance needed that is available with static analysis tools. CodeSonar can be easily deployed for the cost of a developer's morning coffee and scone.

Over the last few years, third-party code has moved from a minor factor in software development to a dominant force in the industry.

It is now used throughout software development in all applications, from highly sensitive government applications to security-intensive financial systems to safety-critical applications to consumer and mobile applications.

According to the latest report from VDC Research, the majority of software that runs on embedded devices is now developed by external sources, not in-house development teams. Some of this is open-source, but in embedded applications, nearly 30% of code is third-party commercial software – so the source is often unavailable. Such components include graphics toolkits, cryptography libraries, and communications middleware (network, USB, Bluetooth), which make up nearly 70% of the common embedded attack vendors.

GrammaTech, leveraging over 10 years of collaborative research, has developed a binary analysis capability to examine third-party code without requiring access to source code. This capability is fully integrated within our proven static analysis tool, CodeSonar, the first and only commercially-available binary analysis product. CodeSonar binary analysis technology provides developers with the ability to evaluate, check, and inspect third-party code, and provides businesses with more options within their supply chain, enabling them to utilize software from new, innovative companies that might not have an established reputation. When source code is available, you can use CodeSonar in mixed source/binary mode, analyzing your complete application.

The days of developing a standalone application are gone – the Internet of Things has rapidly forced manufacturers to rethink how their products will support today's connected economy, and changed the threat landscape forever. Today reality is that there are educated attackers whose sole function is to break into IoT systems for many reasons, including fun, intellectual stimulation, profit, or worse, offensive attacks and terrorism.

Software development teams must nowadays adopt a robust secure design lifecycle, giving them the insights and capability to get it right first, to prevent these attackers from having a chance at breaking in. A general rule of thumb for teams to follow involves an end-to-end threat assessment ,from a third-party audit team, security-optimized designs, and security-scanning tools, of source and binaries.

CodeSonar is ideal for zero-defect tolerance embedded environments because it analyzes both source and binary code to identify serious security and quality liabilities that cause system crashes, memory corruption, data races, and other unexpected vulnerabilities. CodeSonar 4.1 includes new distributed anal-

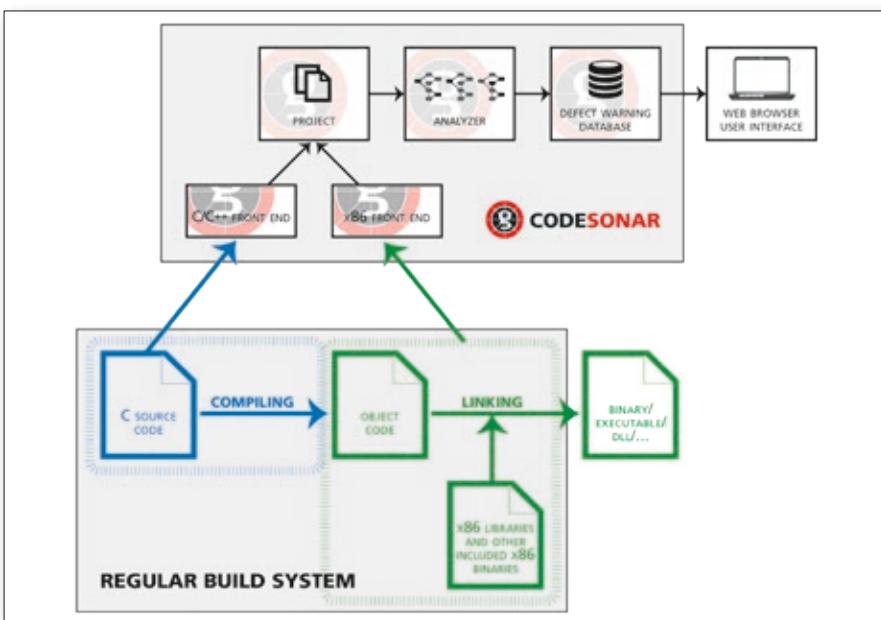


Figure 3. When source code is available, you can use CodeSonar in mixed source/binary mode, analyzing the complete application.

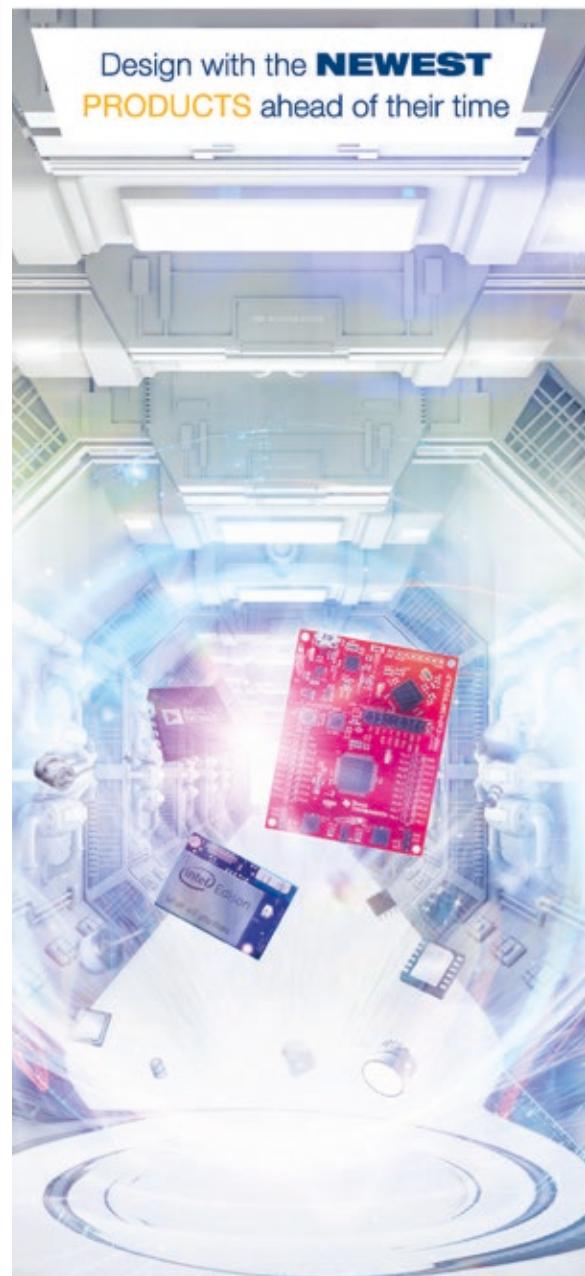
ysis capabilities, deeper tainted data analysis, and binary analysis support for x64 processors. Combined, these advances will help developers build more stable and secure code in the IoT era. New technical advances in CodeSonar 4.1 include:

Deeper Tainted Data Analysis – GrammaTech has substantially increased the precision of its taint analysis capabilities, which includes new tainted buffer access and indirect function call checkers. Analyzing indirect function calls more precisely is invaluable in discovering serious security vulnerabilities such as the recent Heartbleed bug.

New Distributed Analysis – Through groundbreaking research at GrammaTech, funded by the Department of Homeland Security, CodeSonar now distributes static analysis processing across a large numbers of heterogeneous machines (such as Linux, Windows,

and Unix simultaneously). This development has the potential to speed up the analysis phase in proportion to the number of processors in the analysis pool, and gives developers the flexibility to turn up the depth of their analysis to find more critical defects.

Binary support for x64 – As the only commercial static analysis tool with binary code analysis, the 4.1 release extends GrammaTech position as the binary analysis authority by adding the ability to analyze 64-bit Intel microprocessor code. As a result, more development teams will have access to GrammaTech binary analysis to ensure that their third-party code meets internal security and quality standards. Analyzing binary code alongside source code with CodeSonar has been shown to find 40% more defects than when source code alone was analyzed. (Programs tested were a mix of 75% source and 25% binary code.) ■



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Product News

Altia: code generation support for STM32F7 MCUs

Altia announces code generation support for the new STMicroelectronics STM32F7 Microcontroller. The STM32F7 addresses a broad range of applications and is the first microcontroller on the market to feature the new ARM Cortex-M7 processor: the latest and highest-performing Cortex-M core for advanced consumer, industrial, medical, and Internet-of-Things devices.

News ID 3271

SEGGER: compression system tailored for embedded devices

SEGGER launches emCompress, a compression tool for embedded systems to reduce the required storage on the target for boot images, HTML files or other static data. emCompress automatically picks the best algorithm for the memory available. It reduces flash memory sizes, costs and data transmission time.

News ID 3392

Digital signatures: fighting firmware hacking and hardware cloning

By Dirk Akemann, Segger

In the age of the IoT, firmware attacks are becoming an increasing danger. Digital signatures can protect embedded applications against hacking and prevent the cloning of hardware.



■ The number of reports about successful hacks of different devices increases by the week: from internet-hijacking of cars to remotely stopping anaesthetic machines and opening allegedly super-secure safes through a simple USB stick, from worms attacking Apple computers to voting machines being decommissioned because of serious vulnerabilities. These attacks are potentially dangerous not only for the individual user, but in fact for society.

During the rapid evolution of embedded and interconnected devices, most developers of hardware or applications have neglected the issue of preparing the firmware for the growing danger of third-party attacks. They still do without signing and authorizing firmware updates, or neglect the necessary diligence for the handling of signatures. Lack of awareness of this threat makes it even easier to infect firmware. Once in the system, intruders remain in the firmware and do not get detected by common scanners, which usually do not operate on this level. Even a reinstallation of the operating system will not help. Such attacks can ruin devices – or turn them into remotely controlled tools in a more malicious undertaking. Some people seem to surrender in view of this threat. “No matter how much time, money and effort we could put into a device or a system to make it as secure

as possible, there is always the possibility that someone else would put in the time, money and effort to exploit that system,” the director of a US City Electoral Board said, arguing against decommissioning unsecure voting machines. But that is not a convincing argument, because there are in fact solutions for protecting the firmware, without significant expense or effort.

emSecure, developed by Segger Microcontroller, is the first software package for generation and verification of digital signatures that runs on embedded devices without much effort and, at the same time, is also a complete toolset. It has been developed specifically for embedded applications, is easy to implement, and the process of signing and verifying is so quick that it does not degrade perceived boot time and the user experience. It relies on the concept of digital signatures with a pair of private and public keys. The manufacturer of a device or application couples the public key within the product. Whenever he provides firmware updates or other relevant data for the product, these will be signed by help of the private key. The receiving product then checks, by help of the public key, whether it can validate the firmware by its signature. If so, the update is authentic and will be installed. If not, it will be stopped or erased. This way, non-signed or manipulated firmware cannot invade the product. Usually, checksums

or hashes are used to evaluate if data has been corrupted or lost during transfer. However, these instruments do not indicate anything about the sender of the data, i.e. if the software update is from the original manufacturer of a product. They do thus not contribute to higher security – in contrast to digital signatures. Only the latter verify the authenticity of the sender. The digital signature generated by emSecure is based on the asymmetric RSA cryptosystem. Its algorithms have proven their worth for decades. 2,048-bit keys, which are used by default, are currently regarded as absolutely safe and not to be broken by reverse engineering. Governmental institutions like the NSA were not involved in the development of RSA, which means it does not contain a backdoor as is usually demanded by these institutions. However, both DSA and ECDSA signing and verification code is also available from Segger, on request.

emSecure has been designed from scratch for best possible portability and performance together with minimum memory requirements. It can even be used with small single-chip microcontrollers, without the need for additional external memory or hardware. The keys and signatures can best be generated on a stand-alone PC. It has been tailor-made for two areas of application: anti-hacking and anti-cloning.

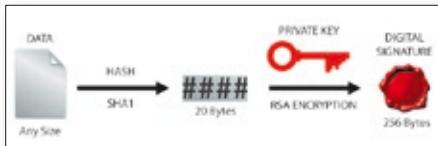


Figure 1. Generation of a signature for the data to send a hash value. This hash value is encrypted by RSA key. The data itself is not encrypted.

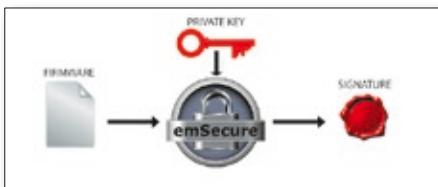


Figure 2. Firmware update is signed by means of the private key.

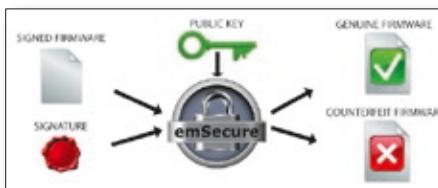


Figure 3. Verification of signed firmware at the recipient by mean of the public key.

In contrast to existing security products that only scan for attacks which have already happened, emSecure seeks to implement security during the design process of the product, precluding such attacks. The aim is to prevent the intrusion of manipulated firmware by third parties. For this purpose, the manufacturer generates a key pair and couples the public key in the bootloader of the product where firmware updates are managed.

Any firmware update is signed with the private key. In order to do so, first a hash value is calculated for the firmware by using a secure hash algorithm (SHA1). The hash is then padded – which prevents common mathematical attacks – and encrypted by RSA. It is important to mention that the firmware is not encrypted. Signature verification can be done in-product or off-product. With in-product verification the firmware for example verifies the digital signature at boot-time and refuses to run when the signature cannot be verified. With off-product verification an external application, e.g. a PC application communicating with the device, reads the signature and data from the product and verifies it.

The necessary key pair can be generated in two different ways, either by random seed or by help of a passphrase. The latter has the advantage that keys can be regenerated. This allows to not store the private key, but generate it only when it is needed. However, the passphrase should not be too obvious, like the

name of the company. The passphrase has to be kept separate and secure, just like the private key. For IoT devices, such anti-hacking protection is essential. They can be small, but still secure, as emSecure offers higher performance on the back of low resource consumption. As a pure software-based solution, it is also affordable and can easily be integrated into existing products, too.

The second area of application is anti-cloning. Cloned devices and applications are a growing risk, not just for turnover and reputation of the affected manufacturers. They can also be dangerous for the user and often have limited functionality and lifespan. According to official estimates, one in ten electronic devices contain illegal parts, be it copies or illegally recycled ones. With emSecure, protection against cloning can be integrated into the original device. First a key pair is generated at a secure facility. The private key will be included in the production process of the product. At the end of the production process, after the unit is assembled and tested, some hardware-specific, fixed, and unique data, like the unique ID of the microcontroller is read from the unit. This data is signed by emSecure with the private key and the signature is written back to the unit into an OTP area or a specified location on memory.

The public key will be included in the firmware which will run on the product. When the firmware is running it will read the unique data from the unit and verify it with the signature. When the signature does not match, for example when it was simply copied to a counterfeit unit with other unique data, the firmware will refuse to run. This means the firmware cannot simply be read out and copied into the cloned hardware. Hackers might eventually deactivate the clone check, if provided with enough time and budget. However, the clone will then be uncovered with the first authentic firmware update, as it again contains verification functions and will identify the clone.

Segger uses emSecure for its own products. The latest version of its J-Link debug probe features both anti-hacking and anti-cloning, while the new IDE Segger Embedded Studio uses it for authenticating licenses. emSecure aims for portability and is designed to fit speed and size requirements for different targets. By default it uses 2048-bit keys, which are considered unbreakable in the near foreseeable future and can be created from provable primes. The process of verifying data is technically split up into two steps, hash computation and signature decryption and comparison of hash values. Performance tests on an STM32 Cortex-M4 microcontroller, running at 200MHz, have shown that verification

for the standard 2k-bit keys take less than 32ms. Static RAM requirement is zero, as verification takes place on the stack.

emSecure comes as a package with all necessary applications for the generation and verification of digital signatures, including the source code. This way, the user can keep full control of the code used in his product. The package also contains Sign & Verify, a Windows tool for easy drag-and-drop creation of digital signatures and the verification of signed files. Sign & Verify brings security to any kind of data transmission, be it commercial or private use. A pair of public and private keys is used to create and verify digital signatures. Digital documents can be signed with the private key.

Signing data this way is very helpful even in the private area. Modifications of the data during transmission – be it through a virus, a trojan or any willful manipulation – will no longer go unnoticed. The utility can also be used commercially, for example to make sure that data stored to and recalled from a server is unchanged. The Sign & Verify package contains a key pair for evaluation purposes. For private use, a unique key pair is available from Segger for free, on request. For commercial use, both the key generator and the source code are available, a license is required. ■

Product News

■ Wind River at IOT Solutions World Congress in Barcelona

Wind River has announced its participation at IOT Solutions World Congress taking place in Barcelona on 16 – 18th September. Together with parent company Intel, Wind River will be exhibiting a range of IoT product demonstrations including real-life implementations within a smart city.

[News ID 3430](#)

■ Vector Informatik announces Technology Days 2015

On 28 and 29 October 2015, the Vector Technology Days will have their premiere at the Motorworld in Böblingen, Germany. In a fittingly automotive ambience with 1000 m² of floor space, the high-tech company will present forward-looking technologies that you can touch. Vector is opening up its development labs and will demonstrate the latest product developments. The exhibition will be flanked by a forum featuring short talks on current development topics, workshops on all aspects of Vector's core competency, and basic seminars.

[News ID 3385](#)

Robust IoT – safety begins with hardware

By Angela Bieber, MEN

While the project described in this article called for a very specific housing to suit the customer needs, many mobile IoT applications can already be achieved using standard systems. Networking of the embedded world is thus within reach – even if the environmental conditions become somewhat harder.



Figure 1. Heat management 4.0: CompactPCI standard cards are equipped with a solid conduction-cooled frame before being mounted in conduction-cooled housing. The image shows MEN standard components.

■ Despite the best efforts of internet giant Google, the goal of predicting a flu epidemic has yet to be achieved – but we have reached the point where the Internet of Things in conjunction with Big Data is now unstoppable. Forecasts indicate that there will be more than 30 billion networked devices in the world by the year 2020. This means we will also be seeing a huge increase in the number of IoT-enabled embedded systems, especially under the banner of Industry 4.0. Supported by Fieldbus and Ethernet technologies or wireless communications, networked devices like these ensure the “smart” use and interoperability between different systems in industrial automation, energy generation and medical technology.

Reliable IoT systems for demanding mobile applications such as train-to-land communication are, however, very different to the network components used in industrial settings. Secure data transmission and the networking of individual components are not the only factors at play here. Devices used in these situations must be designed to cope with an extended temperature range; they must also be resistant to shock, vibration and dampness, and ensure the connection remains stable and reliable throughout the journey or flight, etc. In addition to the ability to withstand extreme environmental conditions, another issue that

plays a crucial role in mobile markets – and indeed in all IoT applications – is data security. While the main focus from a software point of view is on securing the transmission of data and the cloud, the hardware used must first provide the necessary conditions to ensure secure communication and protection against external attacks.

This is achieved by various means, including the use of a TPM-enabled (Trust Platform Management) chip, which facilitates encrypted data storage and secure booting. One of the advantages of encrypted data storage, for example in entertainment applications in trains and buses, is that it offers a reliable way for exclusive film material to be played solely on the operator screens. Secure booting ensures that the system can only be booted after its integrity has been checked and there have been no changes to the flash. This protects the system against unauthorized access. A password-protected BIOS offers additional anti-tampering protection, as does the security provided by whitelisting, i.e. blocking unauthorized applications.

Along with the myriad of measures taken to ensure secure and robust IoT hardware components, there is yet another factor to be taken into account during the development stage: the use of flexible architectures based

on open hardware standards. After all, while it is not yet clear where things are headed with the present assortment of competing communication standards, widely used hardware standards will continue to support communication between individual systems in the future. One prime example of a successful IoT system that also functions reliably under even the most adverse conditions is currently in use on oil platforms. Installed directly on the drilling sites, the server platform communicates with the operator data processing center in real time from here via GSM, relaying all the data relating to the position of the drill head, resistance in the drilling mud, as well as general function and error analyses.

An extreme installation like this calls for maximum performance where the mechanical specifications are concerned – indeed, the powerful computer with 200W of waste heat would be enough of a challenge for any system. The solution therefore had to be just as extreme as the demanding situation itself: to begin with, the CompactPCI standard components were equipped with a solid conduction-cooled aluminum frame. The components, in turn, are encased in an IP64-protected housing, also with thermally conductive properties. This alone would be enough to have the system fully up and running and protected against the rough sea. But



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Figure 2. Robust network components: the wireless access point or gateway in the form of a conduction-cooled Box PC, and the modular storage system as a ½ 19" system. Both offer the option for flexible adaptation on a built-to-order basis.

to ensure sufficient heat dissipation another housing also surrounds the splash-proof processor unit. High-performance IP52-rated fans in the space between the construction provide continuous air circulation, expelling the heat outwards. Although the decision to use vulnerable fans contradicts the idea of an almost maintenance-free system, the risks were outweighed by the advantages of maintaining a compact construction without the need to compromise on processing power. What's more, the need for maintenance is reduced to a minimum because the electronics are left untouched inside the second box.

In order to ensure reliable operation and prevent the possibility of an expensive failure of the electronics, the developers looked to redundant architectures and monitoring components. To this end, they installed two redundant power supply units (PSUs) that can assume the tasks normally performed by the defective power supply unit if a failure should occur. During normal operation, however, the output is divided between the two PSUs, and this in turn helps to increase their working life. Given the strong fluctuations in the voltage of the power supplied by generators on the drilling sites, additional input voltage monitoring combined with a high-speed DA converter was necessary in order to verify the quality of the voltage. This information can also be transmitted via remote diagnostics (made possible thanks to Intel AMT technology), allowing generators with a harmful voltage to be switched off from the control center. Should a power failure occur in spite of these measures, a back-up battery will keep the system running for a maximum of 20 minutes – just enough time to trigger and send the corresponding error message and shut down the system correctly.

The three CompactPCI PlusIO CPU com-



Avalue Embedded Platforms



- One SODIMM Up to 8GB DDR3L 1600, Dual Display(HDMI, LVDS), 1 SATA III, 5 COM, 4 USB 3.0, 2 USB 2.0, 2 Mini PCIe, 8-bit GPIO, Fanless, TPM 1.2 (Optional)



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- VMS-BYT** > Embedded System
Intel® Atom™ SoC Processor E3845
Fanless Vehicle Telematics System
► One SO-DIMM Up to 8GB DDR3L 1333, Rich IO, 1 VGA, 1 LVDS, 1 DC-Out, 1 CFast, 8-bit GPIO, 1 x 2.5" Swappable Drive by, 2 LAN, 2 Line-out, 2 Mic-in, 2 COM, 3 USB, 5 Antenna Mounting, Rugged, Fanless Operation



- SLP-SLK** > Industrial System
Fanless Expendable Controller with
PCI/PCIe expansion slots
► Intel® 6th Generation Core™ Processor + Intel®
Q170 Express Chipset, Dual display, HD Audio,
2 GBE, 3 PCIe, 1 PCIe x16, 4 USB3.0, 2 USB2.0,
4 COM, 1 CFast, 2 x 2.5" drive bay, 1 PS2
Keyboard, 1 PS2 Mouse, 16CH isolated DIO,
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- LPC-1231** > Multi-Touch
12.1" Fanless Rugged Touch Panel PC

 - Intel® Celeron® SoC N3000 family Processor, 2 GbE, Audio, 4 USB, 2 COM, Wide Voltage +12V ~ +26V Input, ErP Power; Backlight Controlled by PWM
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> Intel Atom™ SoC E3845 Quad-Core 1.91GHz,
4 USB, 2 COM, 2 GbE, 5-wire Resistive Touch,
Wide Voltage +12V ~ +26V, Available Expansion
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Product News

■ congatec adds new AMD G-Series motherboards to Mini ITX portfolio

congatec announces the expansion of its industrial-grade Mini-ITX motherboard portfolio with two highly efficient low-power conga-IGX variants that are based on the Gen 2 AMD Embedded G-Series SoC processor and feature powerful SoC integrated AMD Radeon graphics.

[News ID 3283](#)

■ MSC integrates low-power 6th gen Intel Core processors on COM Express modules

MSC Technologies presents the MSC C6C-SLU Type 6 COM Express module family, which is based on the latest 6th Generation Intel Core processors. Intel's U processor platform integrates the low-power processor with graphics controller and the complete chipset in one multi-chip package. The new processor line is perfectly suited to fill the performance gap between existing Intel Atom and high-end Intel Core two-chip solutions.

[News ID 3410](#)

■ Vecow: quad core Intel Core i7 in-vehicle fanless Embedded system

Vecow launches her latest vehicle computing elite, IVH-7700 ICY Series In-Vehicle Fanless Embedded System. Integrated with excellent mobile availability, higher storage capacity, versatile I/O connections, wide range power input, secure power protection and rugged reliability, Vecow IVH-7700 Series Fanless In-Vehicle System is your trusted solution for real-time performance driven In-Vehicle Surveillance, Traffic Safety System, Intelligent Transportation System, Mobile NVR, Intelligent Surveillance and Fleet Management applications.

[News ID 3412](#)

■ AAEON: panel PC features 10.1 inch projected capacitive multi-touch screen

AAEON announces its latest member of the ACP panel series family, the ACP-1104. This new panel PC features the ever-popular 10.1" projected capacitive multi-touch screen with 7H scratchproof glass for added protection. Its ultra-slim profile is much sought after for ease of mounting onto walls or other vertical surfaces.

[News ID 3358](#)

■ Axiomtek: multi-touch 21.5" fanless PCAP Full HD Panel PCT

Axiomtek has launched GOT3217W-881-PCT, its new fanless multi-touch panel computer featuring the new Intel Core i7/i5/i3, Pentium and Celeron processors. The GOT3217W-881-PCT is equipped with a 21.5" Full HD

TFT LCD with 250nits brightness. The fanless design and waterproof enclosure (IP65-rated front panel) makes it highly reliable and can avoid damage from spillage.

[News ID 3437](#)

■ Innodisk: ruggedized mPCIe CAN bus adapter for Industrial and Embedded

Innodisk introduces a new embedded peripheral module that extends embedded systems and industrial PCs with CANBus capability for the Internet of Things. The EMUC-B201 is a ruggedized mPCIe embedded peripheral module that provides dual channel CAN Bus 2.0A/B functionality to an embedded or industrial computer. With CANBus widely used in vehicle sensor and subsystem com-

munication as well as factory automation and control systems, the EMUC-B201 peripheral enables embedded systems for the Internet of Vehicles and Industrial PCs for Industry 4.0.

[News ID 3292](#)

■ Acceed: extra flat Box PCs for space-critical applications

The professional Box PCs Nuvo-3005LP and Nuvo-3003LP are low-profile versions of the proven Nuvo-3000 IPC series from Acceed. These controllers' extra flat chassis was constructed specially for use in tight installation surroundings. Despite their low height of a mere 69mm, these fanless industrial PCs can be used at ambient temperatures of -25 to +70°C.

[News ID 3290](#)

OPALE V2 Compact Compact and Powerful



► Ready for OEM applications

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New premium processor performance for x86 low-power designs

By Gerhard Gilch, congatec

The new Intel Pentium and Celeron SoC processors (codenamed Braswell) are impressive with their massive plus in graphics and more balanced overall performance. But why is this high level performance necessary on a 4-watt Scenario Design Power and what makes these new top-class low-power systems so special?

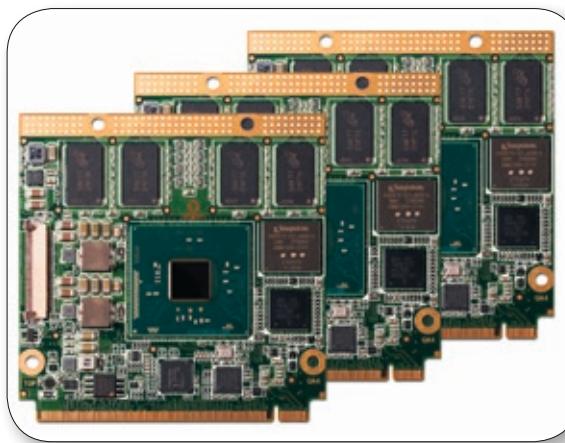


Figure 1. The conga-QA4 module is offered with three different processor variants to provide good scalability.

■ At present, the way we develop low-power systems is changing rapidly. On the one hand, parts of the distributed intelligence are drifting off into the central cloud, resulting in leaner on-site systems. On the other hand, these systems require an industry-grade connection to the Internet of Things (IoT). And a very secure one at that. The corresponding performance of the systems and the connection is a prerequisite for this. Inevitably, the demands placed on IoT-connected systems will further increase, e.g. for interaction with other systems in the field. The platform technology therefore needs to be extremely flexibly scalable. In the majority of applications graphics performance is essential, more and more multiple high resolution screens are being deployed, for example in kiosk and retail systems, in slot machines and digital signage installations, in factories and in SCADA systems or in countless HMIs in all sorts of equipment, machinery and plants.

All these demands have to be catered for with as few watts as possible in the low single digit area to enable fanless, robust and space-saving embedded designs. Today, we need a new, more powerful performance class below the Intel Core i processor line but also one that is more balanced overall and widely scalable to allow the development of entirely fitting, GUI-supporting edge systems for the Internet of Things.

Previous x86 processor generations with comparatively few watts didn't fit the bill in graphics as well as general processing performance, for example, in parallel virus scanning. Over the past years, however, this gap has been closing up progressively and with the availability of the new Intel processor generation a new milestone has been set in the premium class of low-power processors. The launch of these processors also coincides with a multitude of necessary design decisions in the fast-moving environment of new IoT-driven applications. Possibly this launch will affect the embedded industry as significantly as the launch of Intel Pentium M technology about twelve years ago or the first Intel Atom processor launch roughly seven years ago, which sparked off the new SFF (small form factor) trend of x86 processors. In this case however, it will more likely be the market which will dictate the course.

No matter whether the new Intel Pentium and Celeron processor technology does spark off a new era or not: it is one of the important building blocks for the IoT of intelligent embedded devices and it's worth looking at the technical details of the new processor even without the IoT connection, since it offers an overall improved performance with lower power consumption and has become much more powerful in terms of graphics.

The new embedded Intel Pentium and Celeron processors are all based on the new Airmont microarchitecture, the 14nm variant of Intel Silvermont microarchitecture, for which processors were launched under the name of Pentium, Celeron and Atom (all codenamed Bay Trail). The Pentium name, however, has just reappeared on the new Intel embedded roadmap with the new microarchitecture. With the availability of the new microarchitecture, the embedded processor range will therefore be extended in the premium class of the low-power segment. This underlines the special milestone in the performance per watt advancement in low-power processor technology.

The subcategories of the microarchitectures in the Pentium, Celeron and Atom performance ranges – and some further differentiation characteristics like ECC support and extended temperature range for Bay Trail-based Intel Atom processors – make perfect sense by the way. For customer applications, the performance and power consumption of a processor series are primary factors. Just by naming the processor series, OEMs are thus in a position to classify their customers' expectations on board performance. Developers, on the other hand, profit from a uniform microarchitecture by a simplified code development for their applications. They only need to optimize their code for a single architec-

ture and can then nevertheless cover all the requirements in the low-power segment from entry-level to premium-class models.

With this performance increase the new embedded Intel Celeron and Pentium processors are also filling the performance gap towards Intel Core i processors, as shown in table 1. The table compares the average scores of the popular processor board benchmark Geekbench with the new Braswell, Intel Core and important Bay Trail processors. Particularly impressive are the peak values which the new Braswell processors achieve in the multicore score per TDP (Thermal Design Power). The TDP which has been reduced to 6 watts and 4 watts SDP (Scenario Design Power) for typical applications of the new Intel Pentium class smoothly paves the way for developing fanless systems even for low-power systems requiring highest performance.

Even in the increasingly critical area of graphics, the new generation of processors seamlessly connects to the latest Intel Core processors which, compared to the very good predecessor generation, has once more developed impressively. In fact it has been doubled. Users and developers can now also benefit from this performance range of high-resolution GUIs in 4K or even from high quality, latency-free 3D animations. Especially in touchscreen operation, delay-free 3D graphics are a must for user experience and increased operating safety.

Like the Intel Core processors, the new processor generation supports three independent displays, which can be connected on the SoC side via HDMI 1.4b, DP 1.1a and eDP 1.4. Plus, for the first time, the new Intel Celeron and Pentium processors support ultra-high 4K displays (3840 x 2160 pixels). This is relevant for sophisticated digital signage applications operating large format displays with diagonals of several meters or POS/POI and gaming applications where the viewer is situated in close proximity to the monitor and can recognize even the smallest of details.

The double performance was achieved by switching to the energy-efficient Intel Gen 8 graphics, also used in the 5th generation of Intel Core processors. In order to limit the power consumption, the Intel Celeron N3150 and N3050 processors were, however, limited to 12 EU (Execution Units) and the Pentium N3700 to 16 EU, resulting in seamless scalability to the Intel Core class. Needless to say, the new Pentium and Celeron processors also support latest graphics APIs like DirectX 11.1, OpenGL 4.2 and OpenGL ES 3.0/3.0+. Thanks to OpenCL 1.2 support, the new processors can outsource computing-intense parallel tasks - which to date have been carried out on the CPU - to the GPU. This is important, for example, in medical technology imaging or face recognition in video surveillance systems. To achieve this, each EU of the GPU integrates two SIMDs (Single Instruction Multiple Data) floating point units, which can each carry out up to eight 16-bit or four 32-bit integer or floating point operations (FLOP). The 16-bit half-float support is new too. It enables any FPU to carry out simultaneous additions and multiplications (MAD). With 16 EU, the result is the impressive figure of up to 512 FLOPs per clock cycle (16 EU * 2 SIMD-FPUs * 8 FLOPs * 2 MAD = 512 FLOPs) and with that a theoretical peak performance of 358.4 GFlops per second, assuming the execution units are running in burst mode (700 MHz).

Intel has upgraded the integrated video engine responsible for the hardware-based real time de- and encoding of high-definition video material. A new feature is the support of H.265/HEVC compressed video. Compared to its predecessor H.264/AVC, H.265 saves a massive 50 percent of the data rate, so that users can now also play 4K videos – a feature previously reserved for specialized or more powerful processors. The encoder section supports H.264, MVC and JPEG. This is particularly relevant for the MIPI-CSI2 interface integrated in the processor. This allows the connection of two HD



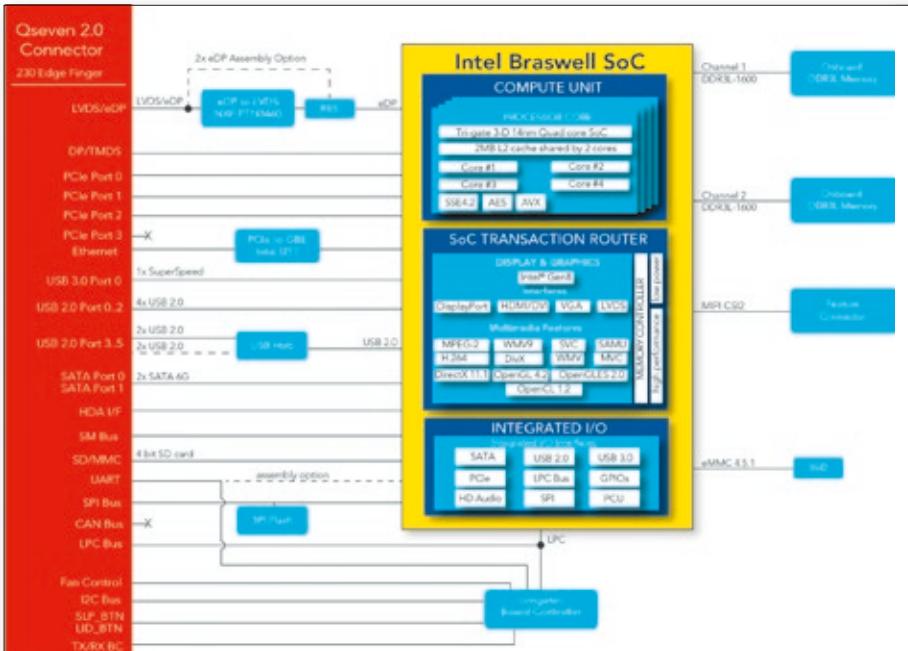


Figure 2. Intel Braswell SoC block diagram

Average Geekbench Scores									
Processor	Freq. [MHz]	Cores	Single-Core Score (SCS)	SCS/TDP	Multi-Core Score (MCS)	MCS/TDP	TDP [W]	Burst Freq	Cache
Intel Core i5-5350U	1800	2	2482	165	4881	325	15	2,90	3
Intel Core i3-5010U	2100	2	1994	133	4108	274	15	2,10	3
Intel Pentium N3700 (Braswell)	1600	4	961	160	3243	541	6	2,40	2
Intel Celeron J1900 (Bay Trail)	2000	4	926	93	2863	286	10	2,42	2
Intel Celeron N3150(Braswell)	1600	4	842	140	2629	438	6	2,08	2
Intel Atom E3845 (Bay Trail)	1900	4	804	80	2617	262	10	1,91	2
Intel Celeron N2930 (Bay Trail)	1800	4	819	109	2566	342	7,5	2,16	2
Intel Celeron N3050(Braswell)	1600	2	884	147	1672	279	6	2,16	2
Intel Atom E3827 (Bay Trail)	1750	2	782	98	1402	175	8	1,75	1

Source : <http://www.primatelabs.com/geekbench/>

Table 1. The Intel Pentium N3700 processor achieves absolute peak values in the multicore score per TDP and takes on a leading role in high-end low-power processors.

cameras with 1080p at 30Hz. Photos with resolutions of up to 5 megapixels are supported. The main advantages of the integrated MIPI-CSI2 interface are the extremely low costs and space-saving integration in comparison to USB cameras, as both image signal processors as well as sensor and camera control functions are integrated directly into the processor graphics. The availability of this simple camera technology opens up completely new scenarios for a host of applications. The main application areas could be not only webcam and video telephony functions but also intelligent vision systems that thanks to the two cameras could even provide 3D image and

video data. Application areas can be found in video surveillance and access control in building, or include quality management systems in manufacturing right up to vision-based control of autonomous vehicles.

The I/Os integrated in the processors experienced some small but effective improvements. For instance, now even more native support for USB 3.0 and 2.0 ports is available. Further to this, up to two SATA data storage units with up to 6.0 Gbps can be connected up to twice as fast (SATA Revision 3.1). Fast DDR3L 1600 modules are also now used for the memory. In addition to these new features, further func-



Figure 3. Coming soon: the congatec IoT Starterkit for Braswell processors which simplifies entry into IoT applications.

tions are available which are familiar from the Intel Atom processors of the Bay Trail generation, such as PCIe Gen2 interfaces for individual extensions or security features like the Intel AES-NI Encryption Instruction Set or Secure Boot.

congatec has made the new high-end class in the low-power area available on the Qseven modules conga-QA4 that will initially support three of these new processor variants (Pentium N3700 and Celeron N3150 and N3050). They are designed to conform to SGET Spec. 2 Addendum and, among other things, will consequently include the MIPI-CSI2 interface. According to performance requirements, these modules are equipped with up to 8GB of onboard RAM and up to 64GB of eMMC flash. Industry-grade extensions such as I²C Bus (400 kHz Fast Mode, Multi-Master), SPI or Power Loss Control have also been implemented. Other features which are integrated via the embedded controller board such as Multi-Stage Watchdog, non-volatile storage of user data, unique manufacturing and board information, readable board statistics, data backup functions or customer-specific data are not only available for onboard use. Potentially, they also provide an important basis for big data in innovative IoT apps to, for example, optimize maintenance management. How this data could be provided in a standardized way and how an IoT connection should look seen from the perspective of embedded computer technology is currently being worked on in the very active SGET (Standardization Group for Embedded Technologies e.V.) after the V2.0 Carrier Board Design Guide for Qseven was completed at the beginning of the year.

These specifications are a crucial basis for further developments in embedded computer technology and the reason why congatec has opted for the SGET Standard Qseven for its first implementation. Even more significant, however, was the form factor itself with its dimensions of 70x70mm which was developed especially for the low-power segment

and has a much flatter build than, for example, alternative COM Express modules, which congatec will, however, in future also make available in the new performance class.

Moving forward it is planned to incorporate the processor technology into the new industrial-grade Thin Mini-ITX, so that boards to match any design task can be provided with personal integration support. If the standard portfolio does not cover the requirements, individual variants or full custom designs are available within congatec Embedded Design & Manufacturing Services (EDMS). All standard boards and modules are qualified for

the Intel Gateway Solutions for the Internet of Things, which makes the IoT connection of these embedded boards much easier for the customers. The launch enables quick and simple adaptation of all existing Qseven applications and evaluation carrier boards to the latest processor technology, accelerating the deployment of new product variants. Incidentally, the kit stands out not just with its integrated gateway functions but also due to its tamper-resistant, hardware-based encryption technology. The aim is to simplify integration of the new processor generation for developers – even in the highly complex and sensitive security IoT environment. ■

Product News

■ Rutronik: low power fanless COM Express mini module from Advantech

Advantech's new low power, fanless COM Express Mini Module SOM-7568 is equipped with the latest Intel Pentium N3700, Celeron N3150 and Celeron N3000 single-chip processors, which are manufactured on new Intel14-nm process technology. The mini module is ideal for lower power handheld applications. It is available at distributor Rutronik as of now.

[News ID 3289](#)

■ WynMax: Mini-ITX industrial motherboard supports dual Intel Gigabit Ethernet

Recognizing IPC market needs, WynMax has developed a new Mini-ITX industrial motherboard WMIX-A77E0 which is equipped with 2nd Gen. AMD embedded R-series APU processors. This system-on-chip supports system memory DDR3 2133/1866/1600MHz SDRAM maximum up to 16GB. WMIX-A77E0 provides rich I/O interfaces include 4 HDMI, 3 COM, 4 USB 3.0 and 8 USB 2.0.

[News ID 3285](#)

■ congatec: Qseven module with quad-core Pentium processor with 4K resolution

congatec introduces the latest addition to its Qseven family. The conga-QA4 module features the new Intel Pentium and Celeron processors based on 14 nm technology and offers increased energy savings and computing power. The optimized Intel Gen8 graphics, with up to 16 graphics execution units and 4K (3840 x 2160 pixels) resolution, result in a significantly improved visual experience.

[News ID 3250](#)

■ Amplicon: 4th gen Ventrix and Impact-R rackmount industrial PCs

Amplicon introduce the amazing power of the Intel Core 4th generation processor family, unleashing incredible processing power

with low power consumption, lower thermal characteristics, and rich I/O. The introduction of the Haswell architecture signals further advancements and capabilities from predecessors; lower power consumption, greater numbers of USB 3.0 and SATA III channels and iAMT revision 9.

[News ID 3263](#)

■ MEN: CompactPCI Serial Revision 2 is here

As recently announced by the American consortium for embedded technology PICMG, there is an update of the industry standard CompactPCI Serial available – CompactPCI Serial Revision 2. The by now four years old successor of the well-known CompactPCI standard has in the meantime several tens of thousands installations in the field.

[News ID 3248](#)

■ Pentair: new revision removes last limitations of CompactPCI Serial specification

Pentair announced its enhanced features and functions for its Schroff CompactPCI Serial systems, to reflect the changes of the new CompactPCI Serial specification published by PICMG in 2014. This updated revision includes improvements and new features which require changes to the chassis.

[News ID 3249](#)

■ acceed: IPC power package for high data throughput

Despite its compact construction, the Nuvo-4000 is a reliable, highly efficient and above all flexible controller for factory automation, in-line production control or demanding tasks in machine vision applications and further data processing systems. The power package's engine is optionally an Intel-CPU i7-3610QE or the smaller i5-3610ME variant.

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Identifying challenges in future 100G backplane designs

By Sergej Dizel, Pentair

The telecom and datacom markets are the most data-hungry industries. This article explains the new PICMG 100G-ATCA specification which is not yet complete, but will enable future 100 Gbps data rates on backplanes.



■ Since the introduction of AdvancedTCA, which was specified in 2002, the race for more data transfer speed on the backplane has been on. The telecom and datacom markets have a hunger for processing power that is never satisfied. Today processor technologies with Multicores, GPGPUs and powerful co-processors can satisfy the demands of full HD video on demand, increasing data-hungry services for smart phones and other services.

In addition to the processing power needed for those applications, infrastructure must support this huge amount of data traffic as well. Coming from packet switching backplanes with 1Gbps of data transfer in the beginning of this millennium, today AdvancedTCA backplanes support 40Gbps of data transfer. This is achieved by four ports each having a transmit and receive differential pairs transferring 10Gbps each. The four ports together are capable of transferring 40Gbps. Even this is not sufficient to feed applications today. Nowadays Dual Star backplanes are often used where two switches work in parallel to increase the data traffic between transmitter and receiver to 80Gbps. This is certainly not the end point of demand for data speed. The IEEE specification for 100Gbps Ethernet over copper was released at the end of 2014. Today, the PICMG working group is defining 100G Ethernet for AdvancedTCA based on the IEEE spec.

100Gbps data rates create many new challenges for backplane design. The graphs in figure 1 and figure 1.1 show the thresholds for insertion and return loss of the IEEE802.3ap specification which defined 40G Ethernet and the new standard IEEE802.3bj, which defines 100G. At 100G, the IEEE defined two coding methods, 100GBASE-KR4 and 100GBASE-KP4. The thresholds of both methods are shown in the graphs. As shown, the thresholds for both new methods of 100G are defined for much higher frequencies. This means for the backplane that all components such as connectors, the bare board and the copper trace structures have to be designed for those high frequencies.

The ZD and ZD+ connectors as defined in the AdvancedTCA specification has not been for those data rates. A few connector vendors have been working on a solution. The challenge for the new 100Gbps AdvancedTCA connector was to achieve a much more homogeneous impedance transition between board and backplane and keep the crosstalk as low as possible. Among other improvements this was achieved by decreasing the size of the through holes in the backplane. This method creates another advantage for the backplane routing as the smaller holes sizes create a larger routing channel in between the connector pins. This leads to a more homogeneous

impedance of the traces and a lower cross-talk between connector vias.

Figure 3 shows the simulation of insertion loss (S_{dd21}) of a 30mm long differential pair in an AdvancedTCA backplane PCB without connectors assembled. The difference between the current configuration with 0.6mm through hole and a reduced through hole size of 0.36mm is obvious. A reduction of the distance of the press fit pins within the differential pair from 1.5 to 1mm is able to further reduce the losses of the transmission line.

The next important part of the backplane to address is the trace structure, especially their dimensioning with regard to losses and cross talk. Not every differential pair has similar properties. For example, when comparing two differential stripline pairs with each having 100 ohm impedance but different trace widths (and thus different layer stackup), they will have different behavior with regard to transmission line losses and cross-talk (emission and immission). At 40G backplane data transfer this issue is solved, but there are new challenges with 100G. This became visible when conducting the first simulations for 100G data transfer. The impedance discontinuities between connector and the differential pair need to be evaluated very carefully. This part of the transmission line already plays a signif-

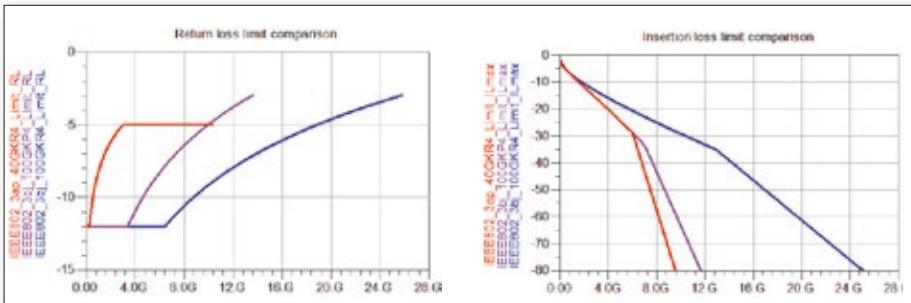


Figure 1 and 1.1. These graphs compare the thresholds for insertion loss (1A) and return loss (1B) at 40G and both methods of 100G.

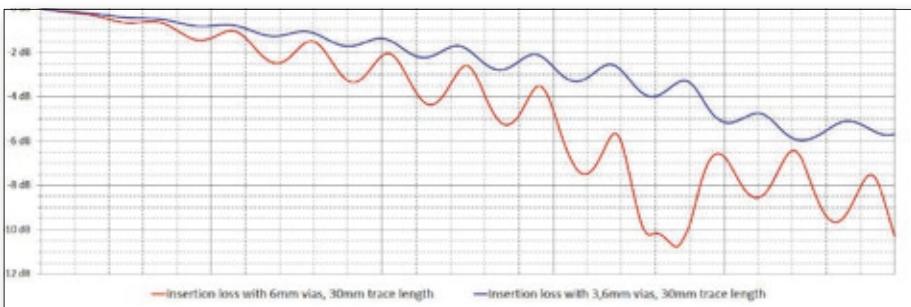


Figure 2. Comparison of insertion loss of a 30mm differential pair with 6mm and 3.6mm vias.

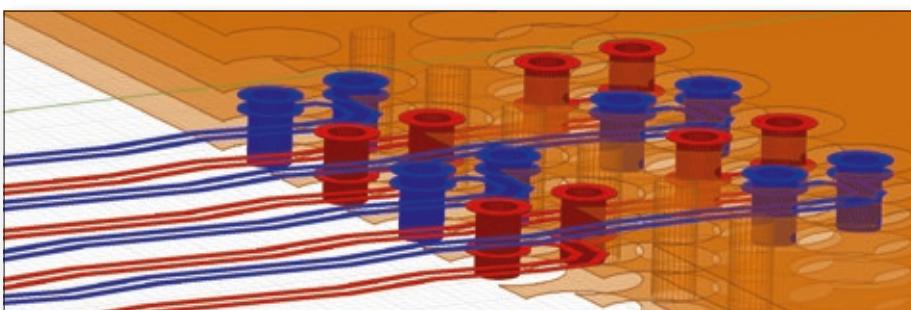


Figure 3. An example of vias and traces in a backplane

licant role in a 40G backplane with 100G this part will be much more critical. The impedance discontinuities between the connector and the backplane have a significant influence on the properties of the whole transmission channel (losses and cross-talk). If the discontinuities are too large, the signal fed into the transmission line is more sensitive to cross-talk from adjacent differential signal traces. When the losses and/or influence from cross-talk are too great, the receiver cannot correctly read the signal. With that, the bit error rate gets increased.

To achieve the desired trace structure in a bare board, new requirements for the quality of the bare board are needed. Bare board material, prepreg and core types, backdrilling, drilling offset, etching and many other factors will play an enormous role in 100G backplane design.

In addition to correctly defining those parameters, the quality and the tolerances of the bare board manufacturing process are essential to guarantee a reproducible result of 100G data transfer. Even the smallest process deviation

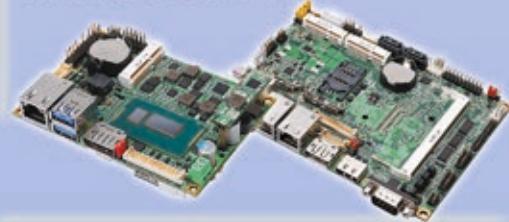
during manufacture will influence the signal properties and, in the worst case, not allow a 100G data transfer. This means it is essential to very carefully choose a PCB manufacturing partner who understands these needs and has their processes carefully controlled. A close partnership is needed to qualify those suppliers and qualify the production technology and processes.

The IEEE802.3bj 100G specification defines parameter for the whole Ethernet channel, which is located between both transceiver chips. The transmission line of an ATCA-backplane is just a part of the whole transmission channel; both ATCA-boards are located before and after the backplane within the transmission channel. For that reason the IEEE802.3bj parameter can't be used one-to-one for backplane validation. The IEEE802.3bj parameter limits must be separated between these three channel parts (both ATCA boards and backplane). The PICMG 100G working group is working on that, and companies like Pentair are playing an active role defining this new important standard. ■

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Security considerations for embedded designs in the new connected world

By Gordon Cooper, NXP

As more embedded devices are connected to the internet, becoming part of the Internet of Things, more opportunities come for hackers with malicious intentions. Security is required to protect against their attempts to copy IP, steal data, or hijack a system. But it is hard to know just how much security is needed when designing a system using an embedded microcontroller.



To simplify the security discussion, it helps to consider security as three elements. In figure 1, an embedded device A needs to communicate with a remote location B. The three components of security to consider are 1) device integrity – securing access to device A, 2) establishing trust with remote location B through authentication and 3) secure messaging between the two devices using data encryption after trust is established.

Device integrity relates to how well the code (or IP) and data on an embedded device are protected from unauthorized access such as a remote software hack, someone gaining access through established user interfaces or physical/probing attacks on the system hardware. There are various ways to protect against these attacks – requiring varying levels of cost and complexity. Establishing trust between devices involves one or both devices verifying the authenticity of the other, to ensure data is not being sent to or from an impersonator. The typical way of establishing trust is by asymmetric key encryption – where a pair of keys (one private and one public) is used for establishing trust. The private key is used for encryption and the public key is used for decryption. Common algorithms for asymmetric key encryption are RSA and ECC. Once trust is established, a symmetric encryption algorithm is used to protect the data as it

travels from device A to location B. Symmetric encryption uses the same key for encryption and decryption. It is faster than asymmetric encryption which is why asymmetric encryption isn't used for all communication. The current encryption standard is AES or Advanced Encryption Standard, a symmetric key block cipher that encrypts data in blocks of 128, 192 or 256 bits using a key of the same length.

While any algorithm is hackable given enough time, it's estimated that a brute force attack – trying every combination (2¹²⁸ or 3.4×10^{38}) to uncover the key – against an AES-128 block cipher could take millions of years using modern supercomputers. AES-256 would require 2²⁵⁶ or 1.1×10^{77} combinations. Since either AES-128 or AES-256 is suitably secure against a brute force attack, the AES-128 is often a better choice as it is 40% faster to implement. Since there is little benefit to a brute force attack against AES, hackers spend their time trying to extract the AES keys. If the AES keys are not well protected, it doesn't matter how secure the algorithm is. It would be like having a six-inch thick steel door protecting your house and then leaving the keys under the doormat. Security is not a one-size-fits-all requirement. How much security is required in an embedded design depends on what you are connecting to, what you are protecting and how much damage is done if security is

breached. The columns in figure 2 represent different levels of security that can be considered in an embedded design. The first column represents a typical embedded application. If the embedded device is not connected to the internet – not part of a network – there's no need to worry about encryption algorithms, establishing trust or key storage. There may still be a reason to pay attention to device integrity – particularly if intellectual property (IP) protection is important. Preventing competitors from reading out the program contents of internal flash protects a company's intellectual property from potential copycats. For this protection, look for microcontrollers that include built-in code read protection.

When IoT connectivity is required, it is time to consider additional security features for code and data protection. Adding software security algorithms to a general purpose microcontroller can provide all the requirements needed for securing messaging. Software RSA or ECC can be used to establish trust and a software version of AES can be used for secure messaging. Keys are stored in either flash or RAM and are often scrambled using software techniques. Software AES algorithm is no more or less secure than hardware accelerated AES implementation. Figure 2 also highlights the benefit of replacing a general purpose microcontroller running soft-

MICROCONTROLLERS ■

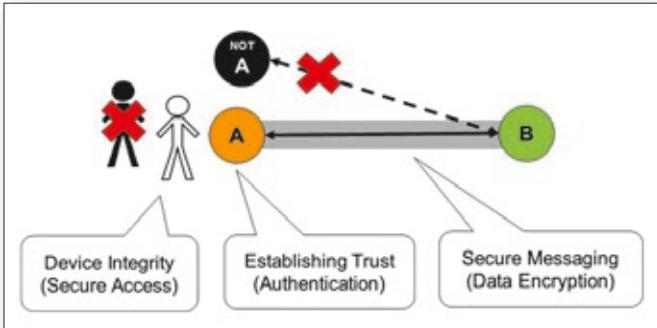


Figure 1. Security thought model

		SECURITY SPECTRUM		
		MCUs for embedded applications		
		LPC18xx/LPC43xx MCUs		
KEY BENEFIT		▪ security software	▪ security hardware	▪ A7 secure element
Handles AES keys	Generation	▪ Software RNG	▪ True RNG	▪ Certified True RNG
	Storage	▪ Flash	▪ Encrypted in OTP unique per device. ▪ Not software readable.	▪ Extraction proof using banking-grade security.
Prevents software tampering (software integrity)		▪ Code read protection	▪ Code read protection ▪ Secure boot	▪ Secure boot with HW signatures verification ▪ Secure firmware update
Establishes secure connection (message confidentiality)		▪ Software authentication	▪ Software authentication	▪ Hardware accelerated tamper proof authentication and setup of session keys
Secures bulk message transfers		▪ AES software encryption	▪ AES hardware-accelerated encryption	▪ AES hardware-accelerated encryption with tamper protection

Figure 2. Spectrum of security

ware algorithms with one that includes hardware security features like hardware accelerated AES encryption, a true random number generator and improved AES key storage.

The primary advantage of a hardware-accelerated AES block over a software implementation is that hardware-accelerated AES is as much as eight times faster than a software version. Two additional advantages are power savings – a hardware AES takes fewer MCU computations and therefore less power – and a smaller program code size footprint. The same software AES encryption algorithms can run more efficiently if they take advantage of the hardware-accelerated AES built into a microcontroller. A true random number generator (RNG) provides an improvement over a software implementation for the creation of truly random keys. A true RNG uses physical phenomenon – like noise – to create random numbers while software implementations have to rely on an algorithm to create a random number. A true RNG is less predictable than a software implementation providing more security. An additional security feature found in some microcontrollers is the ability to store AES keys in memory locations only readable from the hardware IP blocks. This way the keys are no longer exposed to a software extraction.

Microcontrollers with additional security features combined with software encryption algorithms can provide an excellent solution when the embedded device is not physically accessible to hackers. An example would be a thermostat in your house. You might worry about somebody remotely accessing it to gain access to your internal network. But you're probably not worried about someone breaking into your house to probe the microcontroller in your thermostat to extract the AES keys out of it. If you have someone breaking into your house, you have bigger problems than losing your AES keys. On the other hand, if you have a smart meter outside your house, this might be a more attractive target for hackers who want to physically attack and steal the keys. Since the revenue stream for the electric company



Swissbit's first DDR4 SODIMM

More performance, less consumption

The new DDR4 standard lowers the operation voltage to 1.20 V and increases at the same time the speed grade to DDR4-2133. Together with several new power saving features like an improved termination scheme, data bus inversion and grouping of banks the total power consumption and heat dissipation has significantly been reduced against DDR3L. The DDR4 standard also adds reliability features like CRC and command/address bus parity. Swissbit DDR4 SODIMMs support ECC functionality and includes a temperature sensor

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Figure 3. LPC43Sxx block diagram. The LPC18Sxx offers similar features with a Cortex-M3 core.

is an important asset for them to protect, they are more likely to spend money on tamper-resistant security features.

Combining a microcontroller with a secure element can add banking grade security to your embedded system (figure 2). A secure element is a tamper-resistant IC that provides secure storage locations for keys and certificates and often includes hardware-accelerated RSA and ECC for faster authentication. While the hardware-accelerated AES encryption is still handled by the faster microcontroller, the secure element improves device integrity and takes the lead in establishing trust and protecting AES keys.

NXP Semiconductors recently announced LPC18Sxx and LPC43Sxx microcontrollers – extensions of their existing LPC1800 and LPC4300 Series – that add hardware features for code and data protection (figure 3). The LPC18Sxx and LPC43Sxx families include a number of high-end connectivity features such as Ethernet, two Hi-Speed USB, SDIO (important for fastest connectivity to WiFi modules). There are versions with support for Graphic LCD connectivity. Most NXP LPC microcontrollers offer a Code Read Protec-

tion (CRP) feature that can be used to protect the developer's code. The security features added include an AES-128 hardware accelerator, a true random number generator and two 128-bit locations in one-time programmable memory for storage of AES keys. The two 128-bit one-time-programmable (OTP) key locations help protect against attempts at remote key extraction via a software hack. Once the keys are written (in a scrambled format) into OTP, they are no longer accessible via software or JTAG boundary scan. The keys can only be accessed by the internal AES hardware block.

The LPC18Sxx and LPC43Sxx microcontrollers include both flash (512kB to 1MB internal) and flashless versions. The flashless versions must boot on reset from external memory locations – say an external QSPI flash – and then run from the large internal RAM. To protect the code from being seen during the boot, an encrypted image can be stored in the QSPI and on reset, the LPC18Sxx or LPC43Sxx will read the encrypted image, verify it with a built-in CMAC message authentication, decrypt using the AES block and 128-bit key stored in OTP, and begin executing decrypted code from internal RAM. Both microcontrollers are suited to any IoT

application requiring extensive connectivity and microcontroller performance. This could include industrial controls, industrial automation or diagnostic applications, smart home products including thermostats and access control, automotive aftermarket, and consumer products like musical instruments, printers and other internet connected accessories. Another application is a secure IoT gateway. Here, the microcontroller provides high-speed encrypted connectivity with hardware-accelerated AES via Ethernet or SPI to WiFi. Cypherbridge Systems, an NXP software partner, provides an IoT and cloud-connected software development kits for the LPC18Sxx and LPC43Sxx that take advantage of the AES hardware acceleration.

To add banking grade security, an NXP A7-series secure element can be connected to the microcontroller via an I_C interface. The A7 secure element will handle hardware-accelerated authentication and provide secure storage for persistent certificates for cloud storage. Two evaluation boards that include the LPC18S37 or the LPC43S37 microcontroller and an A70CM secure element are available from distributors. ESL Smart Solutions has created EMap, a secure IoT Gateway, using the LPC18S57 microcontroller and Cypherbridge Systems software security libraries. EMap is a highly secure Internet of Things (IoT) gateway. It is available as an off-the-shelf product or as part of a cloud development kit (CDK). Growth in connect devices is inevitable and with it comes various levels of risk. NXP offers a spectrum of solutions to embedded designers to address the appropriate level of code and data security for their applications. ■

Product News

■ Microchip doubles Flash memory and adds new security options PIC24F MCUs

Microchip announces the expansion of its eXtreme Low Power (XLP) PIC microcontroller portfolio. Features of the new PIC24F "GB4" family include an integrated hardware crypto engine with both OTP and Key RAM options for secure key storage, up to 256 kB of Flash memory and a direct drive for segmented LCD displays, in 64-, 100- or 121-pin packages. Dual-partition Flash with Live Update capability allows the devices to hold two independent software applications, and permits the simultaneous programming of one partition while executing application code from the other. These advanced features make the PIC24F "GB4" family ideal for designers of industrial, computer, medical/fitness and portable applications that require secure data transfer and storage, and a long battery life.

News ID 3364

Product News

■ Silica signs distribution agreement with Nordic Semiconductor

Silica has signed a distribution agreement with the ultra low power (ULP) short-range wireless communication specialist Nordic Semiconductor. The agreement authorises Silica to sell and support the full range of ULP wireless solutions available from Nordic across Europe.

[News ID 3239](#)

■ DDC expands power solutions capabilities with acquisition of Emrise

Data Device Corporation has expanded its power solutions capabilities with the acquisition of Emrise Electronics. Emrise is comprised of XCEL Power Systems Ltd and Pascall Electronics Ltd, international market leaders in high reliability power conversion products.

[News ID 3229](#)

■ Toshiba expands line-up of ARM Cortex -M-based MCUs

Toshiba Electronics Europe will enhance its portfolio of ARM Cortex-based microcontrollers with the development of the new TXZ family of microcontrollers that support low-power consumption and high-speed operation for IoT and M2M ecosystems.

[News ID 3368](#)

■ Conrad launches Finnish distribution service

Conrad Business Supplies now offers its specialist B2B electronics distribution services to customers across Finland. Offering a 48hr delivery time to Finland's major industrial and business centres, Conrad provides Finnish customers the same rapid, dependable and high quality of service afforded to its existing European markets.

[News ID 3245](#)

■ Infineon: Power MOSFETs make electrical appliances more compact and durable

DIY tools such as cordless drills and saws have to be handy and durable. Therefore, the electronic components used in the applications need to be space-saving and rugged. Infineon Technologies has extended its StrongIRFET Power MOSFET family and thereby provides a solution that fulfills both requirements.

[News ID 3379](#)

■ u-blox: 150 Mbps 4G LTE and WCDMA module works on AT&T and Verizon networks

u-blox announces TOBY-L201, a 4G LTE Cat 4 module with 3G WCDMA fall-back, which works on AT&T and Verizon networks. TOBY-L201 switches automatically or via AT command to AT&T's or Verizon's network, without the need to load new firmware. Depending on which carrier's SIM card is

inserted, TOBY-L201 recognizes the carrier and starts on that carrier's network. If devices are equipped with two SIM cards or a configurable SIM chip, TOBY-L201 can be switched between operators on-the-fly via a simple AT command.

[News ID 3375](#)

■ Wibu-Systems: lean license entitlement via SAP

Informatics and Wibu-Systems have partnered over the last few months to develop a solution that offers a significant advancement in back office performance. Through the integration of CodeMeter with SAP, license entitlement is incorporated within the existing workflow - a superior advantage for ISVs.

[News ID 3237](#)

■ Infineon: protection from product piracy and IP theft

Industrial automation, medical equipment, electronic components – plagiarism of capital equipment requires effective prevention, such as embedded security solutions from Infineon. According to the OECD, counterfeiting and piracy costs add up to around 638 billion US dollars annually. The new OPTIGA Trust E offers an easily implementable solution to protect manufacturers' valuable IP from being attacked, analyzed, copied and modified.

[News ID 3276](#)

■ ADI: zero-drift, precision op amp simplifies board design

Analog Devices introduced the first in a new series of high-voltage, low-noise, zero-drift, precision operational amplifiers that reduce system noise, cost, board space, and development time by providing on-chip electro-magnetic interference filtering and eliminating the need for calibration circuitry. The dual-channel ADA4522-2 op amp operates within a supply voltage range of 4.5 to 55 V and exhibits noise performance that is at least 35 percent better than its closest competitor.

[News ID 3361](#)

■ Maxim: quad deserializer eliminates components for automotive camera applications

The MAX9286 quad deserializer from Maxim Integrated Products, enables the design of surround-view systems for ADAS (Advanced Driver Assistance Systems) with fewer components and faster time to market. Just one MAX9286 gigabit multimedia serial link (GMSL) deserializer receives and automatically synchronizes video from up to four cameras. Surround view systems are a key component in today's emerging ADAS market.

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Dual wireless protocol solution for the Internet of Things

By Tudor Stănescu, Freescale

This article introduces the Kinetis KW40Z MCU, an ARM Cortex-M0+ based ultra-low power wireless microcontroller platform which is a solution for addressing multi-wireless protocol in the ever-growing IoT space.



The Internet of Things (IoT) is here, whether we know it or not. More and more, the everyday objects around us are evolving to include capabilities that connect the real world to the virtual universe. From the edge sensor node in your home to the vast cloud infrastructure—data is flowing from physical devices and enabling a virtual representation. Whether it's an IPv6 address, a QR code, or some other means of identification, connectivity capabilities are rapidly enabling a mass deployment of the IoT.

When designing silicon for these sorts of connectivity solutions, low resource consumption is key: low power, low cost of materials, and achieving just the right result with the least effort. These requirements, plus the proliferation of terminals for mobile communications, have made wireless the preferred method of connecting the objects around us. Various protocols that were developed for earlier markets (such as handheld Bluetooth accessories or Smart Energy ZigBee®/802.15.4, which met the requirements of the IoT space) were enriched with technologies such as Bluetooth Smart and Thread.

The IoT is as vast a concept as the Internet itself, with the ability to grow and spread like a living organism. The hardware that makes up this organism varies in terms of complexity

and function. Sensor networks are vital organs within the system, acting as organic sensory appendages for all the data being created. As in any data network, gateways that bridge two networks or that connect a network and the cloud are essential. Protocols such as Thread define concepts like border routers, which route IPv6 packets between a sensor network and a regular LAN or WAN.

Another essential concept for protocol specifications in the IoT space (particularly in wireless sensors networks) is network commissioning—the collection of procedures for creating a network to serve its intended purpose. One of the procedures in this operation is adding a new device to an existing wireless network. Usually this involves a method of authenticating the new device to the existing network using out-of-band (OOB) data. The OOB credentials can be obtained by using a secondary protocol. The best example of this would be scanning a QR code on a home automation device that needs to be commissioned to the home automation network with a tool, such as a mobile phone.

Gateways and network commissioning present the need (and opportunity to fulfill that need) of wireless sensor network devices to have dual-protocol capabilities: the ability to be part of two networks as a gateway, or the ability to provide OOB data for commis-

sioning. Dual-mode devices are not a new concept and they have been around since the first systems-on-chip for mobile phones that integrated Bluetooth or Wi-Fi. The IoT, however, presents new challenges when it comes to combining dual mode capabilities with resource consumption requirements for low power and low cost sensors. Because of these constraints, dual-mode devices in the wireless IoT space need to achieve the functionality of both protocols via a single radio frequency front-end through which the protocols are multiplexed. Multiplexing protocols in a system with very low complexity (a limited number of logic gates in the silicon layout) becomes the real design challenge, and an opportunity for differentiation between manufacturers. To best approach this challenge, one must consider both the system architecture and the protocols themselves.

The system architecture involves hardware and software implementation of the layers of the respective protocol stacks. In most cases hardware starts at the lowest level (radio front-end in the case of wireless devices) and stops somewhere around layer 2, also known as the data link layer. Above this level, hardware automation/protocol acceleration becomes impractical for IoT devices because of their low resource consuming nature. The Open Systems Interconnectivity (OSI) model

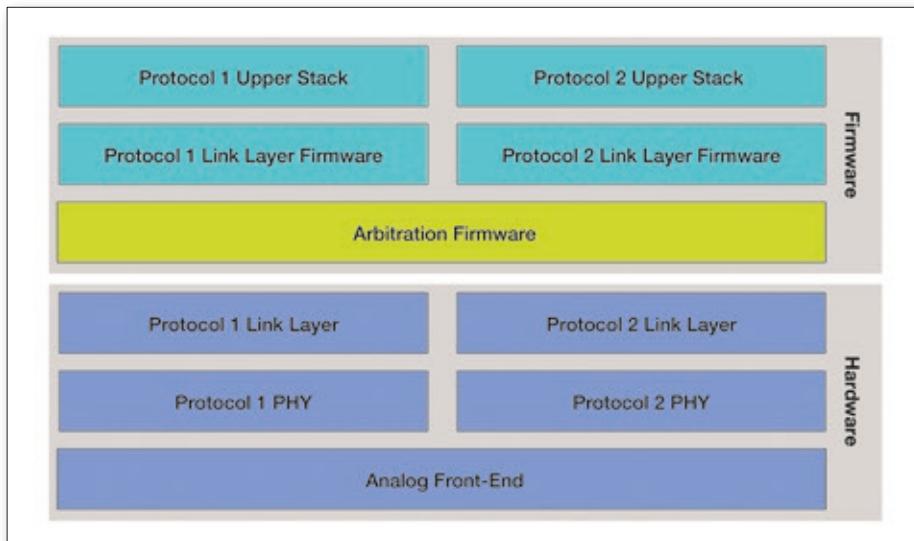


Figure 1. Link layer arbitration

describes the data link layer as the collection of functions that achieve media access control and logical link control. This functionality presents the perfect opportunity for dual- or multi-protocol arbitration/multiplexing by making two data link layers (of two different protocols) aware of each other.

This mutual awareness can be best translated in a set of rules that define the in-system coexistence of the two protocols. Rules can span various levels of the data link layer implementation, from managing access to the physical resource (electromagnetic spectrum), to managing duty cycles of the respective protocols. Some standardization bodies (such as

the Bluetooth Special Interest Group) have already begun defining high-level sets of rules for protocol arbitration, as described in Volume 7 of the Bluetooth specification Wireless Coexistence, also known as the Mobile Wireless Standards (MWS)Coexistence. While these rules are aimed mainly at coexistence within the electromagnetic spectrum, they are ideal for protocol arbitration as well.

To allow for scalability and modularity of the system, it is important to achieve multiplexing at a given level of the protocol stack, since higher layers can become agnostic. There can be cases where IoT application constraints and needs may dictate otherwise, in the sense that the topmost application layer will evidently be aware of the fact that it has two protocols at its disposal and leverage both of them to achieve the desired functionality. Figure 1 shows a proposed system decomposition, where the protocol arbitration is achieved in a firmware layer that runs directly above the data link hardware. This approach eliminates the gate count cost of having an on-chip complex arbitration logic, which may be too rigid at design time to cover all the corner cases that can occur over the lifetime of a wireless microcontroller used in IoT applications.

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3 Embedded Boards from AAEON based on Intel's latest Baytrail range of CPU platforms

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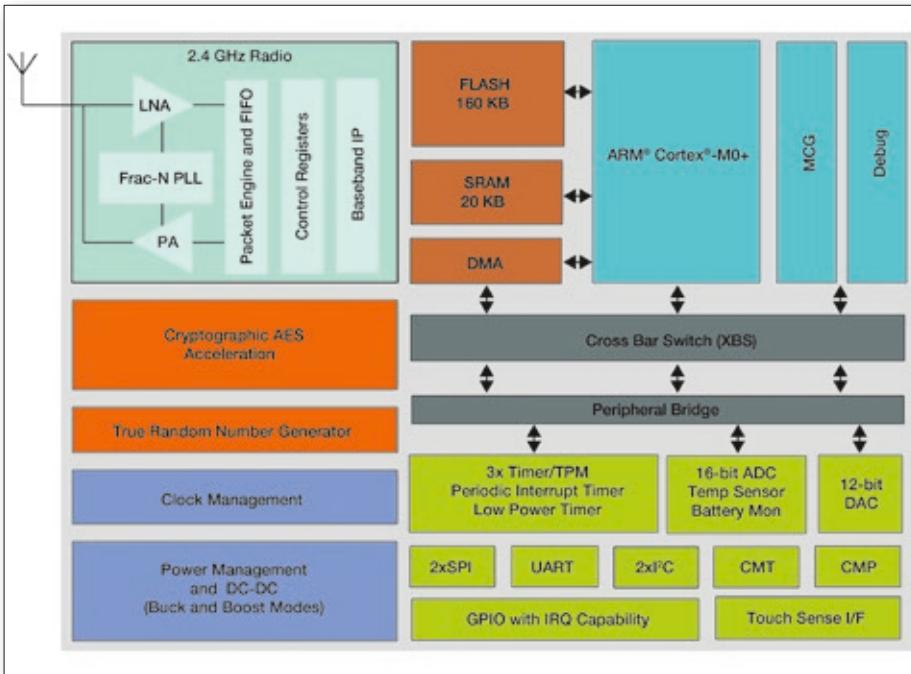


Figure 2. Kinetis KW40Z MCU block diagram

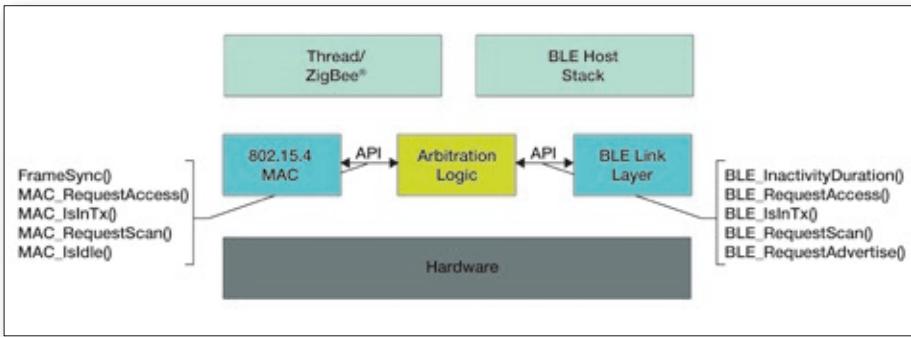


Figure 3. Arbitration API calls

Freescale's solution for addressing multi-wireless protocol in the ever-growing IoT space is the Kinetis KW40Z MCU - an ARM Cortex-M0+ based ultra-low power wireless microcontroller platform. This platform includes dual wireless protocol support for Bluetooth Low Energy (BLE) v4.1 and IEEE 802.15.4. The Kinetis KW40Z system-on-chip integrates a 2.4 GHz transceiver supporting a range of FSK/GFSK and O-QPSK modulations, 160 KB flash and 20 KB SRAM, BLE link layer hardware, IEEE802.15.4 packet processor, hardware security, and peripherals optimized to meet the requirements of the target applications. These two protocols enable a multitude of use cases for BLE profiles implementations coexisting with networking layers on top of 802.15.4 (such as ZigBee or Thread). Furthermore, they serve as an ideal building block for implementing the gateway use case (routing packets between a ZigBee or Thread mesh and a Bluetooth Smart mesh network) and the commissioning use case (using BLE OOB data to commission a Thread/ZigBee device).

The Kinetis KW40Z MCU offers multi-protocol support that follows the exact model of link layer firmware arbitration as previously proposed. The upper layers (BLE host stack and Thread/ZigBee stacks) become agnostic of the dual-mode nature of the system. The arbitration firmware layer manages the two link layer IP blocks for BLE and 802.15.4. This management takes into account the specifics of each protocol. The asymmetrical BLE protocol includes two main states: pre-connection (advertising/scanning) and connection (with frequency hopping). Meanwhile, the 802.15.4 protocol simply transmits data point-to-point with a robust flow control mechanism.

Freescale protocol arbitration firmware implementation borrows from the MWS coexistence logical signaling, described by the Bluetooth specification. The concept of MWS is embodied by 802.15.4, co-located on-chip with BLE in the Freescale solution. Coexistence is managed via API function calls grouped in service access points between the software parts of the link layers for each proto-

col. These functions request access and inform each data link layer of the other activity.

The particular natures of the two wireless protocols implemented by the Kinetis KW40Z (especially the inherent low-duty cycle of the BLE activity in the majority of profiles and applications) allow for a default mode of operation for the arbitration logic provided in the firmware from the Kinetis KW40Z enablement software packages. This essentially puts the BLE link layer in a master mode to control media access of the 802.15.4 MAC. In essence - whenever the BLE needs to perform an operation, it preempts the 802.15.4 MAC for this purpose; whenever it is in the process of performing an operation (either advertising/scanning or connection data transfer) it cannot be preempted by the 802.15.4 MAC. Analysis has shown this to be very practical since 802.15.4 activity is minimally disrupted by the low-duty cycle of BLE applications. This default mode of operation requires a single API function for signaling the 802.15.4 MAC during idle periods in the BLE link layer. With more intensive use of the BLE mode (such as in the case of a Bluetooth Smart Mesh) the full set of API functions would be required to allow proper control of the protocol multiplexing.

The next generation of IoT-enabling Kinetis microcontrollers - Kinetis KW41 MCUs - will add even more value by allowing a physical layer-only capability that expands the use case landscape significantly (in addition to IEEE 802.15.4 and new BLE v4.2). This feature provides a generic FSK modem that allows configurable parameters for FSK modulation. Together with software data link layer implementations, this enables compliance of the whole system with several other established protocols - which use various flavors of FSK modulation. This also presents new challenges for protocol arbitration and multiplexing approaches, requiring adaptation to two hardware implementations of the 802.15.4 and BLE link layer plus one software implementation of another link layer which drives a custom FSK PHY. The robustness of the arbitration module implementation, coupled with the specific multitasking capabilities brought in by a real-time operating system, make the dual-wireless protocol multiplexing solution scale upwards to offer a multi-wireless protocol solution. It all begins with a configurable set of rules, which the protocol arbitration software module helps to configure and manage. And as data begins to flow in greater volume from our physical devices into the virtual world, these and subsequent connectivity innovations will be a major life force of the IoT - allowing it to develop and grow on its own terms. ■

LTE and optimizing LTE Advanced for machine-type communications

By Felix Marchal, Telit

LTE differs from earlier networks with brand-new network core and air interface technologies providing a groundbreaking combination of efficiency and flexibility. The efficient use of spectrum will lead to lower costs and the ability to combine high-speed, low-latency transmission with cost-effective, low bit rate services. LTE-A offers a high data rate of 300 Mbps or more and high-mobility performance.



■ LTE-MTC (also known as LTE-M) is a convenient way of encapsulating the optimization of LTE Advanced for machine-type communications. LTE is marketed as 4G: marketed that way because technically it's 3.9G. LTE-Advanced (LTE-A) is the real 4G because it meets the ITUs requirements for fourth-generation wireless systems. Cellular networks have transitioned from circuit-switched 2G through to packet-switched 3G, 3.5G (HSPA) and 3.75 G (HSPA +), but 4G represents a quantum step. It involves next-generation technology like OFDM (Orthogonal Frequency Division Multiplexing) in the air interface and a simplified, flat, all-IP architecture having open interfaces and an Evolved Packet Core (EPC).

OFDM is immune to selective fading, resilient to interference, and it makes efficient use of the available spectrum. LTE / 4G networks can therefore accommodate up to 10 times more traffic than earlier generations. In addition LTE supports IPv6, which expands the addressable IP space to an inexhaustible figure. LTE employs UE (User Equipment) categories to define the performance specification: the higher the category, the higher the data rate. Category 0 download data rate is 1 Mbps; Category 1 download data rate is 10 Mbps; Cat 6 is 300 Mbps; LTE-A Cat 8 is set to reach 3 Gbps. Higher categories are driven by consumer applications. A data rate of 1

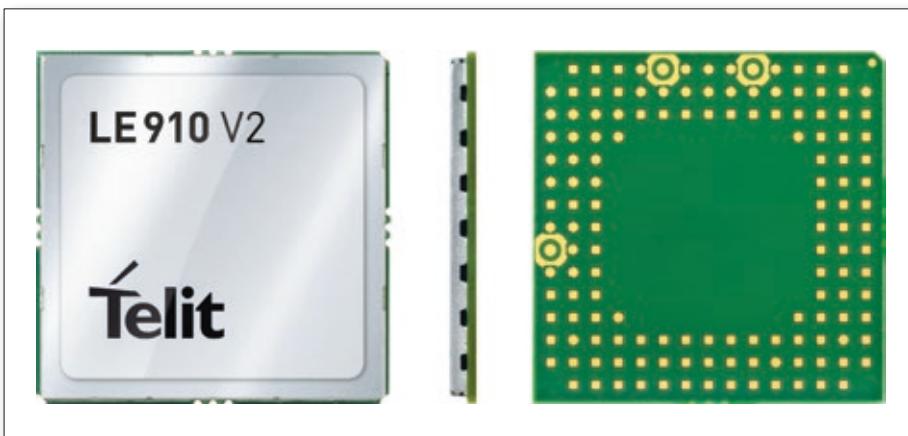
Mbps is more than adequate for most M2M applications, so why mention these higher figures? Two reasons: one, they indicate that LTE is intrinsically flexible and two; they demonstrate that development work is ongoing.

LTE has followed a well thought-out roadmap with releases providing successively improving capabilities that result in: higher and more consistent data rates for users; higher capacity; and a better overall user experience. It is set to become a common technology standard that will enable economies of scale and have a significant impact on our personal and business lives. Moreover, it's a ubiquitous communications technology that can deliver the connectivity requirements of the upcoming IoT era. LTE is ideal for IoT applications that need to respond in real-time, e.g. controlling sensitive equipment, critical smart-grid apps, industrial alarm systems, traffic control systems, and medical devices. The low latency of LTE can enable connected applications that would not otherwise be possible. LTE networks were designed to fall back to an earlier generation network if the attached device could not detect a 4G signal. This was an early, mandatory requirement since different countries had different rollout timing and coverage plans. In addition fallback is important since it allows companies to future-proof their solutions. Companies who recognize that LTE

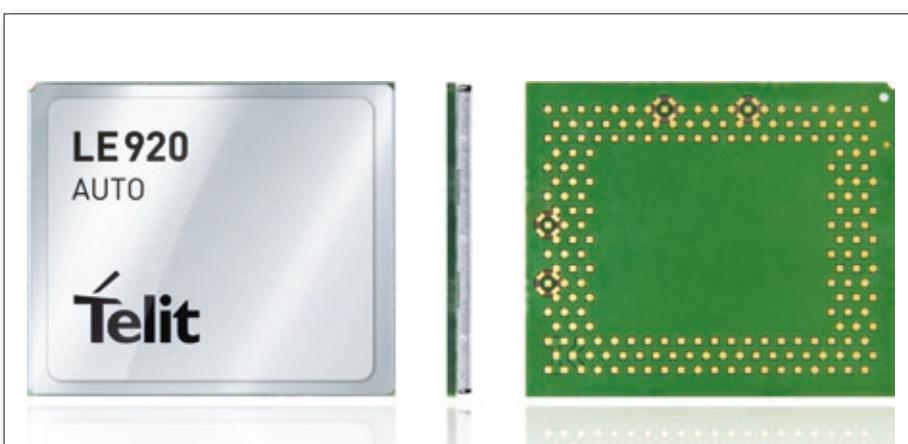
technology will be the global standard and who are marketing solutions that have long life times, ten years or more in key segments like automotive, cannot rely on 3G since it too might reach decommissioning status within this timeframe.

LTE is the first network technology that can comfortably accommodate demanding applications like real-time video surveillance and at the same time provide cost-effective connectivity for low-speed applications. Therefore although these apps have widely different performance requirements, the market will be able to build a wide-ranging ecosystem on a single, wide area communication technology. Moreover, LTE has or will have everything going for it: superior performance; ubiquitous connectivity; scalability; low cost per bit, delivery of whatever QoS customers require, and longevity (MNOs are or will be retiring older network types).

LTE MTC is part of Release 13 of the global 3GPP standard, which is planned for March 2016. The benefits include: leveraging the reliability, pervasiveness, efficiency and longevity of 4G LTE, the significant increase in battery life thanks to longer sleep cycles, while reducing cost/complexity and enhancing coverage in what have traditionally been difficult-to-reach locations, such as inside



The LE910 V2 is an LTE 3GPP Category 4 module delivering data rates of 150 Mbps downlink and 50 Mbps uplink.



The LE920 Series combines two high speed cellular modes: LTE and full fallback capability with HSPA+.

buildings and basements. It will have co-existence with mobile broadband services, thereby facilitating new M2M business model innovation and the ability to play a key connectivity role in the various solutions that make up IoT solutions.

The LE910 is essentially two high-speed cellular modules in one. An LTE 3GPP Category 3 module delivering data rates of 100Mbps downlink and 50Mbps uplink and an HSPA+ module delivering up to 42Mbps downlink

and 5.76Mbps uplink rates. It falls back automatically to HSPA + if it is unable to register onto an LTE network. Two different series of variants are available, one for the North American market and another for the European. Both include multiband configurations, covering different sets of 4G and 3G bands as well as MNO certifications. The LE910 also includes multiple-input multiple-output (MIMO) technology, an essential feature to meet demands for data rate and link reliability.

The LE910 V2 is an LTE 3GPP Category 4 module delivering data rates of 150Mbps downlink and 50Mbps uplink. It's ideal for regions with high 4G penetration levels. Multi network support for North America and Europe is provided.

The LE920 Auto Series combines two high-speed cellular modes: TE delivering 100Mbps downlink and 50Mbps uplink data rates and full fallback compatibility with HSPA+. LE920 modules are also fully backward compatible with existing GSM/GPRS networks, which enables connectivity in remote areas where there is no 3G coverage. The



The ATOP platform supports LTE 4G cellular for voice and data communication

series comprises band-combination variants designed for the market requirements in North America. The series was developed and manufactured according to ISO TS16949 processes, making it ideal for automotive OEMs.

The M.2 family data cards deliver LTE high-speed data rates for PC OEM device manufacturers. The M.2 form factor is ideal for devices having very high throughput requirements such as PDAs, e-readers, tablets, and mobile computing or consumer electronics. The family enables a natural transition from the Mini Card PCI and Half Mini Card to a smaller form factor. Features include lower power consumption, high-speed USB interfaces and support for multiple operating systems.

The LN930 M.2 achieves download rates to 150Mbps through support of 3GPP release 9. There are two variants; both support the various RF frequency bands and band combinations that are deployed worldwide. The LN930 LTE for North America and Europe plus roaming in Asia Pacific. The LN930-AP LTE APAC is especially developed for Asia Pacific.

The LN932 M.2 achieves download rates to 300Mbps through support of 3GPP release 10 LTE Carrier Aggregation. There are two variants. The LN932 M.2 LTE Advanced supports the various RF frequency bands and band combinations that are deployed worldwide. The LN932 LTE Advanced is suited for North America and Europe plus roaming in Asia Pacific.

Despite the enormous potential of the market for smart cars, only 8% of the cars in the world are actually connected to the Internet. Nevertheless, all the top 14 automotive

manufacturers, which account for 80% of the market, have a connected-car strategy. This indicates that their strategy is long-term. The requisite hardware platforms are being embedded today in order to launch applications tomorrow, and then at a later date the manufacturer can decide how they need to grow or change.

ATOP platform combines formidable processing power in order to support almost all conceivable telematics applications with LTE 4G cellular for voice and data communication. Therefore it enables the creation of future-proof solutions, both from an application/service perspective as well as connectivity since it removes any uncertainty about future 2G or 3G sunsets. ■

Fast and secure roaming for wireless applications on public transport

By Benjamin Amsler and Jürgen Kern, NetModule

Fast and secure roaming is a term associated with continuous mobile

M2M communication on public transport vehicles. The number of applications needing a seamless connection with their counterpart is rising rapidly. The precondition is often the transmission of large data volumes in real time into and out of the vehicles.

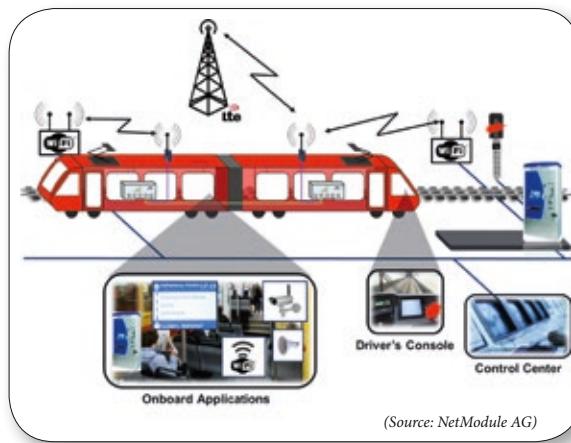


Figure 1. Several complementary network technologies form modern M2M communications infrastructures in local public transport networks.

The trend reversal in communications technology for safety-critical applications is particularly interesting, since it shows a move away from the previously dominant proprietary systems to standardized protocols such as 2G/3G/4G/WiFi. For example, this is seen with communications-based train control (CBTC) with extremely high demands on system availability and secure communications in trams, metro and light rail vehicles. For some considerable time now driverless and autonomous special vehicles have been reality in production and distribution companies, such as the container terminal at the port of Hamburg, as well as fully automatic underground railway systems, such as the metro in Copenhagen. The trend towards complete automation cannot be stopped - in the near future many metro and tram systems will "operate driverless".

But, for several reasons, the existing cellular communications infrastructure does not fully meet the requirements expected by these applications: operators should be able to guarantee a seamless connection with maximum availability and in the case of CBTC systems for automatic train operation (ATO), a redundant network infrastructure is absolutely essential because of the security requirements. Furthermore continuous 24/7 communication incurs considerable costs and often, the

network capacities are not sufficient enough, especially when offering passenger WiFi, ultimately, there is high dependency on the network operator. To counter these deficits companies establish proprietary and dedicated networks for M2M applications, mostly based on IEEE802.11 WiFi in the 2.4GHz and 5GHz range, LTE or GSM-R. These networks, however, are already reaching considerable dimensions and reinforce the trend towards an increasingly heterogeneous network landscape, where islands with the broadband technologies LTE and WiFi are emerging within the extensive 2G/3G/4G coverage.

In the near future it is highly unlikely that one communication technology will completely prevail. Therefore solutions are required that are reliably switching seamlessly between 2G/3G/4G/WLAN networks and can bundle several links to obtain maximum capacity. Standard devices mostly support seamless roaming only between 2G/3G/4G; switching between WLAN and cellular communications is possible only using special protocol software, e.g. the Mobile IP protocol. The interruption of up to a few seconds associated with this roaming method is largely unsolved - a situation that is not tolerable for many applications. There is, however, a possible approach to solve this problem: short switching times are a basic requirement for the change in tech-

nology, and to achieve this, standard modem driver software could be optimised to shorten switching delays. Based on this, it is then possible to operate several connections in parallel, as a result of which the bandwidth can be increased (link aggregation) and, on the other hand, the interruption of a single connection does not lead to communication failure (redundancy).

However, roaming within one communication technology when changing from one network cell to the next is executed much more frequently. Broadband networks such as WLAN in particular, have a wireless range that is physically limited to approximately 100m, which requires frequent cell changes with increasing speeds. One example: a cell with a range of 200m is crossed in 12s by a vehicle traveling at 60km/h. Fast Roaming is defined in the standard IEEE 802.11r and is considered as a mechanism for optimizing this roaming time in encrypted WLAN networks. It speeds up the Basic Service Set (BSS) transition between the access points (APs) thanks to an optimized negotiation of the safety encryption in less than 100ms. Compatibility with the IEEE 802.11r standard can usually be activated by means of a software driver option. In addition to the necessary technical fine-tuning there is a further challenge with WLAN networks: in contrast

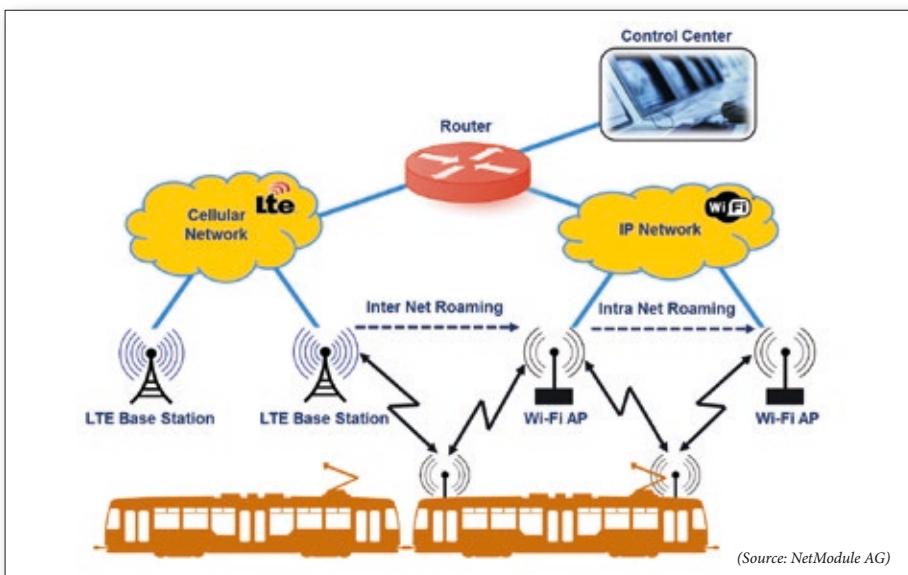


Figure 2. Network swapping by means of fast roaming enables continuous and seamless communication from the mobile client to the control centre and meets the highest demands.

to the administered cellular communications networks, where the mobile client is passed on to the next cell by a higher-level management entity, no controlling entity is foreseen for WLAN networks. The client must therefore decide for itself at what time it dials into the next cell and which one it dials into before the connection breaks off. Almost all WLAN devices are still based on a widely passive roaming algorithm: the WLAN cell is changed only when data is already being lost and the connection breaks. Understandably, this approach is not suitable for fast and reliable communication. In this case solution

strategies are mostly based on active roaming achieving switching times below 50ms. An additional network management server (WLAN controller) observes the movements of the clients in its network and actively and proactively points them to the next cell (similar to what is done in a cellular phone network). However, this presupposes an exchange of proprietary roaming information between the client and server, as well as their interoperability. Intelligent client applications with suitable metrics and application-specific parameters independently prepare the next handover, with typically very good results.

This on the other hand increases the independence of the network operator.

If highly available and completely seamless communication is required, several connections must be maintained simultaneously and operated using a redundancy protocol. With a system solution, the application does not need to worry about fast roaming. The complexity of relevant algorithms must be hidden behind an abstract communication interface layer that is independent of the network technology. Only in this way can several applications benefit from the optimized connectivity at the same time and without restrictions. As a solution dedicated external M2M routers and / or sophisticated internal software middleware components can be considered.

Experts in the industry are convinced that seamless communication with standard wireless technology will also establish itself for security-relevant applications. The driving factors for this are: the products can be used worldwide unlike devices based on proprietary protocols. Extensive broadband communication is possible thanks to quick cell changes using Fast Roaming. Communication across technology borders facilitates migration to new technologies because the existing infrastructure can still be used in the transitional phase. Dead spots and failures can be bridged with alternative technologies. Ultimately, the considerable cost advantage and the increased independence from the manufacturer and service provider should be powerful arguments for investors. ■

Product News

■ Microchip expands 32-bit MCU family with integrated floating point unit series

Microchip announces a new series within its high-performance PIC32MZ family of 32-bit microcontrollers that features an integrated hardware Floating Point Unit for high performance and lower latency in intensive single and double-precision maths applications.

[News ID 3446](#)

■ ADI: clock jitter attenuator optimizes JESD204B serial interface functionality

Analog Devices introduced a high-performance clock jitter attenuator designed to support the JESD204B serial interface standard for connecting high-speed data converters and FPGAs operating in base station designs. The JESD204B interface was specifically developed to address high-data rate system design needs, and the 3.2-GHz HMC7044 clock jitter attenuator contains functions that support and enhance the unique capabilities of that interface standard.

[News ID 3425](#)

■ Wibu-Systems: CodeMeter is ready for Windows 10

With its history of effective cooperation and Gold OEM partnership with Microsoft, Wibu-Systems was an early adopter of their new operating system Windows 10. This has put Wibu-Systems in a perfect position to guarantee a smooth migration for the users of CodeMeter, its all-in-one technology for software protection, licensing, and security.

[News ID 3403](#)

■ Mouser now stocking Freescale's PF3000 Power Management Integrated Circuit

Mouser Electronics is now stocking the PF3000 Power Management Integrated Circuit (PMIC) from Freescale Semiconductor. Developed as a companion device to Freescale's i.MX 7 series and i.MX 6SoloLite and i.MX 6SoloX series of application processors, the PF3000 is a single-chip power management solution.

[News ID 3405](#)

■ Toshiba expands ApP Lite processor family for IoT solutions

Toshiba Electronics Europe has announced the launch of TZ1041MBG, an application processor designed for use in wearable devices such as activity monitoring products, smart watches, bracelet and glasses-type devices. The new IC is the latest addition to Toshiba's ApP Lite TZ1000 family of solutions for the internet of things.

[News ID 3402](#)

■ Renesas: 16- and 32-Mb Advanced Low Power SRAMs

Renesas Electronics announced the release of two new series of Advanced Low Power SRAM (Advanced LP SRAM), the leading type of low-power-consumption SRAM, designed to provide enhanced reliability and longer backup battery life for applications such as factory automation, industrial equipment, and the smart grid.

[News ID 3282](#)

■ MathWorks: MATLAB release 2015b and Simulink updates

MathWorks introduced Release 2015b (R2015b) with a range of new capabilities in MATLAB and Simulink. In addition to new features in MATLAB and Simulink, R2015b includes updates and bug fixes to 83 other products. MATLAB updates include new execution engine that runs MATLAB code faster; Graph and directed graph functions for creating, analyzing, and visualizing graphs and networks; Add-On Explorer - a single interface for adding community-authored and MathWorks toolboxes, apps, functions, models, and hardware support; Hardware support for iOS sensors, Raspberry Pi 2, and BeagleBone Black.

[News ID 3417](#)

■ Altium updates TASKING compiler for TriCore/AURIX microcontrollers

Altium has announced the release of a major update to their TASKING compiler for TriCore/AURIX microcontrollers which power advanced automotive applications. This new release supports the next generation of Infineon TriCore technologies and enables engineers to begin early development on advanced automotive applications before the new AURIX family line is released publicly. This update is now available to all TASKING customers on a maintenance contract and trial versions are available upon request.

[News ID 3315](#)

■ Green Hills integrates INTEGRITY RTOS with Luxoft's HMI design tool chain

Green Hills Software and Luxoft Holding announce the integration of Green Hills Software's INTEGRITY real-time operating system with Luxoft's Populus Suite HMI design tool chain. With the use of Green Hills Software's MULTI integrated development tool chain, this combination allows Populus to run on a wide range of automotive grade microcontrollers, enabling the creation of robust digital instrument clusters with a low memory footprint.

[News ID 3298](#)

■ Telit: developer kits for TI LaunchPad, Raspberry Pi, Arduino and Android

Telit announced new deviceWISE developer kits for the TI LaunchPad, Raspberry Pi, Arduino and Android, popular platforms in the IoT developer and maker communities. These 'dev kits' include programming code libraries and comprehensive, step-by-step instructions to securely connect and integrate these platforms with the Cloud-based deviceWISE IoT Platform – making it easy for developers to exchange data between devices and web-based and mobile apps, manage data plans, perform remote firmware updates and execute all other essential IoT functions.

[News ID 3431](#)

■ Microchip: MPLAB Code Configurator enables set-up of individual CIPs

Microchip announces an expansion of the development platform for its growing portfolio of 8-bit PIC microcontrollers with Core-Independent Peripherals (CIPs). Designers can combine these building blocks to perform application functions autonomously, and they can be interconnected with an increasing amount of integrated intelligent analogue peripherals.

[News ID 3440](#)

■ TI: advanced WEBENCH tools for expert power-supply designers

Texas Instruments unveiled a series of advanced tools in WEBENCH Power Designer that provide experienced engineers extensive design control, analysis and trouble-shooting capability to create complex power-supply designs. From control-loop compensation to simulation export, WEBENCH Power Designer now puts cutting-edge tools in the hands of expert design engineers to create power supplies for industrial, automotive and communications equipment.

[News ID 3273](#)

■ Rutronik distributes STM32F7 series with starter kit and evaluation boards

STMicroelectronics' STM32F7 MCU series with ARM Cortex-M7 core is now available at distributor Rutronik with a starter kit and two evaluation boards. With ST's ART Accelerator and an L1 cache, the STM32F7 MCUs deliver the full performance of the ARM Cortex-M7 core with code executed from either embedded Flash memory or an external memory

[News ID 3310](#)

■ SEGGER: protect personal documents with free Sign & Verify

SEGGER Microcontroller has released Sign & Verify, a Windows application which digitally signs a document to protect it from being maliciously altered. The utility is delivered with a key generator, provided free of charge for personal use. Sign & Verify is an easy-to-use tool based on SEGGER's emSecure.

[News ID 3447](#)

■ Green Hills supports S32V200 vision processor from Freescale

Green Hills Software has announced its Platform for ADAS, including the INTEGRITY real-time operating system and 64-bit MULTI development tools, for the Freescale S32V200 automotive vision processor featuring quad ARM Cortex-A53 cores with dedicated vision processors cores. For the first time, carmakers and their tier-1 suppliers can develop advanced vision and fusion applications on powerful 64-bit cores and confidently deploy safe and secure ADAS features.

[News ID 3267](#)

■ LDRA: version 9.5 release of LDRA tool suite

LDRA announced the version 9.5 release of its LDRA tool suite. The new updates automate manual processes and provide simple, easy-to-use visibility into the relationships between software artifacts at all stages of the software development life cycle from requirements through verification.

[News ID 3280](#)

■ Conrad introduces Link Solutions network testing range from Fluke Networks

Conrad Business Supplies is to begin stocking an updated range of products from network testing specialist, Fluke Networks. Based around the LinkRunner and LinkSprinter hand-held network testers, the Link-Solutions range provides a cohesive way to conduct copper, fibre and Ethernet tests, while effectively managing their results.

[News ID 3281](#)

■ LDRA extends integration with TI's Code Composer Studio 6

LDRA has updated its integration with the Texas Instruments Code Composer Studio to deliver increased effectiveness for developers and productivity for users. As part of the update, LDRA has augmented the number of targets it supports within specific industries and added new features from CCS's latest version 6.

[News ID 3404](#)

■ Green Hills enhances µ-velOSity RTOS

Green Hills Software has announced a major release of its ultra-small footprint µ-velOSity real-time operating system with new support for the latest processor architectures, improved performance optimizations and expanded security and safety features. When combined with versatile middleware products from Green Hills and its technology partners, µ-velOSity and the MULTI integrated development environment offer an ultra-small and fast software platform to quickly develop and efficiently run applications on resource constrained devices such as IoT wearables, home automation and connected industrial sensors.

[News ID 3284](#)

■ AdaCore: GNAT Pro available for Wind River VxWorks 7

AdaCore announced the continuing extension of its Wind River VxWorks real-time operating system support, with the implementation of the GNAT Pro development environment on VxWorks 7. AdaCore engineers worked closely with Wind River on this new product, ensuring that it would support both single- and multi-core systems, as well as other architectures.

[News ID 3287](#)

■ Altera: second-generation Nios II Embedded Evaluation Kit

Altera announced availability of the second-generation Nios II Embedded Evaluation Kit (NEEK), which features Altera's non-volatile MAX 10 FPGA and Nios II soft-core embedded processor. The MAX 10 NEEK is a feature-rich platform that provides a fast and simple way for embedded designers to experience the capabilities of a custom embedded processor in a non-volatile FPGA. The MAX 10 NEEK was jointly developed by Altera and its board partner, Terasic.

[News ID 3291](#)

■ FTDI Chip: evaluation boards for SuperSpeed USB-to-FIFO bridge ICs

To encourage the widespread utilisation of its highly cost-effective and easy-to-implement next generation USB interfacing technology, FTDI Chip has unveiled a new family of evaluation/development modules. The company's FT600/1Q USB 3.0 SuperSpeed ICs, which are already in full volume production, are forthwith backed up by the UMFT60XX offering.

[News ID 3418](#)

■ Wind River updates Real-Time Virtualization offering

Wind River has announced a major update to its real-time virtualization offering that allows customers to further reduce cost and innovate connected devices. The update includes storage virtualization capabilities, enhanced security capabilities, and expanded processor support.

[News ID 3303](#)

■ Altium: TASKING toolset for Infineon's TriCore/AURIX microcontrollers

Altium has announced a free embedded software development toolset for Infineon's TriCore/AURIX product line as part of their strategic partnership. This toolset was developed as part of a major update to the TASKING compiler for TriCore/AURIX, which adds a number of new features and enhancements for advanced automotive application development. The Lite Edition of the TASKING VX-toolset for TriCore includes a one year license and can be requested now on the Infineon website or the TASKING website.

[News ID 3341](#)

■ Phaedrus: Segger upgrade to emFile file management system eases RAM bottleneck

Segger has upgraded the emFile file management system for embedded applications by adding a block grouping feature to reduce the amount of RAM needed for block management of NAND flash memory. NAND can now be used for gigabytes of data with even smaller microcontrollers.

[News ID 3279](#)

■ SEGGER: new block grouping feature for file system

The new block grouping feature for SEGGER's emFile file system reduces RAM requirements for block management and thus allows using even very large NAND flashes with smaller microcontrollers. Block grouping means that the driver treats multiple blocks as a single block to considerably reduce the memory used for administrating the NAND flash memory. When using external NAND memory with microcontrollers, RAM limitation is usually the bottleneck.

[News ID 3259](#)

■ R&S expands trigger and decoder option for RTO and RTE oscilloscopes

Rohde & Schwarz has again expanded its range of trigger and decoder options for the R&S RTO and R&S RTE. With the R&S RTx-K50, the oscilloscopes help users debug serial protocols that employ Manchester or NRZ coding. The option can be used with a variety of standardized buses such as PROFIBUS, DALI or MVB as well as with proprietary serial protocols such as are typically found in industrial environments and in the aerospace & defense sector.

[News ID 3321](#)

■ GrammaTech: new CodeSonar release designed for the IoT era

GrammaTech announced availability of CodeSonar 4.1, the latest version of the company's software analysis tool for C/C++, Java, and binaries. Built to deliver unmatched depth of analysis, the latest version of CodeSonar includes new distributed analysis capabilities, deeper tainted data analysis, and binary analysis support for x64 processors.

[News ID 3333](#)

■ Mouser stocks TI's C2000 Delfino Microcontroller LaunchPad Kit

Mouser Electronics is now stocking the C2000 Delfino F28377S LaunchPad evaluation kit from Texas Instruments. This new TI LaunchPad is an easy-to-use, rapid-prototyping kit for TI's C2000 Delfino F2837xS portfolio of microcontrollers and offers 200 MHz of 32-bit floating-point performance, newly integrated accelerators, as well as high-integrity analog and control peripherals.

[News ID 3442](#)

■ SYSGO: PikeOS hypervisor technology captures automotive market

After Continental also Magna now relies on SYSGO's Hypervisor PikeOS to consolidate complex applications in automotive electronics. The new technology will initially be used in Magna's 360-degree view system SurroundVue and integrates camera system and vehicle information system on the same hardware. The new platform creates the basis for

further joint customer projects. Production is expected to begin at the end of 2015.

[News ID 3240](#)

■ Renesas: Synergy- Embedded development at the API

The Renesas Synergy Platform is a unique hardware and software platform that enables engineers to start development at the API (Application Programming Interface). It integrates commercial-grade software that is qualified warranted and supported by Renesas with a new family of microcontrollers and an ecosystem of tools and support options into one scalable and secure platform.

[News ID 3448](#)

■ WITTENSTEIN: RTOS for systems considering safety, that don't require certification

WITTENSTEIN high integrity systems announce the launch of their latest RTOS product, SafeRTOS CORE; an RTOS for embedded systems where safety needs to be considered, or designed-in for future consideration. It is ideal for projects where full safety certification/ documentation is not required, or at least not required at the start of a long safety development life cycle.

[News ID 3258](#)

■ Vector Software: integration with AdaCore's CodePeer 3.0 static analysis tool

Vector Software announced an integration of the VectorCAST test automation platform with CodePeer 3.0 - AdaCore's advanced static code analysis tool for Ada, including version 2012.

[News ID 3253](#)

■ GrammaTech: CodeSonar achieves ISO 26262, IEC 61508, and EN 50128 certification

GrammaTech announced that their static analysis product CodeSonar has been certified for use in the development of safety-critical software according to several international standards: ISO 26262, IEC 61508, and EN 50128. These three standards were designed to define the functional safety of electronics throughout their lifecycle within automotive systems, medical devices, and railway applications, respectively.

[News ID 3329](#)

■ Rohde & Schwarz: analyze broadband and pulsed signals up to 85 GHz

The new R&S FSW85 high-end signal and spectrum analyzer is the only instrument on the market to cover the frequency range from 2 Hz to 85 GHz in a single sweep. This makes it possible for users to test baseband and RF with a single analyzer. Since no external harmonic mixers are required, the R&S FSW85

makes the test setup much simpler. An internal preselection suppresses the image frequency and other spurious emissions that commonly occur during harmonic mixing.

[News ID 3244](#)

■ MathWorks: model-based design used to design and build wave farm

MathWorks announced that Carnegie Wave Energy has used Model-Based Design to design and build the world's only operating wave farm. MATLAB and Simulink enabled Carnegie Wave Energy's engineers to develop unique technology for generating clean electric power from the ocean's waves.

[News ID 3452](#)

■ Green Hills announces MULTI 7 IDE release

Green Hills Software has announced a new release of its MULTI integrated development environment. With this release, Green Hills Software continues to evolve its software development suite with features designed to increase developer productivity and speed time to market.

[News ID 3451](#)

■ PLS: UDE 4.4.6 supports all functions of ST's new SPC58 E-line MCUs

PLS Programmierbare Logik & Systeme is already able to offer the Universal Debug Engine 4.4.6 debugging and testing solution, for the first samples of STMicroelectronics new SPC58 E-line in ST's multi-core automotive microcontroller family. The new SPC58 E-line MCUs are among the most sophisticated automotive MCUs currently available on the market.

[News ID 3384](#)

■ LDRA: tool suite selected for structural coverage and standards compliance

LDRA announces that Wind River has selected the LDRA tool suite and DO-178 Qualification Support Packs for both internal software quality assurance and to help Wind River customers expedite the qualification and certification of their aerospace and defense applications. The selection of LDRA hinged on the ability of its tools to achieve 100 percent MC/DC coverage at both source and assembler levels—a mandatory requirement for object code verification—and to perform data coupling and control coupling analysis.

[News ID 3241](#)

■ Advantech: Embedded IoT gateway with Intel Quark SoC x 1000

Advantech launched the UBC-221 IoT gateway solution powered by the Intel Quark SoC x1000 processor and designed as a compact size, high capability, multi-connectivity gateway. UBC-221 is suitable for IoT or automation control applications such as smart city

parking, security and surveillance as well as industrial control. UBC-221 is optimized specifically for IoT development. Features include: 1 x UART, 2 x GPI, 2 x GPO, 2 x 10/100 Ethernet (one supports PoE), 1 x USB, 1 x MiniPCIe, 1 x SD and 1 x 12V DC input. UBC-221 also supports wireless connection such as Wi-Fi, 3G/4G, Bluetooth, and ZigBee through onboard MiniPCIe expansion.

[News ID 3297](#)

■ ADI: low power buck regulator boosts battery life for IoT applications

Analog Devices introduced an ultralow power buck regulator that extends battery life in portable devices by achieving the industry's highest ultra-light-load power conversion efficiency. With a 90 percent efficiency rating and consuming only 180-nA quiescent current, the ADP5301 buck regulator is designed to deliver maximum power for a longer period of time than previously achievable and is ideally suited for Internet of Things (IoT) applications, including wireless sensor networks and wearable devices such as fitness bands and smartwatches.

[News ID 3378](#)

■ ERNI: subminiature connectors with 0.8mm pitch in antimagnetic versions

ERNI Electronics has expanded its 0.8mm MicroStac SMT connector series to include antimagnetic versions with 12 pin (single row) and 54 pin (dual row). The MicroStac components are based on a patented hermaphroditic design. The special design enables reduced logistic and inventory costs.

[News ID 3316](#)

■ Renesas: RX111 Safety Package

Renesas Electronics launched its RX111 Safety Package, to significantly reduce development time to implement functional safety for industrial equipment and devices, such as sensors, safety controllers, and industrial drives. Industry 4.0 and the Industrial Internet of Things movements are driving the need for more robust and inherently safe devices on the factory floor, from the PLCs down to the sensors at the edge of the factory network.

[News ID 3396](#)

■ Microchip: two new PIC MCU families with core-independent peripherals

Microchip announces two new 8-bit families that expand its growing portfolio of PIC MCUs with Core-Independent Peripherals (CIPs). 8-bit MCUs can now be used in a much broader range of applications, due to the growing number of these intelligent, interconnected CIPs that combine to perform functions autonomously, without the core. Because these functions are deterministically and reliably performed in hardware instead of software, CIPs enable system performance

that is far beyond typical 8-bit MCUs while simplifying the design experience and reducing memory cost.

[News ID 3274](#)

■ Telit: IoT portal combines connectivity management with application enablement functions

Telit released the Telit IoT Portal which consolidates a suite of advanced connectivity management functions with the company's deviceWISE IoT Application Enablement Platform. The service enables companies to deploy, configure and manage end-to-end IoT deployments from a single, Cloud-based portal.

[News ID 3389](#)

■ Infineon: MOSFETs deliver highest energy efficiency in space constrained applications

Infineon has launched a new family of StrongIRFET MOSFETs for DC powered circuits including battery powered circuits, brushed and brushless DC (BDLC) motor drives. The MOSFETs can bring highest energy efficiency to end-applications such as power and gardening tools, light electric vehicles, drones and e-bikes that demand a high level of energy efficiency but are restricted in available space. This is made possible by the compact Medium Can DirectFET housing featuring a new layout.

[News ID 3269](#)

■ Conrad: PLCs based on ARDUINO

Conrad Business Supplies has introduced a range of new, highly flexible and customisable programmable logic controllers exclusively from CONTROLLINO. These new products are suited to a variety of automation applications, including temperature management, advanced lighting and media control. They join Conrad's wide selection of over 1500 PLCs from other leading manufacturers including SIEMENS, C-Control, WAGO and Phoenix Contact.

[News ID 3345](#)

■ Renesas: Bluetooth smart wireless solution to accelerate use of Embedded devices in IoT

Renesas Electronics announced a new wireless solution that supports the Bluetooth Smart near field wireless communication standard. The new RL78/G1D Group of microcontrollers has been developed by combining the low-power RF Transceiver Technology for Bluetooth Low Energy with Renesas' expertise on consumer and industrial MCUs, and on-chip peripheral devices necessary for wireless communication. By employing an evaluation kit and Bluetooth-SIG qualified protocol stack, the new MCUs enable system designers to conduct evaluation of wireless characteristics and initial evaluation of communication behaviors.

[News ID 3264](#)

■ Digi-Key partners with ARM University Program to offer 'Lab-in-a-Box'

Digi-Key Electronics announced their partnership with the ARM University Program to distribute the innovative 'Lab-in-a-Box' (LiB) to higher educational institutions around the globe. The LiB contains ARM-based technology and high quality, rigorous training materials that support electronics and computer engineering courses.

[News ID 3262](#)

■ TI: integrated USB Type-C power delivery controller

Texas Instruments introduced the first all-in-one USB Type-C and USB Power Delivery controller, which integrates a port power switch and port data multiplexer. The TPS65982 USB PD controller is the only integrated circuit available that provides the full power path, operating as a Single- or Dual-Role Port and enabling a variety of host and device power implementations.

[News ID 3307](#)

■ ICOP introduces 933 MHz industrial-grade Panel PC family

ICOP Technology introduces with the industrial-grade PPC series a new 933 MHz Panel PC family developed to be deployed as lean, low-power HMIs (Human Machine Interfaces). The compact and fully x86 compatible, rugged Panel PC series in metal housing follows the trend towards client/server architectures with central processing clouds and slim, distributed control terminals as well as industrial-grade thin client installations.

[News ID 3232](#)

■ ARBOR: upgraded 10.4" rugged tablet with Intel Celeron processor

ARBOR Technology has launched the ARBOR Gladius G1052C 10.4 inch rugged tablet PC to complement its growing lineup of mPOS, warehousing and logistics tablet PCs. The G1052C, powered by an Intel Celeron N2930 quad-core processor, is an upgrade to the previous G1050 version in performance and specification improvements

[News ID 3230](#)

■ DFI: 10.4 inch industrial touch panel PC available in 5-wire resistive and projected capacitive

DFI is introducing a new product: KS104-CD. KS104-CD is an industrial panel PC based on Intel Atom N2800 processor that provides better data processing and lower power consumption in comparison to the last generation Intel processors. It is available in both 5-wire resistive and projected capacitive 10.4" LCD true-flat touch screen panel to meet a customers' diverse range of needs. The touch panel PC comes with 1 VGA for display output, 2 audio jacks, 2 Giga LANs, 3 COM, 2 USB, 1

2.5" SATA drive bay, and 1 Mini PCIe slot for Wi-Fi or mSATA module. In addition, the IP65 compliant on front panel offers the capability to withstand harsh and severe environments. The KS104-CD is aimed to utilize a variety of applications such as KIOSK, digital signage, and retail solutions.

[News ID 3270](#)

■ MSC presents SVGA TFT LCDs from NLT with long-life backlights

MSC Technologies offers two SVGA (800 x 600 pixels) TFT LC displays from NLT for harsh industrial applications. The LCDs integrate long-life LED backlights that provide 100,000 hours of operation, a new breakthrough for NLT products. This corresponds to a continuous operating time of eleven years for 24/7.

[News ID 3275](#)

■ MSI: fanless embedded BOX PC with Broadwell or BayTrail platform

MSI released a new compact-size industrial BOX PC, MS-9A69. It's a fanless embedded BOX PC that comes with the Broadwell or the BayTrail platform, satisfying different applications that require high-performance or low-power computing kernel. MS-9A69 supports 2 or 3 independent displays, versatile DC input of 12V/19V/24V, 2 Mini-PCIe expansion slots, and rich I/O of 4 LAN (w/ 2 optional), 6 USB, and 6 COM ports, offering the flexibility for machine builder and system integrators to build systems for automation, digital signage, IoT gateway, kiosk, POS, and bus or in-vehicle applications.

[News ID 3454](#)

■ ARBOR: ARES 5800 models feature modular design, multiple expansion and rich onboard I/O

ARBOR Technology added a productivity-enhancing expansion to its programmable embedded controller product line-up. The new ARES 5800 series is based on the 4th Generation Intel Core i5 Processor, and supports up to 16GB DDR3L SO-DIMM memory for optimal performance and efficiency. Currently, there are three models (ARES-5800, ARES-5803 and ARES-5830) differentiated in terms of their I/O interface and expansion bus.

[News ID 3265](#)

■ MEN: wireless access Point and safe gateway into the IoT

The NM50 is a maintenance-free WLAN access point for connecting networks in demanding railway and automotive applications. Its robust design and reliable data transmission make the NM50 an ideal gateway solution for vehicle-to-vehicle or vehicle-to-land communication in safety-critical environments of the IoT.

[News ID 3411](#)

■ IBASE: 4x4K digital signage player with hardware EDID emulation function

IBASE Technology launches the SI-304 four HDMI output digital signage player supporting up to 4096 x 2160 4K resolution for every display channel. SI-304 is not only ideal for 2x2 video walls, but also suitable for menu boards in restaurants, as well as in electronic displays in banks, airports and shopping malls, to convey dynamic information and targeted promotions.

[News ID 3436](#)

■ IBASE: fanless, slim and compact digital signage player

IBASE introduced the brand new SI-102-424 fanless digital signage player based on the Embedded G-Series SoC that is perfect for digital signage, retail or hospitality applications. The SI-102-424 Signature Book takes advantage of the high performance, low-energy consumption and APU integrated Radeon 8KE graphics that present dynamic contents and compelling visuals to deliver an engaging customer experience.

[News ID 3301](#)

■ Advantech: Embedded computing platforms with 6th gen Intel Core processors

Advantech unveils its latest range of embedded computing platforms equipped with 6th generation Intel Core processors. These platforms comprise Computer On Modules SOM-5897 and SOM-6897, an MI/O Extension Single Board Computer MIO-5272, Industrial Motherboards AIMB-275 and AIMB-585, and Digital Signage Players DS-780 and DS-980.

[News ID 3434](#)

■ ICOP: ETX Computer-on-Module with DM&P Vortex86DX3 processors

ICOP Technology introduces the new VDX3-ETX, a DM&P Vortex86 DX3 processor-based ETX Computer-on-Module. OEMs can deploy the fully ETX 3.0-compliant dual core computer module with up to 1.0 GHz clock frequency into all existing ETX-based applications to substitute older x86 processors that are currently being discontinued.

[News ID 3278](#)

■ EKF: miniature CompactPCI Serial IPC systems in 4U/32HP 19-inch technology

Rugged, versatile, economic – the SRS-3201-BLUBOXX series of miniature CompactPCI Serial IPC systems from EKF is suitable for all industrial requirements, even under harsh conditions. The small rack is built of high-quality 19-inch components. With its low dimensions of only 172 x 168 x 208mm (4U/32HP), the BLUBOXX provides space for up to five CompactPCI Serial boards (single size Eurocard style). The BLUBOXX systems include a bottom mount fan unit and an

industrial grade removable power supply.

[News ID 3260](#)

■ Kontron to deploy 6th Gen Intel Core processor family

Kontron announced that the latest 6th generation Intel Core Processor will power new Kontron boards and modules to be released in early 2016. With these boards, Kontron's customers can take full advantage of Intel's latest and most powerful processor version, Skylake-H and U processors. Kontron maximises its product portfolio with new long life DDR4 SODIMM memory with up to 32 GB, which is also available as ECC memory.

[News ID 3390](#)

■ Axiomtek: Celeron quad core SoC-based Embedded system

Axiomtek has launched eBOX626-842-FL, the energy-efficient fanless embedded box system suited for rugged and extreme applications with its extended temperature and wide range voltage capability. The extreme compact eBOX626-842-FL utilizes an onboard Intel Celeron quad core processor J1900 2.0GHz to boast both excellent performance and ultra-low power consumption. The ultra-slim fanless embedded computer supports system memory up to 8 GB with one DDR3L-1066/1333 SO-DIMM socket and offers HDMI and VGA display outputs, offering not only high computing capability but also excellent graphics performance.

[News ID 3332](#)

■ SGET: industrial grade MXM2 connector for Qseven standard with 10-year-LTA

SGET Standardization Group for Embedded Technologies highly values the long term availability of its Standards and the related key components. With regard to Qseven this especially concerns the 230-pin MXM2 system connector. This was initially designed to work as a cost-effective board-to-board connector for consumer graphics cards and has come close to its end of life in this function. Iriso, is now manufacturing and delivering the MXM2 connector which is vital for the Qseven standard.

[News ID 3335](#)

■ AAEON enters 4K realm with EPIC-BDU7

AAEON unveils the most advanced entry in their EPIC form factor board lineup, the EPIC-BDU7 that comes with Intel's 5th Generation Core processors, delivering high performance at a very low power consumption of 15W. Intel's latest processors bring enhanced graphics processing capabilities with support for 4K resolution video and media content while offering 3-independent displays from the board's LVDS, VGA, DisplayPort, and eDP options. Support for the latest operating systems and today's high speed I/O devices

are available in this new generation of product.

[News ID 3369](#)

■ Advantech: highly secure ATX industrial motherboard for ATM/KIOSKS

Advantech introduces SIMB-A31, a new industrial-grade ATX motherboard powered by a 4th generation Intel Core i processor. Advantech also integrated its new SUSIAccess 2.0 Pro version with SIMB-A31. The abundant I/O connectivity and PCI slot expansion supports various industrial applications such as Automation, ATM and Kiosks.

[News ID 3336](#)

■ Amplicon announce Impact-D 100 DIN Rail PC

The new Amplicon Impact-D 100 has been designed and manufactured in the UK to the highest standards. Designed to be compact, rich in I/O and running the latest quad core ATOM processor, the Intel ATOM E3845. Amplicon has carefully chosen the components and CPU family to ensure optimal performance vs. heat and power consumption, this ensures the system will operate and control your application 24/7 with many years of maintenance free running.

[News ID 3337](#)

■ Axiomtek: industrial Mini-ITX motherboard handles most demanding HD video formats

Axiomtek has launched its new industrial Mini-ITX motherboard, MANO842, featuring quad-core SoC, fanless design, advanced graphics performance, and 12VDC/STD ATX power input. The powerful MANO842 is equipped with a quad-core Intel Celeron J1900 processor with Intel HD Graphics engine, delivering outstanding computing, graphics and media performance at a competitive price.

[News ID 3355](#)

■ MEN: Box PC for wireless communication in automotive applications

The robust box PC BL70W was especially developed for wireless applications in mobile markets. Due to its compliance to the E-mark requirements it is well suited for automotive applications in busses, construction vehicles or agriculture machines. Despite its compact design it offers sufficient space for nine antenna slots in total as well as a multitude of application-specific I/O.

[News ID 3352](#)

■ EKF: SAS/SATA host controller XMC mezzanine module

EKF unveils the DS1-LEOPARD, a SAS/SATA host controller XMC mezzanine module. The Mini SAS 4x connector is suitable for attachment of up to four external SAS or SATA storage devices, such as hard disk drives, SSDs, or



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streamer tapes. The on-board Marvell controller is provided with a Gen2 PCIe x4 interface. All I/O ports are compliant to Serial Attached SCSI (SAS-2.0), and in addition to Serial ATA (SATA 3.0).

[News ID 3351](#)

■ Avalue introduces Open Frame Tablet product line

Avalue is unveiling a new product line – Open Frame Tablet – including OFT-07W01 (7-inch), OFT-10W01 (10.1-inch), OFT-15W01 (15.6-inch), OFT-21W01 (21.5-inch), OFT-23W01 (23.6-inch) to meet different applications size need. Open Frame Tablet series carry Intel BayTrail-T/CR Z3735F Quad Core CPU with high performance but lower cost.

[News ID 3377](#)

■ Advantech: 3.5" Embedded SBC with flexible expansions

Advantech announce the release of MIO-5251. Utilizing Intel's latest quad core Celeron J1900 2.0GHz processor, with even the same CPU performance as 3rd generation Core i3, MIO-5251 is positioned best choice between previous generation Atom and Core i platforms. More than a standard SBC, Advantech MIO-5251 in a 3.5" MI/O Extension (146 x 102 mm) form factor offers wide temperature operation from -40 to 85

[News ID 3362](#)

■ IBASE: SMARC module with ARM Cortex A9 i.MX6 processors

IBASE Technology announce the release of RM-F600-SMC, a SMARC module powered by the high performance Freescale i.MX6 processor running 1.0 GHz. RM-F600-SMC supports an image capture interface for MIPI cameras, 18/24-bit parallel LCD, LVDS and HDMI interface, as well as a full-HD 1080p hardware video codec engine.

[News ID 3371](#)

■ Acceed: mobile Box PC features 16 PoE ports

The new fanless and highly compact Box PC Nuvo-3616 from Acceed is equally suited for mobile applications and fixed industrial installations. It is distinguished by its 16 Ethernet PoE ports with a total of 160W output. Its further performance features include an optional third generation i5 or i7 quad core processor from Intel, up to four 2.5" SATA HDDs with RAID support in patented easy swap trays for fast changing and the robust fanless casing designed for industrial application.

[News ID 3344](#)

■ Avalue: SLP-SKL, EMX-Q170 and EAX-Q170 based on 6th gen Intel Core

Avalue Technology is unveiling SLP-SKL, EMX-Q170 and EAX-Q170, based on the 6th generation Intel Core processor family. The

6th generation Intel Core processor family is a brand new micro-architecture built on Intel's 14nm manufacturing process. The new 6th generation Intel Core processor family offers dramatically higher CPU and graphics performance, a wide range of power and feature scalability, and new advanced features that boost IoT designs from the edge to the cloud.

[News ID 3399](#)

■ congatec: COM Express compact modules with 6th gen Intel Core processors

congatec has introduced four new COM Express compact modules parallel to the launch of the new 6th generation Intel Core processors. The new modules are specially designed for challenging applications that demand high performance in sealed, fanless system designs. They feature a 15 watt configurable TDP and are equipped exclusively with the energy-saving ULV-SoC editions based on new 14nm microarchitecture. Compared to 15 watt modules with fifth generation processors, users benefit from improvements in graphics and processing performance, enhanced energy efficiency and more high-speed I/Os.

Typical fanless applications for congatec COM Express compact modules can be found in medical and industrial imaging, central control room technology, shop floor terminals, HMIs, robotics, professional gaming, infotainment, professional AV, smart video surveillance, autonomous vehicle control, computer-aided situational awareness as well as high-end digital signage applications. Graphics card free, triple-head systems – for example in the areas of retail and kiosks, where embedded systems control up to three independent cash or vending machines – present a further application example.

The conga-TC170 modules, with COM Express Type 6 pinout, are equipped with the ULV-SoC editions of the sixth generation Intel Core i3/i5/i7 processors. For the first time, they offer a configurable TDP (Thermal Design Power) of 8.5 to 15 watts, which simplifies matching the application to the system's thermal design. The power supply has also been optimized, which in addition to the new microarchitecture also contributes to the energy efficiency and allows a longer turbo-boost.

[News ID 3409](#)

■ Concurrent: 3U VPX board featuring Xeon processor E3 v5 family

Concurrent Technologies announces their first processor board based on the Intel Xeon processor E3 v5 family. TR E5x/msd is a 3U VPX board featuring the quad core Intel Xeon E3-1505M v5 processor with up to 16GB of DDR4 ECC DRAM and a rich assortment of I/O interfaces. These features mean that TR E5x/msd is particularly suited to multi-pro-

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cessor command, control, communicate and compute applications in the military, aerospace and transportation markets.

[News ID 3395](#)

■ AAEON announces 6th gen Intel Core processors product line-up

AAEON unveils a string of products from the company's board and system line-ups powered by 6th Generation Intel Core processors. Every generation of processors brings new features and improved capabilities to the table while inheriting the merits of its predecessors.

[News ID 3398](#)

■ ADLINK: new products based on 6th gen Intel Core and latest Intel Xeon processors

ADLINK announced the first of fourteen new products in various form factors based on the 6th generation Intel Core i7/i5/i3 processors and latest Xeon processors, coming to market in the second half of 2015 and early 2016. These current Intel processor-based offerings

feature an updated 14nm microarchitecture and added support for Ultra HD 4K resolution displays.

[News ID 3408](#)

■ **ADLINK: COM Express module with Xeon processor and Iris Pro graphics**

ADLINK will offer its first COM Express Basic Size Type 6 module incorporating the latest Intel Xeon E3-1200 processor and Intel Core i7 processor with Intel QM87 Chipset. Featuring improved graphics and processing performance compared to previous generation processors, the Express-BL is ideally suited for carrier-grade edge device solutions that demand intense graphics performance and multitasking capabilities in a space-constrained environment.

[News ID 3305](#)

■ **HEITEC signs partnership with Wakefield-Vette**

Since HEITEC took over the electronics packaging systems line from Rittal more than five years ago, this extensive product portfolio has been successfully enhanced, manufactured and marketed predominantly in Europe. Wakefield-Vette has now entered an exclusive strategic partnership with HEITEC in order

to distribute the components of the product line for industrial enclosure technology and system platforms to the North American market and to offer the related services.

[News ID 3309](#)

■ **MSI: 5th gen slim fanless system fulfills display-critical applications**

MSI WindBOX series embedded computer family members are known as slim, compact, yet powerful solutions for the reliable operation in industrial applications. MSI is pleased to release WindBOX III Advanced, MS-9A75, to enhance the completeness of WindBOX series embedded system.

[News ID 3308](#)

■ **Toradex announces upcoming COM based on Freescale's i.MX 7 processor**

The announcement of Freescale's i.MX 7 processor has created a lot of excitement at Toradex, who will be among the few hardware partners showcasing a platform based on the i.MX 7 processor, during Freescale's official launch of the same, early next year, extending its existing portfolio of COMs. The new module will offer a robust and secured platform for building products targeted toward IoT applications.

[News ID 3407](#)

■ **Pentair acquires Pigeon Point Systems to expand portfolio for monitoring systems**

Pentair announces the acquisition of Pigeon Point Systems, a producer of high-quality management components, focusing on open modular platforms as AdvancedTCA, MicroTCA, CompactPCI and VPX. By combining Pigeon Point Systems products with Pentair's broad range of Schroff products, Pentair will be able to provide an expanded product portfolio, increase presence globally and broader technical expertise to serve Pentair customers, and their ever increasing needs in embedded computing and reliable system monitoring and control.

[News ID 3319](#)

■ **Pentair introduces Schroff heat conductors for conduction cooling**

Pentair announced the introduction of Flexible Heat Conductors (FHCs) to help ensure effective thermal transfer for conduction cooling. This new development is filed as patent. Made from heat dissipating metal, FHCs are particularly well-suited for small single-board systems and larger systems that cannot be air-cooled with active fans or perforated ventilation designs.

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We congratulate ADLINK for completing 20 years of success in business. We wish you all the success for many more years to come. And we hope to continue being your business partner in future.

J. K. Jia
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