

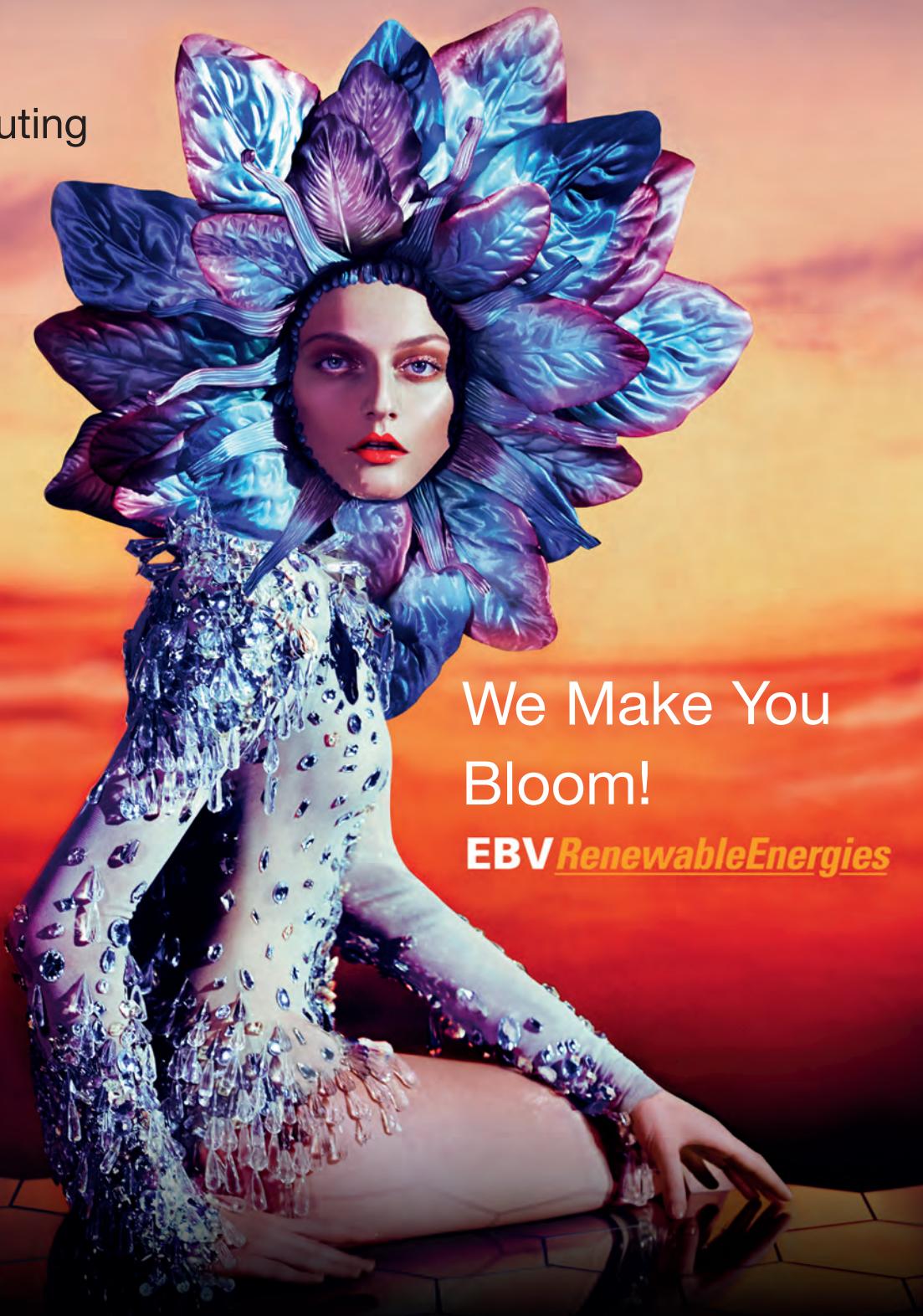
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Special Features

- Smart Energy
- Microcontrollers
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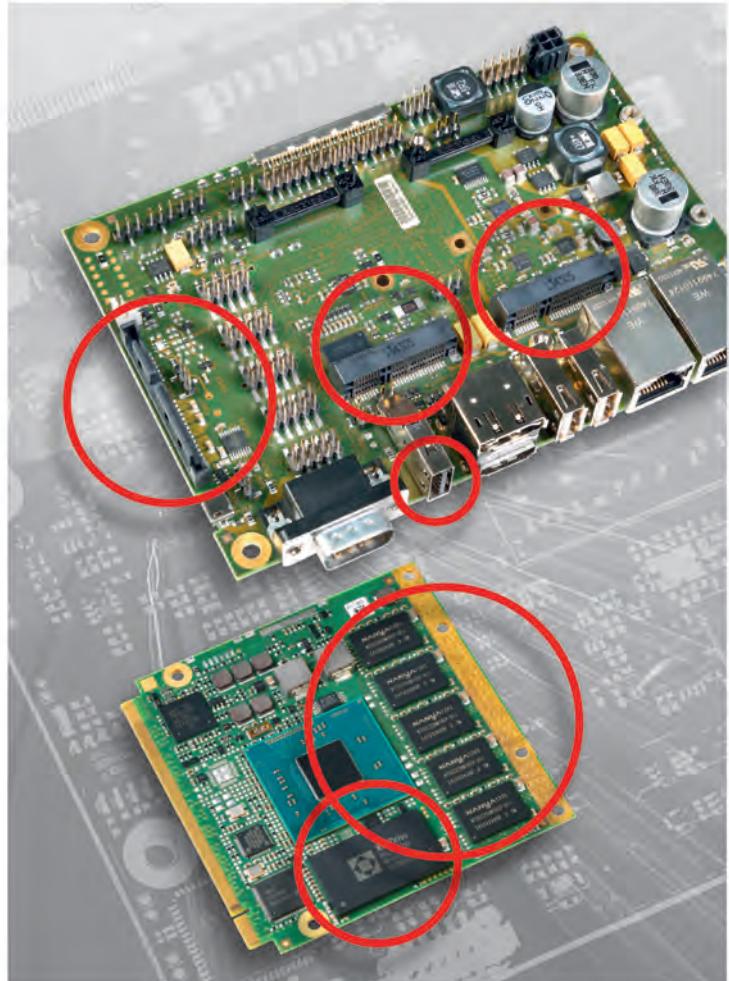
As 25 years ago the Internet was invented no one could imagine which influence this communication network would have to our daily life. Nowadays when I walk through Schwabing, a part of Munich where I live, I realise that most people I see on the streets – especially the youth – are looking in their smartphones and wiping the touch screens while walking – connected to the Internet. This proves that the ubiquitous connectivity to the Internet of people, everyone, everywhere und anytime, became reality yet. But this is only a snapshot of today's world. The evolution of the Internet keeps going. One new Megatrend affecting especially the embedded industry is the Internet of things (IoT). According to Wikipedia "The Internet of Things refers to uniquely identifiable objects and their virtual representations in an Internet-like structure. Equipping all objects in the world with minuscule identifying devices or machine-readable identifiers could transform daily life" and also the industry. The fourth industrial revolution called Industry 4.0 and based on the possibilities enabled by the IoT is just one example. Additional fields of applications include: waste management, urban planning, environmental sensing, social interaction gadgets, sustainable urban environment, continuous care, emergency response, intelligent shopping, smart product management, smart meters, home automation and smart events

According to Gartner there will be nearly 26 billion devices on the Internet of Things by 2020. According to ABI Research more than 30 billion devices will be wirelessly connected to the Internet of Things (Internet of Everything) by 2020. Cisco created a dynamic „connections counter“ to track the estimated number of connected things from July 2013 until July 2020. This concept, where devices connect to the internet/web via low-power radio, is the most active research area in IoT. A criticism is that the Internet of Things is being developed rapidly without appropriate consideration of the profound security challenges involved and the regulatory changes that might be necessary. In particular, as the Internet of Things spreads widely, cyber attacks are likely to become an increasingly physical (rather than simply virtual) threat.

But despite the problems this show: the race to enter the IoT market and succeed with new applications is already on! Hence due to the multitude of applications the IoT and its influence for the embedded industry was the main topic at this year's embedded world exhibition and conference. Nearly every exhibitor launched products suited for this emerging market whether microcontrollers, microprocessors, digital signal processors, small form factor boards like COMs, as well as associated hardware, software and development tools. Our embedded world review (starting page 10) highlights some examples.

As you can see – the IoT could be able to open up a new era and bright future for the embedded industry. But the future must show which ones of the multitude of applications are valuable for the user and will succeed at the end.

Yours sincerely
Wolfgang Patelay
 Editor



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<ul style="list-style-type: none"> • DDR1 • DDR2 • DDR3 • DDR4 			

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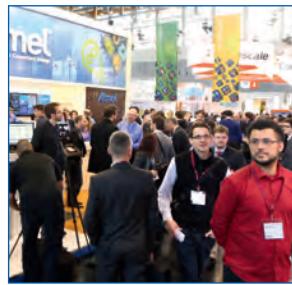
Cover Photo: EBV

Cover Story: Smart teamwork enables networked support for renewable energies Page 6



Renewable energies – one term, countless options: from smart grid communication and charging infrastructures for e-cars through to energy storage. Anyone developing renewable energy applications needs a partner who can provide not only large volumes of electronic components, but also advice and support through the design phase. That is the mission of the EBV Renewable Energies team.

embedded world: Internet of Things applications gain momentum Page 10



embedded world 2014 ended with a new record: 26,688 trade visitors from all over the world (+18 % overall) and 856 international exhibitors from 35 countries made the twelfth embedded world the biggest in the history of this event. This year's main topic: applications for the Internet-of-Things (IoT) and their impact for the embedded industry, were discussed all over the show by exhibitors and visitors. This article outlines some selected product news also well suited for IoT applications

EN60601-1 third edition: a standard with many faces Page 16



This article takes a look at the third edition of EN60601-1 governing how the peripherals of a medical embedded system must be connected. It sheds light on the differences from the previous version and describes exactly how power module manufacturers have addressed the discrepancies.

Intelligent diagnostics maximize factory-floor up-times Page 24



This article introduces the ISO2H823V, a power management integrated circuit with built-in intelligent diagnostic functions designed for a wide range of industrial control applications, including programmable logic controllers (PLCs), distributed control systems, robotics and many more.

LynxSecure Type Zero enables ongoing hypervisor evolution Page 34

This article discusses the evolution of modern hypervisor architectures, from Type-2 to Type Zero, and describes the performance, reliability, and security benefits achieved through LynxSecure Type Zero architecture



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Smart teamwork enables networked support for renewable energies

By Karl Lehnhoff, EBV

Renewable energies – one term, countless options: from smart grid communication and charging infrastructures for e-cars through to energy storage. Anyone developing renewable energy applications needs a partner who can provide not only large volumes of electronic components, but also advice and support through the design phase. That is the mission of the EBV Renewable Energies team.

■ A system can only really be considered smart if it offers bidirectional exchange of information and data between the energy generator at one end of the energy-transmission chain and the end-user at the other. This intelligence is enabled by a variety of electronic components: microcontrollers specifically designed for electricity meters, powerline modems, high-performance processors with communication interfaces, efficient power supplies, precise analog circuits or high-voltage semiconductors for the transmission and transformation of the electric current. As a result, the challenges facing the Renewable Energies team are extremely varied and complex, as Karl Lehnhoff, Director, Vertical Segment Renewable Energies at EBV Elektronik, explains.

According to Lehnhoff, the target groups of the EBV Renewable Energies team include any business engaged in generating energy – from photovoltaic through wind energy to biogas. In addition there is the entire field of energy transport, including high-voltage networks, substations and control technology, as well as net automation, measuring the status of the network, conversion of high voltage into low voltage and adjustable local network transformers. On top of this, the experts also deal with energy storage in relation to renewable energy, including charging stations for electric vehicles. And last but not least, an im-



portant aspect of automation throughout the entire smart grid is communication and above all data security. It's not just an issue for smart meters, but for all billing-related meters and data concentrators.

Renewable energy has been a core area for EBV for many years now, and is integrated into its vertical business structure under the name Renewable Energies. Market-related segments include Automotive, Consumer, Renewable Energies, Healthcare and HighRel. Technology-oriented segments include EBV FPGA, RF and Wireless, LightSpeed and Identification.

Anyone working with renewable energy needs not only dedicated experts but also a wide network linking to all neighbouring disciplines, in order to provide their customers with complete and appropriate support. Support from EBV can, if wished, start right from the beginning of a project: the experts from the Renewable Energies segment advise customers on their choice of suitable technology and the right electronic components, as well as assisting in technical matters that arise during development or even during production of new appliances.

There are five dedicated specialists explicitly assigned to deal with renewable energy. They are supported throughout Europe by more than a hundred application engineers and ex-

perts from other verticals. Naturally EBV didn't want to establish parallel sales organisations with the verticals, but just to link up expertise and resources. Who provides the support is decided on a case-by-case basis. The industrial sectors are too intensively networked to be sharply segregated. So the experts work together closely, including on shared customer visits. After all, how EBV is organised doesn't make a difference to the customer. What matters to them is that they receive the right support for their application. In the end a customer can't generally be pigeon-holed. It is routine for EBV to think outside the box.

There are many examples of the inter-disciplinary co-operation of the EBV teams: for instance, when designing a smart meter the question arose about communication within the smart home. So, the expertise of the RF & Wireless experts was also needed. The adjustable local network transformer integrates measuring technology that enables status monitoring. In the end it is just the same as condition monitoring from industrial automation and therefore projects like this have interfaces with both the Identification vertical segment and with colleagues from the RF & Wireless segment when communication or WiFi connection of the adjustable local network transformer is concerned. In the case of charging stations for electric vehicles there was of course

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Figure 1. Solar energy is already delivering a significant amount of renewable energy.



Figure 2. In future wind energy will contribute a large amount of renewable energy.

co-operation between the Renewable Energies experts and the Automotive specialists at EBV, who, for example, contribute their knowledge where automotive regulations are concerned. The customer comes to EBV, not with a product specification but wanting a solution for their system. So it's not just about the hardware, the company also has to master the software technique and know all the regulations and standards relevant to the application. And that is precisely where a 'can of worms' is metaphorically opened up, because in some areas of renewable energy the problem is that there are no integrated regulations. For instance, in the standardisation for short-circuits in wind power and PV, different scenarios apply in different countries. In metering it is even more complex. As regards security, in particular, essentially nothing is definitely regu-

lated yet. It will take another five to ten years. The BSI discussion in Germany has also stimulated thinking about safety in other countries. In other words, there may, in the future also be new rules in other countries. They could, however, be less strict than the BSI protection profile.

How far can the distributor assist with the issue of security? This is a new topic for many customers, and they definitely need support. EBV can provide it in cooperation with third party software service providers. As regards security EBV yet again profits from its networked organisation. The support of the technology segment, in this case Identification, comes into play again in such issues. The relevant security levels are not specifications for renewable energies, but technical guidelines or challenges

which can also be discussed elsewhere, for instance, in connection with the Internet of Things and Industry 4.0.

To tackle the issue of renewable energies EBV has also recently launched a microsite with the same name: under <http://renewableenergies.ebv.com/home/> visitors can, amongst other things, zoom from the application level to the semiconductor section. This overview allows a click on the relevant product to directly access detailed information such as technical features and logistical details. For more information or to request advice the visitor can send a contact request. Of course this website does not replace personal advice, it is just an informative reference tool. The focus here is on products for use in renewable energy applications that have just come onto the market. There is also a summary of manufacturers on EBV linecard, who offer dedicated components tailored to the market, such as a special MCU for metering or power modules for photovoltaic.

Renewable energies with all their aspects undoubtedly bring with them great market potential, even though the earlier European euphoria about photovoltaics has long since given way to disenchantment. On the one hand there is growth, but on the other there is price erosion, thus can be summarised the development of the photovoltaic market in general. Things are just as tough for wind energy in Europe. In global terms there are only three European wind power providers still in the top ten. One of the drivers of renewable energy is the growing degree of automation of the smart power network. The greater the share of renewable energy in the power network, the more automation is required. On peak days we, in Germany, already feed in around 50 per cent of the energy from renewable generation. At the same time the challenge is then to keep the network stable. To handle this task new applications will be required and metering is a hugely promising factor. European Union regulations are largely responsible for this, as they ordain that by 2020 eighty per cent of meters in member states should be smart meters. The smart meters are developed in Europe and experts also expect that the majority of production will take place in Europe.

The alleged Eldorado of electric vehicles, however, does remain one of the options at least for the present. We have to deal with a politically-driven segment. When the battery systems become more affordable however, this market could get going relatively quickly. Otherwise we are still a long way off the planned figures of the Federal Government of one million vehicles in 2020. EBV customers are well-prepared and have got to grips with the issue early on, but obviously there is still no market yet.



Figure 3. Excess renewable energy can be stored in dam reservoirs.

Finally there is another interesting recycling application in connection with electro mobility: old batteries from electric vehicles could still be used as stationary energy storage in the home. When the batteries are scrapped, 15 or 10 kW/h of the original 20 still remain. Enough, for example, to use them as stationary back-up batteries for domestic purposes. That would be very worthwhile in any case, not least as regards environmental protection, which is important to EBV. With EBVChips EBV has left its home territory of distribution and together with manufacturers and customers developed ICs and modules for various areas of use. With Hermes and Hunter, EBV has brought two EBVChips into its range that can be used in renewable energy applications. Developed jointly with Avago, the Hunter data converter offers an inter-

esting solution for galvanic-insulated current measurement. The integral LVDS interface guarantees very good signal integrity in FPGA-based systems such as servo drives or power transformers. The component fits in industrial drive technology and also in PV inverters, as well as pitch controls and wing rotation for wind turbines. Hunter contains an analog input stage with differential inputs for $\pm 200\text{mV}$, a second order Sigma/Delta modulator, an optical isolation line and the LVDS interface. So the module is equipped with every function necessary for measurements with a dynamic range of 78dB. The appropriate filter can be located in the related FPGA or in a processor. Fitted in an SO-16 cabinet with direct interface for shunts, Hunter offers high DC and AC precision over a wide temperature range. With the Falcon Eye Hunter EBVChips can also offer a reference design suitable for evaluating the Hunter chip.

For energy-saving M-Bus communication EBV has designed its Hermes EBVChip. This was created in cooperation with On Semiconductor and is practically an upgrade of a tried-and-tested IC which has been on the market for 20 years already. Fitted in the space-saving QFN-20 cabinet the M-Bus slave transceiver meets the European standards EN 13757-2 and EN 1434-3 and supports communication speeds of up to 38,400 Baud and, depending on use, can drive up to six M-Bus loads (repeaters, meter gateways). Hermes needs very little standby current and also works with low bus voltages. In addition, it has performance features optimised for energy-saving operating modes and is therefore ideal for connection to wireless modules. The M-Bus slave system is also equipped with failsafe function and can be supplied from the bus or an external current supply. Hermes has been in production since April 2013 and has got off to a very good start. EBV wants to build on this in the future and develop further EBVChips for the new energy age. ■

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embedded world: Internet of Things applications gain momentum

By Wolfgang Patelay, Editor

embedded world 2014 ended with a new record: 26,688 trade visitors from all over the world (+18 % overall) and 856 international exhibitors from 35 countries made the twelfth embedded world the biggest in the history of this event. This year's main topic: applications for the Internet-of-Things (IoT) and their impact for the embedded industry, were discussed all over the show by exhibitors and visitors. This article outlines some selected product news also well suited for IoT applications



■ Freescale Semiconductor announced an addition to its Kinetis mini portfolio with the introduction of the Kinetis KL03 MCU, the world's smallest and most energy-efficient 32-bit MCU based on ARM technology. The MCU builds on the previous generation Kinetis KL02 device with new features, advanced integration, and greater ease-of-use – all in an even smaller 1.6x2.0mm package. The company sees the miniaturization of MCUs as a key driver of IoT evolution. With the groundbreaking form factors of the new Kinetis KL03, systems designers for edge node products now have the technology they need to develop entirely new product categories capable, quite literally, of changing the world. It is ideal for the fast-growing Internet of Things (IoT) market, where edge nodes increasingly require more intelligence in ever-smaller form factors. The Kinetis KL03 MCU combines the power efficiency of the Kinetis L series based on ARM Cortex-M0+ cores with enhanced low-power functionalities including register files, SRTC, low power UART, and additional low power wake-up pins.

Additionally, the new product offers greater ease of use over the previous generation. An added ROM-based boot loader allows factory programming and on-line system firmware upgrades without adding circuitry to the board, reducing programming-related costs for customers. An

internal, highly accurate voltage reference (Vref) delivers improved analog performance by supplying an embedded 1.2 volt reference for the ADC, enabling several use cases for applications requiring high ADC accuracy. The Kinetis KL03 MCU is code compatible across 900+ Cortex-M products. In addition, a FRDM-KL03Z Freescale Freedom development platform, as well as Processor Expert development system, Solution Advisor guide, and comprehensive Freescale and third-party enablement support in the ARM-ecosystem will be available to support development targeting the new MCU. Customers can begin evaluation immediately with the FRDM-KL02Z board.

Reneses unveiled the RX64M group of microcontrollers (MCUs), its first product in the flagship RX Family of 32-bit MCUs to be fabricated in a 40 nm process. Based on the new RXv2 CPU core, the new MCU group consists of 112 products running up to 120 MHz with zero wait state from the high-speed embedded flash memory, and feature both the high-speed real-time performance as well as large memory capacities required by industrial applications and network equipment. With the expansion of the connected society and Internet of Things (IoT) markets, there has been rapid growth in diverse IoT-related products such as connected network and industrial equipment used in factory automation and building automation,

driving the need for greater CPU computing performance, improved real-time response, and ever lower power. Part of the RX family, which covers a wide range of applications, from mid-range to high-end products, the RX64M MCUs provide a high-end MCU solution for applications that require the higher performance, on-chip memory and lower power. Since the new MCUs maintain compatibility with the existing product line, system designers working with current RX products can migrate easily to these new MCUs. In addition to a full complement of communications functions, the RX64M group of MCUs adds new PWM timer functions. Furthermore, the devices are highly backward compatible, as they feature the functions included in the existing Renesas RX600 series of MCUs. By including motor control timer functions and an IEEE 1588-compliant Ethernet function, which is required by industrial applications, the new MCUs can improve inter-system synchronization performance and provide flexible support for all types of motor control.

In addition to the vast amount of general-purpose serial interfaces, these devices support high-speed communications functions such as two Ethernet MAC and two USB interfaces, supporting the device, host as well as OTG functions, an SD host interface, and a QSPI (quad serial peripheral interface). Furthermore,

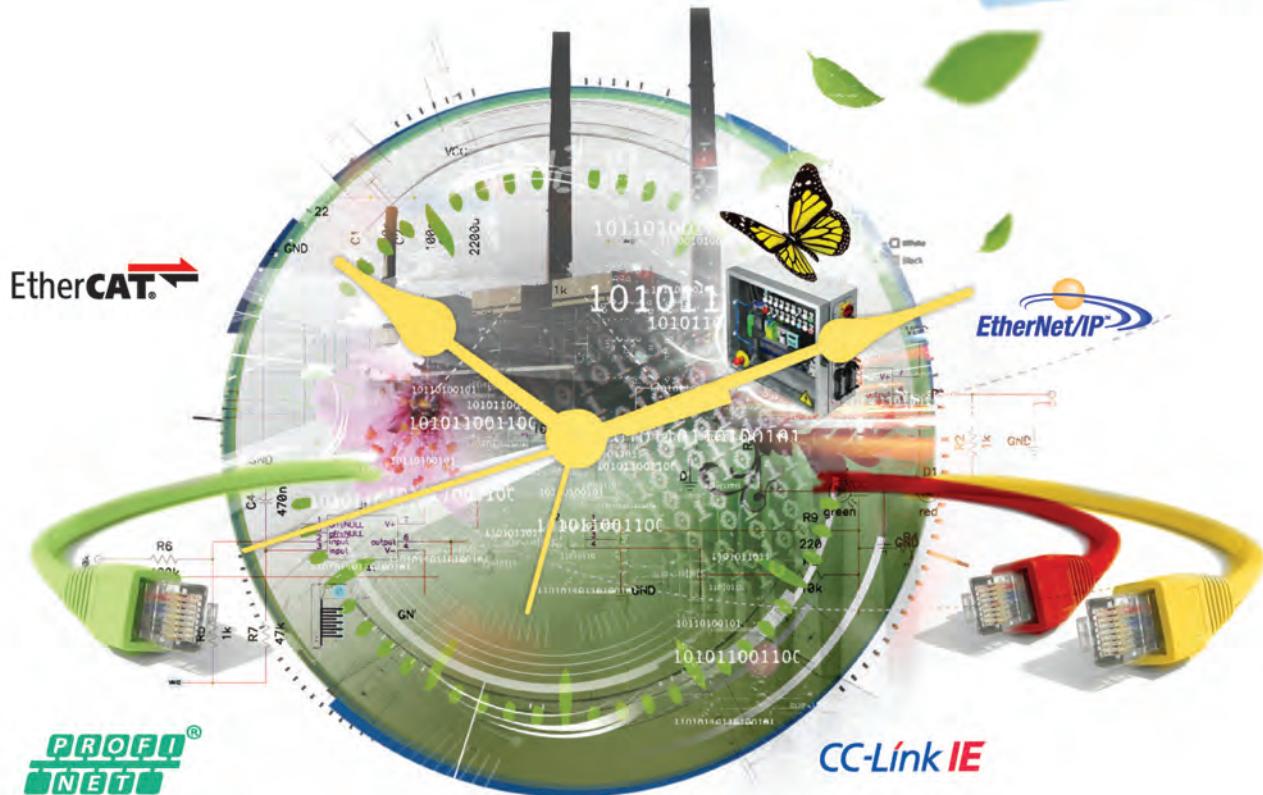
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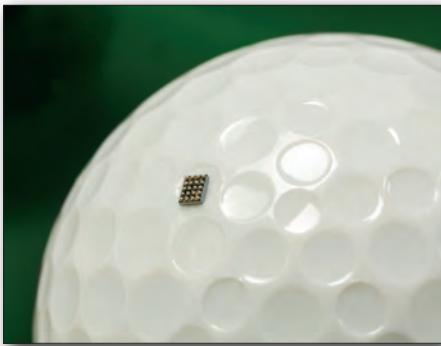


Figure 1. Smaller than a golf ball dimple, new Kinetis KL03 unleashes design innovation for Internet of Things applications.

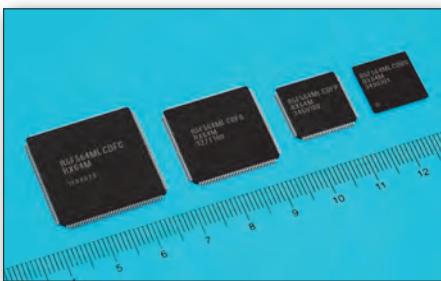


Figure 2. The RX64M MCUs combine connectivity and high performance with 4 MB of flash memory and 512 KB of SRAM for industrial equipment and other IoT applications.



Figure 3. The Novato reference design accurately measures and transmits industrial temperatures.

they include an encoding function to increase reliability and robustness of those communications functions. For a quick development start, the RX64M MCUs will be supported by a robust development tool environment from both Renesas and third-party tool vendors that make up the RX ecosystem, such as Micrium, Express Logic, CMX, Segger, and freeRTOS.

Silicon Labs introduced the industry's first single-chip digital ultraviolet index sensor ICs designed to track UV sun exposure, heart/pulse rate and blood oximetry and provide proximity/gesture control for smartphone and wearable computing products. The Si1132 and Si114x sensor ICs are ideal for activity-tracking wrist and arm bands, smart watches and smartphone handsets. In addition to enabling UV index sensing, the devices also provide ambient light

and infrared proximity sensing capabilities for health and fitness applications. Conventional UV sensors combine UV-sensitive photodiodes with an external microcontroller, ADC and signal processing firmware. Silicon Labs is the first to combine all of this functionality into a single-chip solution offered in an exceptionally small 2x2mm package that helps reduce the design's footprint and bill of material cost. When combined with an accelerometer, the sensors enable developers to implement sleep tracking in wearable applications. In addition, the sensors ability to measure both infrared and visible light levels enhances the control of LCD backlighting in mixed-light source environments. The result is an inexpensive yet effective means of adjusting backlighting to ease eyestrain and reduce power without distracting the end user.

The UV index sensors ultra-low-power architecture enables thinner wearable designs with smaller batteries and extends battery life with as little as 1.2 μ A average current for once-per-second UV measurements. The sensors also offer greater sensitivity and sensing range at significantly lower power levels than competitive offerings. The high IR sensor sensitivity provides significantly longer battery life in motion sensing/gesture applications through the use of a single 25.6 μ s IR-LED on-time while enabling up to 50cm sensing range. Dynamic adjustment of LED currents further minimizes power consumption.

Maxim Integrated's Novato smart temperature-transmitter reference design transmits temperature measurement over -200 °C to +850 °C range with better than $\pm 0.1\%$ accuracy. Factories can now easily, and very accurately, measure and transmit industrial temperatures with the Novato reference design, a 4–20mA loop-powered temperature transmitter with the HART communication protocol from Maxim Integrated Products. The Novato reference design transmits temperature measurements from remote sensors to the central control unit over a 4–20mA current-loop using the highway addressable remote transducer (HART) communication protocol. This smart transmitter enables low-power temperature measurement from -200 to +850 °C with accuracy better than $\pm 0.1\%$ or $\pm 1.0\text{ }^{\circ}\text{C}$. Novato's flexible design supports 2-, 3-, or 4-wire resistance temperature detector (RTD) sensor inputs and works with any type of RTDs, from PT100 to PT1000, making it ideal for a wide variety of industrial applications.

Toshiba Electronics Europe has launched a low power consumption Bluetooth IC TC35667FTG that supports Bluetooth Low Energy communications. The new IC will find application in various wearable and healthcare-orientated smart devices, sensors, as well as smartphone

accessories, remote controllers and toys. It adopts an original low-power circuit design and integrates a highly efficient DC-DC converter, reducing peak current consumption to below 6mA and deep sleep current consumption to below 100nA. TC35667FTG also integrates an ARM processor, enabling download and execution of customer programs stored in EEPROM. It supports customization of applications, eliminating the need for any external microcontroller. The receiver has a sensitivity of -91dBm and transmitter output power can be varied from 0dBm to -20dBm in 4dB steps. Housed in a 6x6mm QFN40 package with 0.5mm pin pitch, the low power consumption IC will enable the adoption of Bluetooth LE communications in the small devices while also promoting long battery life. The IC supports server and client functions defined by GATT (Generic Attribute Profile). Toshiba will expand the device line-up to include support for automotive applications of Bluetooth Smart devices.

FTDI introduced its application-oriented microcontroller families. Targeted at key tasks where they can add value, these speed-optimised microcontrollers elevate system performance and operational efficiency while providing unique connectivity features, as well as simplifying system implementation and chip integration processes. There are two AOC product families - the 8-bit FT51, which is designed to address control system deployments and the 32-bit FT900, which is aimed at use in high-performance systems such as video imaging, multimedia and other demanding, cost-sensitive activities involving large amounts of data.

Both these families employ an extensive selection of IO options and incorporate powerful, efficient core processing architectures. The FT51s 8051 CPU core has been tuned in order to achieve 48MIPS processing capacity. Its USB Hub function enables sub-systems to be cascaded, while a comprehensive cadre of ADC/DACs facilitate sensor interfacing. By executing instructions from shadow RAM, rather than flash memory, the FT900 can operate at true zero wait states up to 100MHz and 293DMIPS performance. It has a built-in camera interface for attachment to CMOS imaging modules with VGA resolution. The FT51 and FT900 AOCs join FTDI Chips already well-established 16-bit microcontroller offering - Vinculum II - to present the electronic engineering fraternity with a product range spanning from low-end 8-bit devices right through to 32-bit devices, all with impressive performance metrics and system interconnection assets. The new R&S RTE oscilloscopes from Rohde & Schwarz are available with bandwidths from 200 MHz to 1 GHz. An acquisition rate of more than one million waveforms per second helps users find signal faults quickly. The



Figure 4. The new interface can be used on oscilloscope mainframes as well as offline on a PC with Agilent N8900AInfinium offline analysis software.

scopes' highly accurate digital trigger system with virtually no trigger jitter delivers highly precise results. The single-core A/D converter with more than seven effective bits (ENOB) almost completely eliminates signal distortion. With a sampling rate of 5 GS/s and a maximum memory depth of 50 MS/channel, the R&S RTE can accurately record the long signal sequences required when analyzing the data content of serial protocols such as I2C and CAN. Users performing complex tasks will especially appreciate the high measurement speed of the oscilloscopes. Mask tests, for example, quickly return statistically conclusive results. The highly responsive, spectrum-analyzer-like FFT reliably

detects even sporadic signals, making the R&S RTE suited for EMI debugging during product development. Thanks to the high-resolution 10.4" XGA touchscreen, users can intuitively perform their daily T&M tasks. For instance, they only have to swipe the screen to access saved instrument setups. And they can simply „drag & drop“ waveforms to arrange them on the screen. Real-time miniature views of the signals on the edge of the screen allow users to always see what is happening. Dialog boxes are opened as semi-transparent overlays over the active waveforms, which maintain their full size. Signal flow diagrams and forward and back buttons in the dialog boxes simplify navigation. Innovative tools help users boost their productivity. The QuickMeas function simultaneously performs several measurements on a signal. Fingertip zoom allows users to simply swipe a signal zoom area to quickly view signal details. Tools are selected from a configurable toolbar. Rohde & Schwarz also offers a wide range of dedicated application solutions for the R&S RTE, including trigger and decoder options for serial protocols, a mixed-signal option with 16 additional digital channels and a power analysis option. A broad probe portfolio rounds out the offering. Agilent Technologies announced at embedded world

2014 a next-generation user interface for its Infinium real-time oscilloscopes. It is the first oscilloscope user interface to take advantage of new display technologies and significantly enhance the user experience by offering faster documentation, personalized viewing and improved usability. Infinium oscilloscopes with the new user interface allow engineers to easily manipulate their data across multiple monitors and move windows, charts and measurement results to where they want them on the screen. The new interface can be used on oscilloscope mainframes as well as offline on a PC with Agilent N8900AInfinium offline analysis software. Infinium offline software resolves the oscilloscope-processing bottleneck by allowing engineers to view, analyze, share and document their results somewhere other than where they perform the tests, or at a different time. To enable engineers to create better documentation faster, the new user interface displays bookmarks and composite files - documentation features previously unavailable in oscilloscope user interfaces. Because Infinium offline software makes it possible to run the new user interface on a PC, engineers can more easily share information with design partners, vendors and customers using USB flash drives, email or Web conferencing.

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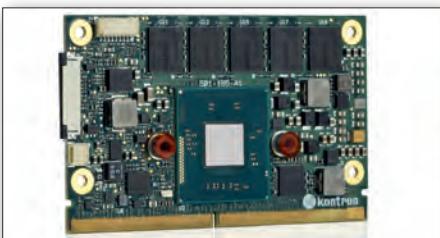


Figure 5. SMARC modules with Intel Atom processor E3800 series facilitate mini-computers with extremely low-profile and high graphics performance.



Figure 6. The CB70C COM module offers high computing performance on a small form factor board and is based on the new Rugged COM Express standard.

The Infinium user interface delivers a number of industry-firsts. First to offer separate dockable windows for time, frequency and protocol measurements for user-customizable views. First to save composite files to enable file sharing across multinational companies. First to migrate a full-featured real-time oscilloscope user interface to the PC for rapid navigation and powerful viewing/analysis. First to offer smart markers that dynamically update delta values coupled with annotated axis values for faster debugging. It is first user interface to offer transportable and server-based licensing to facilitate sharing. (Not only can users share data, they can also lend application licenses.)

In addition, the N8900 Infinium offline analysis application is the first PC-based application to support protocol decode for I²C; SPI; RS-232; RS-422; RS-485; UART; JTAG; CAN; CAN symbolic; LIN; FlexRay; USB; PCIe(r) gen 1, 2 and 3; MIPI D-PHY and M-PHY; DigRF; 8B/10B; SATA/SAS; HDMI; DDR1, 2, 3 and 4; LPDDR 1, 2 and 3; and 64B/66B Ethernet for faster debugging of designs that include serial buses. Wind River announced at embedded world 2014 that it has reinvented its real-time operating system (RTOS) to address the new market opportunities created by the Internet of Things (IoT). The latest release, VxWorks 7, will further reinforce its leadership in traditional markets such as aerospace, defense, medical, and industrial, and also enable the company

to extend its reach into emerging applications enabled by IoT. Recognized as the industry-leading RTOS, VxWorks has been re-architected with a highly modular approach leading to the separation of the VxWorks core operating system from packages such as the file system or networking stack. As a result, individual applications can now be updated at any time without requiring a rework or retest of the entire system, increasing scalability and the ability to quickly adjust to market changes.

The latest release of VxWorks includes the following new features and enhancements. The new modular approach allows customers to apply targeted, efficient upgrades to packages and protocols without changing the system core which minimizes testing and recertification efforts and allows customers to maintain their systems on the cutting edge of technology. The comprehensive set of built-in security features includes secure data storage, tamper-proof design, secure upgrade, root of trust, and user and policy management. Enhanced functionality was added to address the increasing need for safety applications in medical, industrial, transportation, aerospace and defense. A combination of the microkernel and the standard kernel, built on the same VxWorks platform, allows customers to reduce development and maintenance costs by leveraging one RTOS foundation across different classes of connected devices, from small-footprint consumer wearables to large networking equipment and everything in between. Support is provided for a broad range of industry-leading standards and protocols such as USB, CAN, Bluetooth, FireWire, and Continua, as well as out-of-the-box, high-performance networking capabilities. The graphics ready platform includes a new highly efficient stack based on the published OpenVG API, hardware-assisted graphics drivers and the Tilcon graphics designer tool.

Kontron introduced its ultra low-power SMARC Computer-on-Modules with Intel Atom processor E3800 series. The SMARC-sXBtI Computer-on-Modules offer excellent graphics, high processor performance and x86 compatibility on the smallest SMARC footprint, combined with very low power consumption (5 to 10 watts). Both the flat profile of the module and its mobile feature set are tailored for smallest portable handheld devices. The modules can, however, be deployed in any application where power consumption has to be kept at just a few watts but high-level computing and graphics performance are required. The SMARC-sXBtI Computer-on-Modules have been developed to comply with the SGET specification and are equipped with Intel Atom processor E3800 series and up to 8 GB RAM, optional with ECC. They support the extended

temperature range of -40 to +85°C, measure only 82 x 50mm and have an especially low-profile design thanks to the use of edge card connectors. Nevertheless, there is still enough space for up to a 64GB on-board SSD to store OS and application data. A highlight of the pin-out is the mobile feature set with 3 UARTs with complete function range also for, e.g., GPS as well as support of the MIPI-compliant serial camera interface. The powerful Intel Gen 7 Graphics are carried out via HDMI 1.4 and LVDS (optional eDP) with up to 2560x1600 and 60 Hz to the display. Further interfaces include 1x GbE LAN via Intel Ethernet Controller I210, 1x USB 3.0 and 2x USB 2.0, amongst others. Customer-specific extensions can be implemented via 2 SDIO and 3 PCIe x1 lanes with 5GT/s.

Congatec is now using the new Yocto project BSP for more stability for a large variety of customer requirements. The Yocto project was launched at the end of 2010 by merging the CE Linux Forum with the Linux Foundation. Yocto project supports ARM, Intel, MIPS and power architecture platforms on the hardware side. Many drafts, templates, tools and methods that may be used with the Linux-based system are available for the developer, regardless of the hardware architecture.

Congatec provides its BSP based on version 1.5.1 (Dora), so users may create their own Yocto project according to the specific application involved. From now on, the Yocto project BSP is available for the conga-QMX6 module. The Computer-On-Module (COM) is equipped with the Freescale i.MX6 ARM Cortex A9 processor family, scalable from 1 to 4 ARM cores. With its modern 3D-compatible high end HD graphic interface, it is particularly suitable for demanding multimedia applications. Primary target markets are manufacturers of mobile and ultra mobile industrial devices, as well as users in the fields of medical, automotive and industrial automation technologies. Equipped with an Intel Core i7 processor, the CB70C COM module from MEN offers high computing performance on a small form factor



Figure 7. The TQMa6x module is optimized for accelerated video-, graphics- and multimedia applications.

board. Based on the new Rugged COM Express standard, it is also well suited for use in mission-critical applications. Rugged COM Express or VITA 59 is a new standard which is based on the proven PICMG COM Express standard. Due to mechanical modifications, the modules are now also able to meet the high requirements of critical markets regarding temperature, shock and vibration, EMC compatibility and resistance against dust and humidity. The Intel Core i7 processor family with a core frequency of up to 2.1 GHz and a Turbo Boost frequency of 3.1 GHz makes it possible to choose between 1, 2 or 4 processor cores. As many as 16 GB DDR3 DRAM are soldered to the board. In addition, Intel AMT, Open CL 1.1 and high-end graphics are supported. The adaptable BIOS with integrated Intel AMT support can be flexibly adapted to the final application without additional costs. The Board Management Controller supervises the board functions and temperatures. I/O interfaces of the CB70C include PCI Express, LVDS, DDI, VGA, HDAudio, SATA, Ethernet and USB.

As the CB70C is embedded in an aluminium frame for conduction cooling specified according to the VITA 59 standard, it can be used in the extended temperature range of -40 to +85°C. Due to the soldered components and the compact frame, the module is also protected against shock and vibration and is EMC proof. The dimensions of the CB70C Rugged COM Express module are a bit larger than those of a standard COM Express Basic module with pin-out type 6, as it is equipped with additional small wings on the sides to ensure thermal connection to the aluminium frame in which it is embedded. The new module is also available without these wings as a standard COM Express module according to PICMG COM.0 and then named CB70.

At embedded world, TQ-Systems demonstrated the TQMa6x module for accelerated video-, graphics- and multimedia applications. For the first time, TQ will run a demo in which two displays are used simultaneously. Different demonstrations will be shown on the displays. An operator interface based on QT that can be operated through a Projected Capacitive Touch (PCT) screen will be shown on the 7" display. A 3D demo will be run on the second display – a 10.4" display likewise with PCT – in order to demonstrate the capability of the CPU with the integrated GPUs and VPUs. The software developed together with Pengutronix offers a basis for applications in which several displays with touch support are used. Even though this will entail a certain degree of adaptation work to customer projects, this in itself provides a good basis for innovative operating concepts with or without animation. The Pengutronix kernel team supplies a preview of the media drivers, currently running

through the quality process of the main line Kernel. GPU accelerated Qt 5.2 software stacks can be provided on demand. All externally usable signals of the CPU are available on the TQMa6x module on three industry-compatible pin strips (2 x 160 + 1x 40 pins) on a 0.8 mm grid that have proven their worth at TQ for over 15 years.

Thanks to the high degree of interface integration this module is suited for a variety of applications where the advantages of virtualization play an important role. The ARM Cortex-A9 core, scalable in terms of performance and the clock rate of up to 4 x 1.2 GHz ensures

that the optimal performance can be selected for every application. The TQ Minimodule TQMa6x is equipped with up to 2 GByte DDR3L RAM, up to 128 MByte SPI NOR flash and up to 16 GB eMMC flash for program and data. The design is enhanced by an EEPROM, an RTC and a real-time clock backed by battery from the main board. Whether for operating with several displays or for applications where scalable processor performance is required, the embedded module TQMa6x with its long-term availability and characteristics together with the existing software support by the PikeOS provides a solid basis for future-oriented development. ■

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EN60601-1 third edition: a standard with many faces

By Matthew Dauterive, Recom

This article takes a look at the third edition of EN60601-1 governing how the peripherals of a medical embedded system must be connected. It sheds light on the differences from the previous version and describes exactly how power module manufacturers have addressed the discrepancies.



In the last few years, the control over electronic medical devices has exploded. From GMP Annex 11, which calls for as much as code review of a microcontroller when the code is proprietary, all the way to the third edition of EN60601-1 – a safety standard for medical devices and systems which governs the way that medical devices must be electrically protected. Much focus has been given to Annex 11 and the computerized aspect of an embedded system. Standards raise expectations of creating uniform rules and transparency within their scope of application, and in view of this globalized world, it would not have been amiss to expect the same from the third edition of the EN60601-1 standard. Even after years of preparation, astonishing differences still exist thirty-five years after IEC/UL 60601 was first published.

While the USA gave itself an additional year of grace, enforcing the new UL60601-1 on July 1, 2013, Europe spared no time and replaced the outdated second version from 1995 with the third version on July 1, 2012. Further complicating the transition, the new standard applies to all devices launched onto the European market, even new products with old designs, while the same standard in the USA was only applied to newly developed products. The Canadians took the middle road with the CAN/CSA standard by enforcing the standard on the same date as in Europe, but applying it

only to newly developed products like in the USA. Medical devices often have product lifetimes of five to ten years, so this constituted a costly drawback for European manufacturers – not only because they had to retrofit new components to old designs, but also due to the high additional costs of certifying their new products. This grey zone, which will last years, is a heavy burden particularly on small companies now faced with the decision to take current products from the market prematurely while their competitors from the USA are allowed to continue selling their old products.

The situation is even less clear for devices that fall under the EN/UL 60601-1 2nd edition standard. The third edition is only mandatory for these products once the second edition no longer holds sway for 60601-1 2nd edition products – which may indeed come later. Some countries will not or at least have not yet enforced the third edition, and their products are still certified according to the second edition.

Medical engineering products will literally be subject to double standards for years to come.

Virtually nothing has changed in technical specifications for insulation while risk management has gained focus as a major area of innovation. Similar to Annex 11, in the 60601-1 3rd edition, medical device manufacturers will be required to document their risk management process as based on the ISO 14971 model. Specific processes will have to be observed and documented, alongside compliance with fundamental technical standards. In previous versions of 60601-1, devices were allowed to break during testing as long as this did not pose a risk to patient or operator health, but the third edition requires that the system keeps its essential functionality. This has to be documented in a risk management file or RMF, which will also require far more contact between the manufacturer and testing authority throughout the development process – especially as results from the testing process have

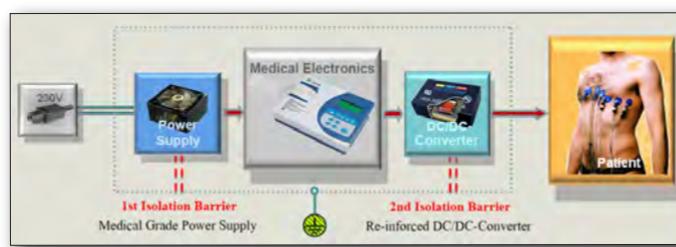


Figure 1. Block diagram of a medical device for direct patient contact with a reinforced isolated DC/DC converter as the second isolation barrier.

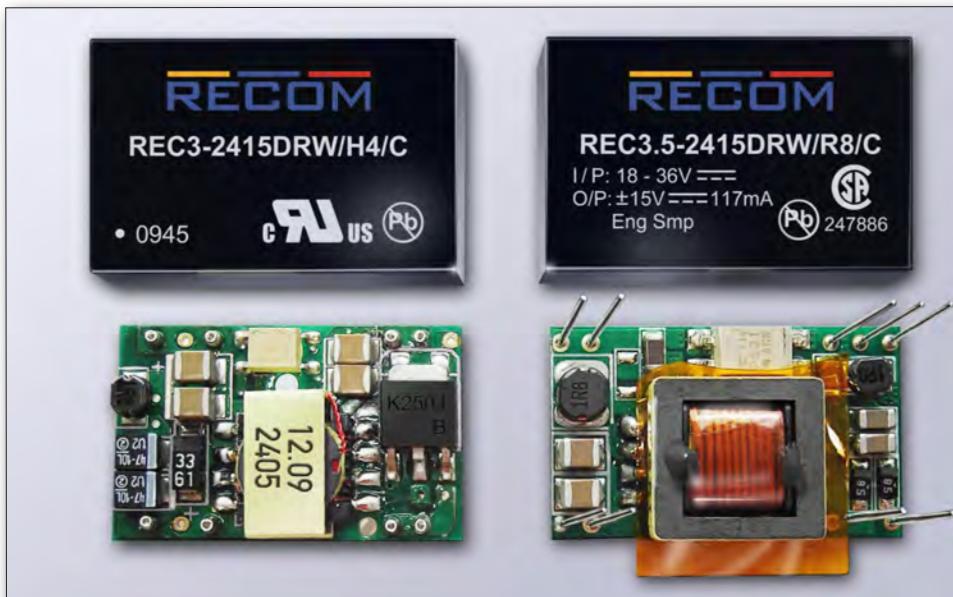


Figure 2. Visual comparison between a reinforced isolated REC3.5 (right) and a single isolation REC3 that is unsuitable for applications with patient contact (left).

to be included in the RMF document. Devices with patient contact (MOPP, means of patient protection) require two isolation barriers for electrical safety, an important requirement in power modules. The first barrier on the supply side has so far been implemented in a medical PSU, while reinforced isolated DC/DC converters provide the second isolation barrier between the medical electronics and diagnostics tools, such as endoscopes and ECG electrodes, to double the safety.

One new feature of the third edition is that it separates off operator protection; in theory, clearance and creepage distances as defined in EN60950-1 for electronic equipment are enough for devices without patient contact intended for protecting operating staff (MOOP). You might interpret this as a relief, but the requirement for very low operating current also needs to be observed according to EN60601, so manufacturers would be well-advised to limit their possibilities and use medically isolated converter modules in MOOP devices as well.

As a leading DC/DC converter manufacturer, Recom supply a broad range of medical converter modules certified according to the third edition with double MOPP for direct patient contact such as our RxxP, RxxP2, RV, REC3.5 and REC6 (1, 2, 3.5 and 6 watt) lines. Transformer clearance and creepage distances in these reinforced isolated converters have to be three times the size as those used in industrial settings. So far, this has been implemented with primary and secondary windings on opposite sides of a toroidal core separated by a partition wall in the middle. That deals with the isolation issue, but the magnetic fields would not be able to overlap due to the spatial separation between the two windings.

An unpleasant side-effect would be a decrease in efficiency in the two transformers resulting in increased heat losses. Recom engineers have developed a small transformer with primary and secondary windings interlocked in such a way as to ensure virtually optimal overlapping magnetic fields despite the creepage and clearance distances required for reinforced isolation. The new converters achieve fifteen to twenty percent more output in the same casing due to quasi-resonant circuit topology, and are also approved for ambient temperatures of up to 85°C – around 15°C more than most transformers with conventional toroidal-core transformers – due to the low heat loss. Depending on type, we were able to reduce isolation capacitance to values down to 1.5pF, ensuring lower leakage current as required in medical electronics.

A complete generation of highly isolated converters for medical applications has emerged from this new transformer design, such as in programming devices for pacemakers, blood gas analysers and oxi-meters. The RxxP and RxxP2 series cover the 1W and 2W classes and are available in SIP7 casings. The 2W version is available as an RV series in DIP24 casings for pin compatibility with legacy designs. The REC3.5 and REC6 series both provide 3.5W and 6W, respectively, and also come in a DIP24 casing. The models quoted are available with isolation voltages up to 8kV DC and 10kV DC.

Apart from the reinforced isolated converters mentioned, there are many other product lines in the product range approved for medical applications without patient contact (MOOP) – regulated and unregulated SMD converters with power ratings from 0.25W to 2W (RxS family) as well as a wide variety of different converters up to 6W. ■

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Power-optimized Computer-on-Modules ensure short design times

By Peter Eckelmann, MSC

The Q7-BT compact Qseven module family from MSC with the latest Intel Atom processor E3800 offers high performance with low power consumption, and is thus well-suited for portable, battery-operated systems. The error correcting code (ECC) ensures high data integrity, reliability and system availability, enabling medical devices with special safety requirements to be realized.

Continuously increasing technical capabilities, such as extremely high precision and test speed, are in the foreground with conventional large-scale medical systems. However, at the same time, many manufacturers have recognized the need for portable and/or battery-operated devices for clinics and for the mass market. Examples of this include compact laboratory and measurement devices, imaging systems and handheld devices for patient monitoring. The driving force comes from the end-users and goes in the direction of low costs, high level of comfort as well as simple and rapid results.

User-friendly operation of the medical devices is also an essential factor so that all patients can carry out the doctor-prescribed tests themselves at home without technical know-how. An important design goal for portable systems is, for example, to avoid calibration by the user. Prerequisites for achieving this are improved and simplified diagnostic methods, as well as innovative electronics technologies such as high-performance processors and easy to use displays. In the United States, all medical devices must therefore meet the Clinical Laboratory Improvement Amendments (CLIA) standards.

The development of medical devices can be significantly optimized through the use of standardized computer-on-modules (COMs),



Figure 1. The new MSC Q7-BT Qseven 2.0 module family is based on the new Intel Atom processor E3800 product technology (formerly codenamed Bay Trail).

which are available in different versions with scalable processor performance and a selection of interfaces. The instantly ready for use COMs integrate the most modern standard PC functionality and are easily mounted via a proven standard connector on a baseboard. All the device manufacturer needs to do now is implement the interface connection on this carrier board as well as the software, according to the specific application.

Most of the embedded modules offered meet form factor and performance parameters defined in internationally recognized standards. Today, besides the older ETX standard, especially the COM Express and Qseven form factors are widely used. COM Express primarily addresses the high-end market with powerful modules that, for example, integrate an Intel Core processor of the 4th or 3rd generation with up to four cores. With the change from type 2 pin-out to type 6 pin-out, up to three digital display iInterfaces (DDI) and fast USB 3.0 are supported. However, the power dissipation of many of these COMs is often too high for passively cooled embedded systems.

The current Qseven Specification, which specifies modules in the compact form factor of 70mm x 70mm, supports both x86 and ARM/RISC architectures. A number of embedded applications for a wide range of mar-

kets, especially mobile and battery-operated systems, can thus be realized. The Qseven modules are designed for a maximum thermal design power (TDP) of approximately 12W. Therefore, in particular, low-power ARM and Intel Atom processors are used here, which of course are limited in their performance data.

MSC Technologies module families with the new Intel Atom processor E3800 (formerly codenamed Bay Trail) now fill the gap between high-end COM Express modules with Intel Core processor and the earlier Intel Atom-based Qseven modules at the lower entry-level. The processor modules optimized for performance per watt are available in both form factors, and are designed for interesting applications in future markets including portable, battery-operated systems.

In comparison with the previous generation of Intel Atom processors, the Intel Atom processor E3800 product family offers a range of important features that are required as standard today. Besides an enhanced microarchitecture and the introduction of out-of-order execution, in particular, a more powerful graphics was integrated. The Intel Gen7 graphics has a high-resolution 3D functionality as well as hardware coding and decoding of HD videos. DirectX 11, OpenCL 1.1 and OpenGL 3.2 are supported. In addition to single- and

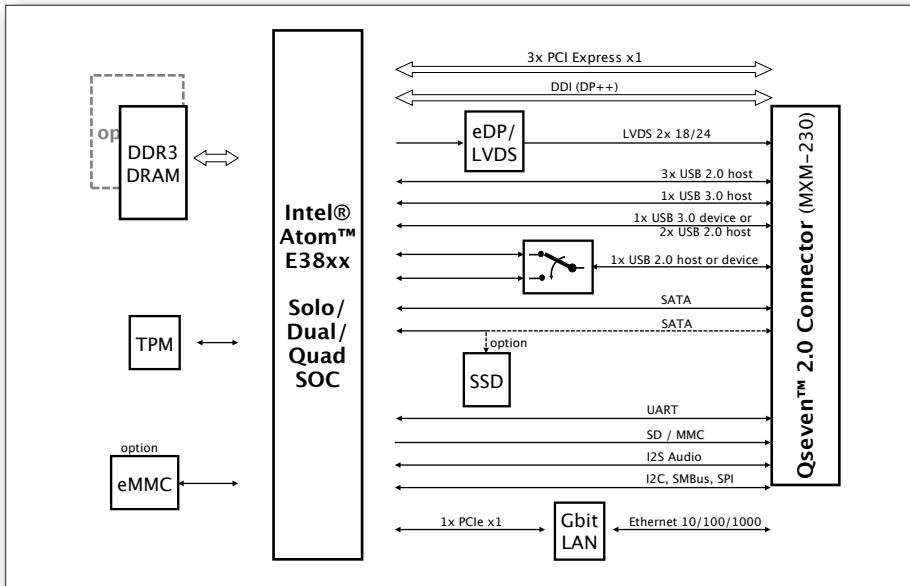


Figure 2. Block diagram of the MSC Q7-BT Qseven module

dual-core Intel Atom CPUs, for the first time processors with quad core on an x86-based Qseven platform are now also available. The implemented Turbo Boost technology enables individual processor cores and the graphics to run faster, which considerably increases the peak performance. According to Intel, the computational performance of the new Intel Atom processor E3800 product family is three times higher than the predecessor family. With Intel Advanced Encryption Standard New Instructions (Intel AES-NI), for the first time the Atom processors offer effective data encryption. The sophisticated power management ensures low current consumption with comparatively high computational performance.

The new MSC Q7-BT Qseven 2.0 module family is based on the new Intel Atom processor E3800 product technology and is offered in five variants today (table 1). The most powerful board integrates the Intel Atom processor E3845 with four CPU cores. The modules with dual-core Intel Atom processors E3827, E3826 and E3825 are pin and software

compatible. For less demanding applications, the module based on the E3815 Intel Atom processor with one core is available. The MSC QT-BT Qseven modules are available for both the commercial and industrial temperature range.

MSC integrates into the MSC Q7-BT Qseven modules up to 4GB DDR3 DRAM and implements an optional error correcting code (ECC) that delivers a high level of data integrity, reliability, and system uptime which is ideal for many intelligent systems with demanding high security levels. All data read from the memory are checked. The check algorithm is so powerful that it is possible to determine where the error occurred. Single-bit errors can not only be identified, but even corrected. Double errors can at least be identified. Innovative medical systems with particularly high safety requirements can thus be realized. The high reliability of the board is augmented by the integrated Intel VTx virtualization technology and built-in security engine.

The new Qseven module family offers a broad range of modern interfaces like USB 3.0 Host and optional USB 3.0 Device, 3 x PCIe x1 Gen. 2.0, Gbit Ethernet, audio, LPC, I2C, SMBus, SPI Bus and SATA-300. DDI Display Interface for HDMI, DisplayPort (DP) and embedded DisplayPort (eDP) and 18/24 bit dual-channel LVDS are available. Optionally, up to 64GB SATA SSD and additional up to 64GB eMMC Flash Disk can be assembled. MSC Technologies offers adequate baseboards and starter kits. The MSC Q7-BT platform integrates TCG (Trusted Computing Group) hardware-based security functionality TPM 1.2 (Trusted Platform Module) from Infineon. ■

Intel Atom processor	cores	clock frequency	TDP
E3845	four	1.91GHz	10W
E3827	two	1.75GHz	8W
E3826	two	1.45GHz	6W
E3825	two	1.33GHz	6W
E3815	one	1.46GHz	5W

Table 1. The MSC Q7-BT Qseven 2.0 module family is offered in five variants.

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Interview about AMD's roadmap for the embedded market

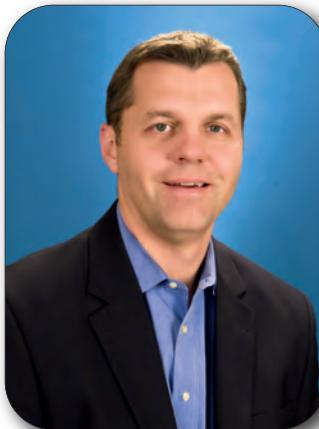
The embedded computer market is growing rapidly while at the same time undergoing profound changes. AMD is responding to these market needs with a dual strategy for embedded customers: the company is offering the freedom to choose between and/or combine ARM and x86 processors. As a part of this dual strategy, AMD has announced plans to extend its already-successful Embedded G-Series and R-Series SOC and APU product lines and to deliver the next-generation embedded AMD Radeon GPU family.

■ **B&S/ECE Magazine:** The market for embedded systems is gigantic and it continues to grow. Which developments can we expect in this area?

Scott Aylor: “The embedded market consists of various segments and forms the fundamental basis for the surround computing era. The segment of intelligent embedded systems (those equipped with high-performance microprocessors, IP connectivity and high-level operating systems) is poised to experience extremely fast growth. I believe that it will soon become the most important segment within the embedded industry. According to a recent study by market researcher VDC (VDC Research - Strategic Insights 2012: Embedded Processing Technologies) the market for CPUs for traditional and intelligent embedded systems will grow by 36 percent, from around 330 million units in 2013 to more than 450 million units in 2016. Devices with x86 and ARM architectures will account for 82 percent of the total addressable market.”

B&S/ECE Magazine: How well is AMD prepared for this market growth?

Scott Aylor: “We are very well prepared. AMD offers developers in the embedded community the solutions they need to be successful in this rapidly expanding and transforming market. We know what the market demands are and know how we have to react. This is best reflected in our embedded roadmap for this



Scott Aylor, Vice President and General Manager of AMD Embedded Solutions

year. We've set a strong roadmap in motion; all developers need to do is jump on board.”

B&S/ECE Magazine: What specific requirements do customers in this market have?

Scott Aylor: “Customer demands differ significantly depending on the market segment – from low-power to high-performance, from Linux to Windows and from x86 to ARM. With our upcoming lineup we are in a position to cover all these needs. We are the first vendor to announce our ability to provide both ARM and x86 processor solutions for low-power and high-performance embedded computing designs. According to Jim McGregor, principal analyst with TIRIAS Research, ‘The unprecedented rise of intelligent connected solutions over the next several years will require a myriad of ultra low-power to ultra high-performance solutions connecting devices to the cloud.’ We plan to lead the industry in offering a set of solutions that are flexible, scalable and innovative.”

B&S/ECE Magazine: How exactly does AMD plan to satisfy all these diverse demands?

Scott Aylor: “Our near-term roadmap includes two leading x86 APUs (accelerated processing units) and CPUs (central processing units), a high-performance ARM system-on-chip (SoC) and the next-generation discrete AMD Embedded Radeon GPUs (graphics processing units). This range extension offers the embed-

ded developer community a much wider choice and, in so doing, helps them meet design requirements in a more exact way.”

B&S/ECE Magazine: With a view to these upcoming developments, where do your products offer advantages over existing platforms in the market?

Scott Aylor: “With our ARM and x86 architectures we can realize corporate visions of developing an ambidextrous ecosystem. This wide solution range for embedded design developers is supported by our embedded longevity program for supply stability assurance to fit their every need.”

B&S/ECE Magazine: What specific technical areas has AMD been focused on for the new products?

Scott Aylor: “The upcoming roadmap has been designed towards improving two ratios: performance-per-watt and performance-per-euro. Together with the recent launch of the prize-winning AMD Embedded G-Series SoC family, which sets a new benchmark in terms of performance-per-watt of low-power multi-core APUs, our latest additions to the roadmap for embedded products represent a further significant strategic push for AMD in the high-growth embedded market.”

B&S/ECE Magazine: There has been much speculation about AMD’s upcoming embedded ARM products. Can you give us some more information?

Scott Aylor: “We are building out plans to launch the Hierofalcon processor family, which is based on ARM Cortex A57 architecture. Hierofalcon is a real milestone, as it will be AMD’s first 64-bit ARM-based embedded platform which serves datacenter, communications infrastructure, and industrial applications.”

B&S/ECE Magazine: Can you divulge any further details?

Scott Aylor: “The Hierofalcon platform will integrate up to eight ARM Cortex A57 CPUs with an expected clock rate of up to 2.0GHz

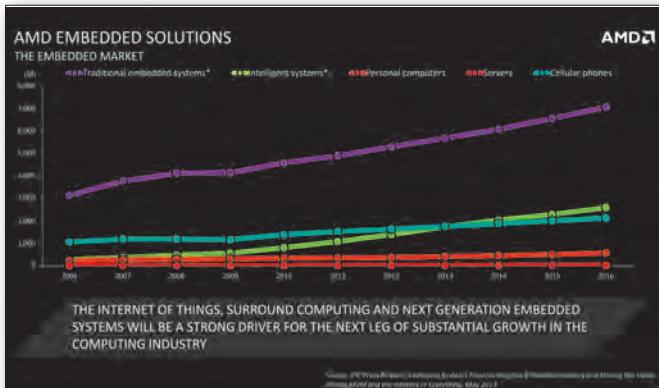


Figure 1. IDC forecast for the embedded market

and a high-performance memory with two 64-bit DDR3/4 channels with error-correcting code for high-availability applications. The highly integrated system-on-chip further offers 10GB KR Ethernet and third-generation PCI Express for high-speed network connectivity, making it ideal for control-level applications. This extension to the embedded roadmap offers developers of high-performance embedded systems a solution which may have significant cost savings, both in terms of power consumption as well as system costs.”

B&S/ECE Magazine: Security surely plays a major role here?

Scott Aylor: “Yes, of course. The need for networked, secure systems has really come into the forefront. With ARM TrustZone technology support and a dedicated cryptographic coprocessor for security tasks, the Hierofalcon will have an extremely high level of security.”

B&S/ECE Magazine: By developing platforms based on ARM architecture, will AMD be neglecting the established x86 path?

Scott Aylor: “Certainly not. AMD continues to build on its legacy as a leading supplier of x86 solutions and we expect Bald Eagle, which is an x86-based, high-performance, next-generation embedded processor, to become available in the first half of this year. It will come as an APU or CPU and have up to four new Steamroller CPU cores with up to a 35-watt TDP. The APUs will provide the new performance-optimized GPU architecture AMD Radeon Graphics Core Next and HSA extensions for high-performance embedded applications, resulting in a superior solution for next-generation digital signage and embedded digital gaming applications. In addition, the Bald Eagle family facilitates greater design flexibility for developers. To enable this, new power management functions such as configurable TDP will be introduced.”

B&S/ECE Magazine: And what are the plans for the low-power segment?

Scott Aylor: “We will also launch Steppe Eagle, which covers this segment, in the first half of this year. It will further extend the performance and low-power range of the current, award-winning AMD Embedded G-Series SoC platform with an improved Jaguar CPU core architecture and an AMD Graphics Core Next GPU architecture with new functions for higher CPU and GPU frequencies. The Steppe Eagle SoC was designed for low-power embedded applications and, in comparison to the current AMD Embedded G-Series SoC, offers, next to a high performance-per-watt, a low TDP and increased high-end performance above 2GHz. In addition, the Steppe Eagle SoC gives embedded development engineers the flexibility to leverage the current AMD Embedded G-Series board design and software

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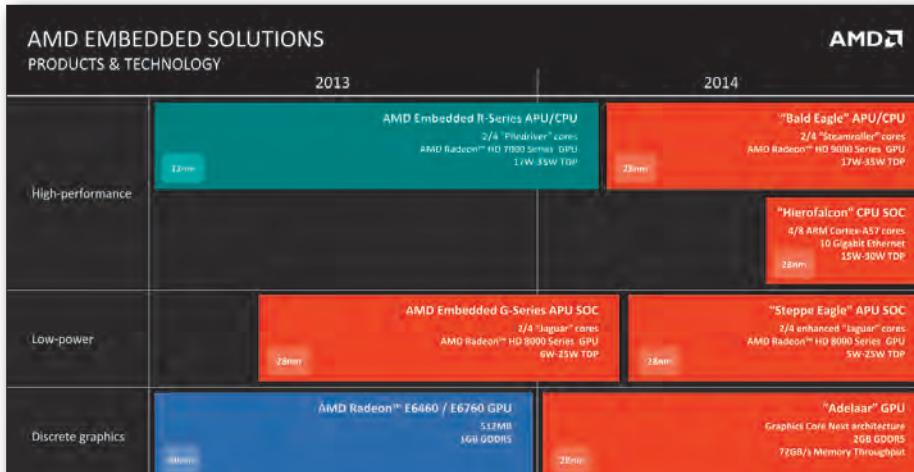


Figure 2. AMD product roadmap for the embedded market

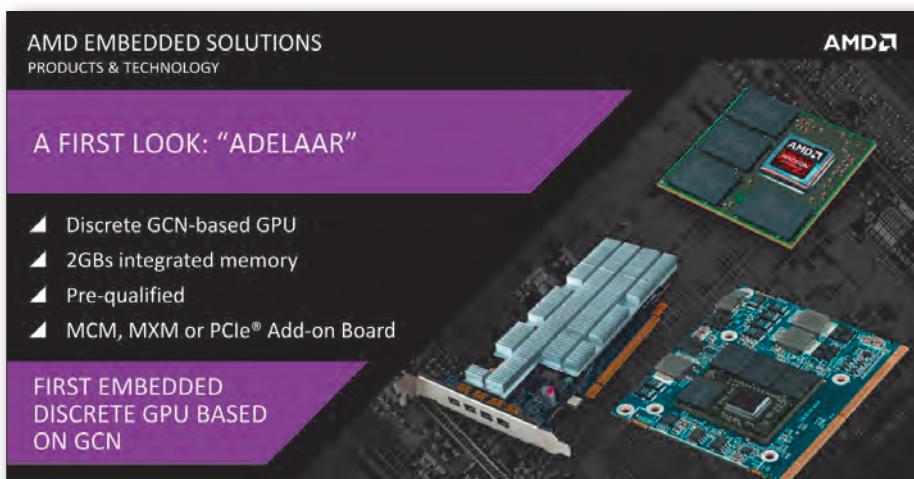


Figure 3. A first look at the Adelaar the first discrete AMD Embedded Radeon GPU for embedded systems, which is based on the AMD Graphics Core Next architecture especially developed for embedded systems.

stack into numerous applications with footprint-compatibility.

B&S/ECE Magazine: Tell us about the new AMD Embedded Radeon GPUs.

Scott Aylor: "Adelaar is an embedded GPU based on AMD Graphics Core Next architecture, which was developed specifically for embedded applications. This stands out from other products in the market thanks to its multi-chip

module (MCM) with prequalified and integrated 2GB graphic memory. The Adelaar GPU family offers excellent 3D graphics, multi-display support and DirectX 11.1, OpenGL 4.2 support and supports both Windows and Linux. Adelaar comes with a planned long-term availability of seven years as an MCM, a Mobile PCI Express Module (MXM) and as a standard PC graphics card (part availability is planned for seven years from date of announcement, subject to change without notice. Further support is available under contract)."

B&S/ECE Magazine: What other differentiators for AMD can you talk about?

Scott Aylor: "More than anything, it is paramount to make sure our customers get the right end-to-end solution for the job. So, with its current and future products, AMD is actively supplying the market for intelligent embedded devices with a comprehensive ecosystem of software and hardware partners, which support multiple operating systems, including both Windows and Linux."

B&S/ECE Magazine: What are your expectations for 2014?

Scott Aylor: "I think, with all these new products in the pipeline, that 2014 will be an extremely exciting year, both for our customers and for our company. The new products will target a wide range of different industries and enable our customers to develop really innovative solutions. We will especially be targeting the industries of industrial control and automation, thin clients, medical imaging, digital signage, digital gaming and digital surveillance systems. We also look forward to seeing new applications in the military, aerospace and communications infrastructure industries. We are definitely excited to show the industry our commitment to the embedded market and we are looking forward to seeing the applications that our customers develop with these products." ■

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■ Mouser: get creative with Embedded Artists LPC800/LPC812 MAX prototyping board

Mouser Electronics is now stocking the LPC800/LPC812 MAX ARM Cortex M0+ rapid prototyping board from Embedded Artists, combining the best development features of LPCXpresso, mbed, and Arduino. The LPC/LPC812 MAX rapid prototyping board is based on the NXP Semiconductor 12MHz LPC812, a member of NXP's LPC800 series of microcontrollers (MCUs).

[News ID 1275](#)

■ Toshiba: low power consumption Bluetooth ICs for smart devices

Toshiba Electronics Europe has launched a low power consumption Bluetooth IC that supports Bluetooth Low Energy communications. The new IC, TC35667FTG, will find application in various wearable and health-care-orientated smart devices, sensors, as well as smartphone accessories, remote controllers and toys. The new IC adopts an original low-power circuit design and integrates a highly efficient DC-DC converter, reducing peak current consumption to below 6mA and deep sleep current consumption to below 100nA.

[News ID 1241](#)

■ TI: InstaSPIN-FOC motor control technology with key updates

Texas Instruments celebrates the one-year birthday of the TI InstaSPIN-FOC motor control technology, along with announcing some exciting new updates and a special birthday C2000 InstaSPIN-enabled tool offer. The InstaSPIN-FOC motor technology has enabled motor control system designers to identify, tune and fully control (through variable speeds and loads) any type of three-phase - synchronous or asynchronous motor - in just minutes.

[News ID 1308](#)

■ Sierra Wireless completes acquisition of In Motion Technology

Sierra Wireless has completed the acquisition of In Motion Technology ("In Motion"). In Motion is a leader in mobile enterprise solutions, providing rugged in-vehicle mobile routers tightly integrated with an advanced mobile-optimized security system and a powerful management and application platform. The complete solution enables organizations to connect and manage mobile operations, vehicles, and workforces more efficiently, reliably and securely.

[News ID 1309](#)

■ Arrow Electronics signs EMEA distribution agreement with Variscite

Arrow Electronics has signed a distribution agreement with Variscite, a leading manufac-

turer of embedded solutions and system-on-modules. Under the agreement, Arrow will distribute all products offered by Variscite in the EMEA region.

[News ID 1314](#)

■ Silicon Labs expands Ember Zigbee portfolio for IoT

Silicon Labs announces a major expansion to its ARM-based Ember ZigBee system-on-chip portfolio delivering unmatched wireless performance, energy efficiency and reliability for the Internet of Things. Silicon Labs' new EM358x SoC family provides additional flash and RAM memory options to meet the needs of larger, more complex smart energy and home automation designs.

[News ID 1217](#)

■ Renesas: inverter kits ease integration of 3-phase motors in equipment

Renesas Electronics Europe announced two motor control reference platforms designed to drive any 3-phase permanent magnet synchronous motors (PMSM), also called Brushless AC motors. They enable engineers to reduce or even eliminate the time they would normally take to calculate motor parameters and evaluate the best tuning algorithm coefficients. As a result, they can rotate a permanent magnet AC motor in less than one minute.

The two new inverter kits revolutionise the integration of 3-phase motors in equipment. Both are based on Renesas' 32-bit RX family of MCUs, with one kit on RX220 offering 50DMIPS and the other on RX62T offering 165DMIPS. The RX220 inverter kit is designed for equipment requiring medium dynamics and a low-cost bill of material. The RX62T microcontroller integrates six operational amplifiers, six comparators, a floating point unit and two timer units to drive two 3-phase motors simultaneously. This kit provides the dynamics required to drive motors with a high level of accuracy.

[News ID 1219](#)

■ Freescale: Kinetis KL03 MCU in 1.6 x 2.0 mm² package

Freescale Semiconductor announces a breakthrough addition to its Kinetis mini portfolio with the introduction of the Kinetis KL03 MCU, the world's smallest and most energy efficient 32-bit MCU based on ARM technology. The Kinetis KL03 MCU builds on the previous generation Kinetis KL02 device with new features, advanced integration, and greater ease-of-use – all in an even smaller 1.6 x 2.0mm² package. The new capabilities of the Kinetis KL03 device help customers to achieve lower power in a smaller form factor, saving on product design time and cost.

[News ID 1229](#)

Embed ARM in Automation

M-5360A
ARM Cortex A8 SoM



PAC-4010
ARM based
Controller



Matrix-513
Box Computer



- ARM9/Cortex M3/A5/A8
- Modbus Gateway/Box Computer/ Web Control I/O
- FreeRTOS/Linux/WinCE support
- LAN/RS485/CAN/Wireless/Analog/Digital/Relay
- Ultra low power and wide temperature

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Intelligent diagnostics maximize factory-floor up-times

By Hubert Baierl, Infineon Technologies

This article introduces the ISO2H823V, a power management integrated circuit with built-in intelligent diagnostic functions designed for a wide range of industrial control applications, including programmable logic controllers (PLCs), distributed control systems, robotics and many more.

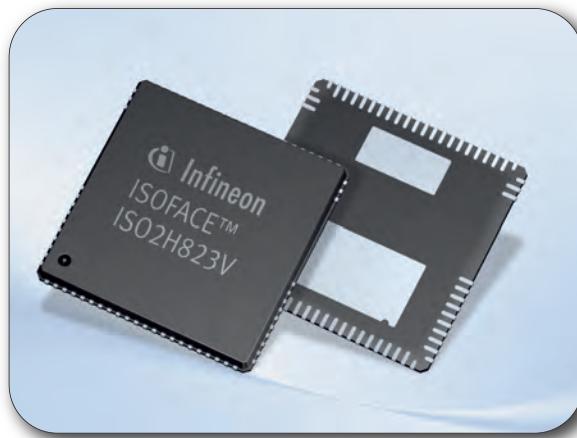


Figure 1. The ISO2H823V is a power management integrated circuit setting a new standard for system-level diagnostics in a tiny 12 x 12 mm VQFN package

■ When technical equipment fails, more often than not finding the root cause of the problem consumes significantly more time than actually fixing it. In highly sophisticated factory automation environments where capital intensive equipment is in operation, or where time-coupled chemical processes are at work, line-downs can have substantial implications on the commercial viability of the enterprise. Therefore, the days of machinery providing no diagnostic feedback are becoming obsolete. Solutions that can provide intelligent diagnostic feedback as the system is beginning to fail (preventive maintenance), or when a hard failure has occurred (repair), are key to reducing expensive unscheduled down-times.

The ISO2H823V is an 8-channel high-side driver IC that features integrated 2.5kVrms galvanic isolation, which exceeds the IEC 61131-2 requirements for reinforced isolation. Concurrently, it sets a new standard for system-level diagnostics. Each of the 8 channels is equipped with five-fold diagnostic monitoring capabilities: open load active, open load inactive, short-to-V_{bb}, overcurrent and overtemperature. Additionally five types of diagnostic feedback on the IC-level are provided. This is all integrated into a small 12 x 12 mm VQFN package. In the industrial control system, thanks to the integrated galvanic isolation, the device is positioned between the 3.3V microcontroller

domain (control side) and the 24V factory floor domain (process side). The most frequent failure mechanisms on the application level include overload of the driver outputs or actually having no load (open load) connected to the driver outputs. Another severe deficiency is lack of or insufficient supply of the 24V_{bb} on the factory side of the system. The ISO2H823V can detect either of these problems and many more. This capability is highly valuable for OEMs to prompt preventive maintenance, and in case of malfunctions to drastically reduce the time required for repair. The great benefit for the system designer rests on the fact that many powerful diagnostic capabilities are available in the single IC. This eliminates the need to develop complex and potentially cumbersome circuit layouts based on multiple discrete components, to be able to perform diagnostic monitoring. In consequence, system design efforts, risks and time are reduced substantially, PCB area can be kept small, and the reliability of the solution is not compromised. As already mentioned there are five types of diagnostics for each individual channel.

Overload [OCL]: Wear-out of machinery may lead to an output overload. In its extreme form there is actually a short circuit to GND caused by erroneous wiring, or a short circuit during operation, or a natural disaster which leaves the equipment flooded, i.e. it is literally

under water. The device can detect such cases. When a channel switch is on, that channel output current is monitored. If the output current exceeds the threshold to activate the current limitation, typically set at 1A, then overcurrent limitation (OCL) is flagged to the microcontroller. Unlike other products, the ISO2H823V provides not only overcurrent feedback, but it also informs the system controller which channel is subjected to the overcurrent. This information can be instrumental in identifying the root cause, which is critical to getting the system back on line within the shortest time possible.

Open load [OLA]: Mechanical strain, e.g. vibration or excessive bend stress of a cable, as well as corrosion can lead to the wiring between the IC switching output and the load becoming high-ohmic or even disconnected (wire-break). The power management device can detect such circumstances. The IC performs output current monitoring, and not only for the purpose of limiting the maximum output current. The same capability is used to detect no-load situations. An open load active (OLA) feedback is provided if an output is turned on and the output current of an individual channel is less than 0.5mA to 3mA. The system hardware design has the freedom to set the triggering threshold level within this range. No other driver product designed for the industrial con-

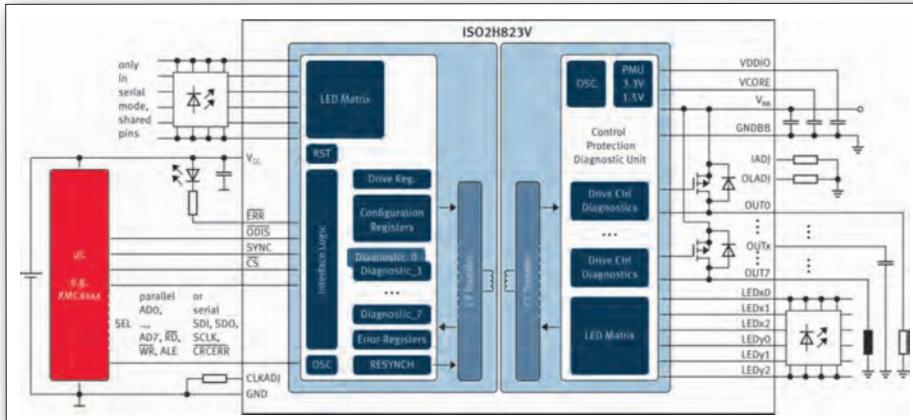


Figure 2. Many integrated diagnostic capabilities are available in the single IC. This eliminates the need to develop complex and space consuming circuit layouts based on multiple discrete components

trol market provides integrated open-load detection that is specific to any of the individual channels. As with the overload detection, this greatly helps OEMs to reduce the time to identify the root cause of such a failure.

Open load when driver is still off [OLI]: Even before the switch is turned on, an open load (wire-break) can be detected. This is possible because in addition to monitoring the output current, the voltage at the output of the IC is also being monitored. In case of the output being in off-state a small trickle current of $25\mu\text{A}$ is passed through the load. For loads with an ohmic resistance of less than 12kohm , if the output is disconnected from the load, the output will float at a voltage higher than 2V which in turn triggers the OLI diagnostic feedback.

Short to V_{bb} while the output is off [SCV]: The switch output could erroneously be connected to V_{bb} . Root causes may include wiring error, a short circuit during operation, or a

natural disaster which leaves the equipment flooded. This condition can also be detected by the IC.

Overtemperature at an output [OTA]: Excessive heavy duty operation of outputs may be an indication of gradual degradation of the machinery on the factory floor. For this reason each of the output channels is equipped with an individual temperature sensor. When the output driver temperature reaches 150°C the respective output channel is automatically turned off to avoid material damage to the IC.

Five types of diagnostics are available on the IC level.

V_{bb} monitoring [UV, MV, W4P]: Of all of the IC-level diagnostics, V_{bb}-monitoring is probably the most important one. V_{bb}-monitoring checks the voltage level on the driver output side. The possible reasons for this voltage failing and falling below the normal operation

level could be that the power supply is not adequately designed for the loads, or the power supply is simply beginning to fail. It is also conceivable that the electrical connection between the power supply and the switching IC is gradually increasing its ohmic resistance, i.e. corrosion may be at work. In a large number of applications the nominal supply voltage (V_{bb}) on the factory side is $24\text{V} +/- 20\%$. However, if that voltage drops to a level as low as 9V , the outputs are turned off while it is still possible to do so. This is not done without a pre-warning. As a matter of fact, there are two intermittent stages: if the supply voltage drops below 16V then an under-voltage warning [UV] is issued. At that voltage the performance level of outputs of the IC is not yet compromised. The UV feedback provides a pre-warning. If the supply voltage drops further, i.e. to a level of 13V and below, then a missing voltage warning [MV] is sent. At this supply voltage level, the IC outputs are still working. However one may be well advised to perform a controlled system shut-down while it is still possible. Only if the supply voltage drops to 9V or less are all outputs automatically turned off and a wait-for-power [W4P] feedback triggered. In this case the supply voltage has dropped to a level too low for proper operation.

There are four additional IC-level feedbacks available.

Overtemperature on IC-level [OTP]: In addition to the temperature monitoring of each of the eight output channels, the IC has a ninth temperature sensor. This additional sensor provides overttemperature protection on IC-level. The threshold is set to 125°C in order to remain below the glazing temperature of standard FR4 PCB materials. When this threshold is exceeded all outputs are automatically shut off (OTP).

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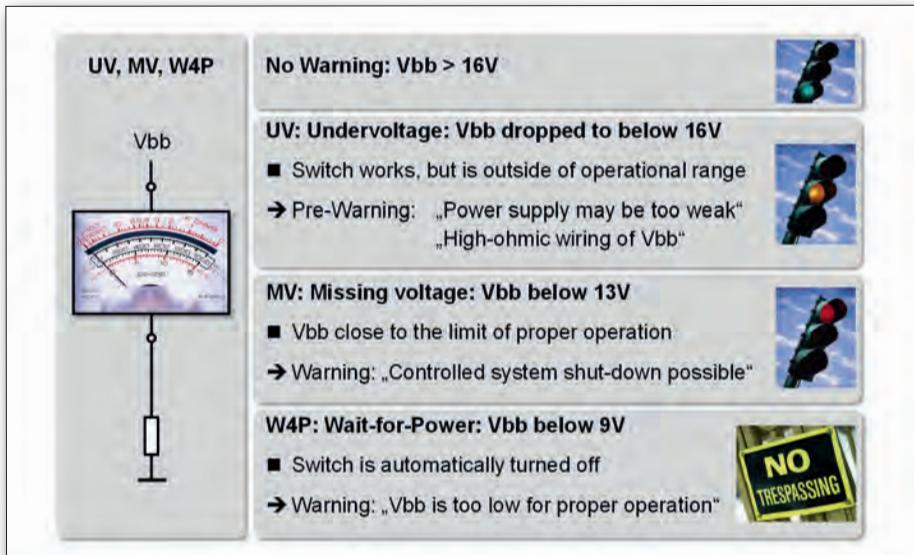


Figure 3. V_{bb} -monitoring checks the voltage level on the driver's output side

Incandescent lamp [LAMP]: While the ISO2H823V delivers compelling benefits over previous generation solutions, it must also be able to retrofit with factory automation systems which are not yet at the end of their operational life. The detection of the presence of an incandescent lamp

(used for signaling purposes on the factory floor) is a requirement for many such legacy systems. The LAMP feedback permits the system controller to distinguish between the turning-on of a cold incandescent bulb and short circuits. Integrity of the communication across the integrated galvanic

isolation [TE]: To attain uncompromised robustness against electro-magnetic interference, communication across the integrated galvanic isolation is safeguarded by multiple proprietary measures. In the unlikely event of disturbance of that communication its occurrence would be flagged to the microcontroller by way of setting the transmit error (TE) flag. If this error were to occur repetitively then it would indicate a substantial problem present on PCB-level.

Being sure all outputs are in fact off [ALLOFF]: To verify system status, but also for safety reasons, it can be of importance to be sure that all outputs are in fact off. The IC provides such explicit ALLOFF feedback when all outputs are indeed off.

With this list of ten different types of diagnostic feedbacks, the ISO2H823V clearly sets a new standard in diagnostics for industrial control applications. The channel-specific diagnostic as well as the types of channel-specific diagnostic feedbacks can be enabled and disabled on a channel-by-channel basis. This grants the user the maximum of flexibility and allows the selective use of these features to meet application-specific requirements. ■

Product News

Christ-Elektronik: easy integration of touch applications

Christ-Elektronik announces the new innovative and easy to use Embedded System Kit Touch-it CE Pico-ITX. While you are reading this sentence, the Embedded System Kit Touch-it CE Pico-ITX has already been taken into operation and booted. The basis is formed with Pico-ITX carrierboard & Toradex Colibri Tegra Module with its ARM architecture in conjunction with the resource saving and efficient operating system Windows Embedded Compact 7 Pro.

[News ID 1333](#)

FTDI: 48MIPS MCU for control system implementations

FTDI Chip releases the FT51, the second of its application oriented controller devices. Possessing a comprehensive feature set, a vast array of I/Os and extensive data conversion capabilities, this 8-bit microcontroller unit incorporates one of the highest performance 8051 compatible processor cores on the market. Operating at a 48MHz clock speed, it has a 48MIPS processing capacity (1clock cycle per instruction).

[News ID 1278](#)

Freescale: newest PF Series PMIC is optimised for i.MX 6 systems

Optimised to work seamlessly in systems based on Freescale's i.MX 6Solo, i.MX 6SoloLite and i.MX 6DualLite applications processors, the exceptional configurability and quick-turn programmability of the MMPF0200 makes it ideal for a host of power-sensitive platforms including portable medical devices, IP headphones, home security systems, IPTV controllers, tablets and home energy management solutions.

[News ID 1273](#)

Atlantik: ConnectCore for i.MX6 SoM from Digi

Atlantik Elektronik presents Digi's new SMT solderable ConnectCore Wi-i.MX6 processor module, a blend between a classic SoM module and discrete i.MX6 microprocessor design (with optional Wi-Fi / Bluetooth 4.0 functionality on the module). The ConnectCore Wi-i.MX6 is an ultra-compact and highly integrated system-on-module solution in a 50 x 5 x 50mm LGA (BGA) package with 2mm pitch distance based on the Freescale i.MX6 Cortex-A9 processor family.

[News ID 1298](#)

Digi expands distribution agreement globally with Arrow

Digi International and Arrow Electronics have announced they have signed a global distribution agreement expanding their existing successful North American distribution alliance. Arrow will offer leading Digi embedded products and Device Cloud by Etherios, which allows any device to communicate with any application anywhere in the world. Previously available to Arrow customers in North America, these solutions now are available globally.

[News ID 1340](#)

Sierra Wireless and Tech Mahindra sign global sales agreement on M2M solutions

Sierra Wireless and Tech Mahindra have signed a formal teaming agreement to work collaboratively to develop and deploy end-to-end M2M solutions for customers worldwide. The collaboration leverages Sierra Wireless device-to-cloud offerings and Tech Mahindra's system integration and application development expertise to offer cost-effective, turnkey solutions tailored for prospective M2M customers in markets such as energy, transportation, industrial, and healthcare.

[News ID 1284](#)

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■ New reference designs for industrial sensing solutions

In this talk Sean Long, Director Marketing & Applications with Maxim Integrated , introduces the new reference designs Novato, a 4-20mA temperature sensor with HART capability, and Santa Cruz, the world's smallest I/O link ambient light sensor. Maxim Integrated offers a range of Industrial sub-system reference designs intended to provide design engineers with proven circuits for easy prototyping and faster time-to-market. This includes designs for analog I/O, digital I/O, power management, as well as sensor interfacing.

■ How to simplify your next Internet-of-Things system design

Daniel Cooley, senior marketing director for microcontrollers and wireless products at Silicon Labs, explores how embedded developers can simplify their Internet of Things (IoT) connected device designs by leveraging Silicon Labs' Simplicity Studio™ development ecosystem. This presentation provides an overview of Silicon Labs' ultra-low-energy MCU options for the IoT and explains how Simplicity Studio tools make the development process easier and faster.

■ Motor Control: Improved speed, precision and simplicity with Kinetis V series MCUs

With the new Kinetis V series microcontrollers, motor control no longer needs to be inefficient, noisy or difficult. Built on the latest ARM® Cortex®-M0+ and Cortex-M4 cores, the Kinetis V series consists of multiple MCU families with scalable performance, memory and feature integration to address everything from entry level BLDC motors to advanced PMSM and ACIM motors. Register for this live webinar to learn about its high performance cores, analog and timing peripherals and best-in-class enablement including reference designs, software libraries and motor configuration tools.

■ Rugged industrial computers and Ethernet-enabled products for smart energy solutions

Smart energy is the use of computers, electronics and advanced materials to optimize electric power and revolutionize transportation. As explained in this webinar by Roger Shyu, Project Manager of IPC & Embedded System, Axiomtek brings various rugged industrial computers and Ethernet-enabled products to fulfill different requirements in energy automation. Axiomtek's rBOX series of DIN-rail fanless embedded systems and IPC122 which is approved by electric power substation automation certificate features convenient installation and maintenance for communication control in power plant management, electricity distribution and control system.

■ Unprecedented performance gains for network appliances with the Intel Atom C2000 family

Benchmark testing from Lanner Electronics has shown that the new Intel Atom processor C2000 delivers significant performance advantages and lower cost of ownership for entry to mid-range communications appliances. This white paper introduces a series of communications appliances based on the Intel Atom processor C2000 product family which unifies computing, networking, management, virtualization, and security capabilities in an integrated hardware architecture.

■ Nine trends for industrial control and automation

There are many existing and developing trends in industrial control and automation applications that OEMs and manufacturers alike need to be concerned with. Nine of these trends are: efficiency, sustainability, connectivity, security, usability, safety, integration, scalability, and reliability.

This webinar will dive into these trends in detail and then discuss how AMD Embedded-Based Solutions can help address each of these trends.

■ Plug-in upgrades with refreshed Intel Xeon processor E5-2600 v2

The latest Intel Xeon processor E5-2600 v2 family delivers significant performance enhancements including additional processor cores within the existing power budget (TDP) and are plug-in replacements for the previous generation. The result is a performance upgrade that requires little investment beyond requalification of the system for specific applications. In this article we are going to explore opportunities to upgrade your solutions to take advantage of the Intel Xeon processor E5-2600 v2 family without major development costs. Implementation examples are used from Associate members of the Intel Intelligent Systems Alliance DFI, Emerson and Hewlett-Packard.

■ Enabling a new generation of entry level network appliances

Network appliances are key systems for small and medium sized enterprises. The Intel Atom processor C2000 product family (formerly code named Rangeley) are enabling a new generation of entry level network appliances that deliver significantly higher performance using fewer components. The solution integrates several features that have previously only been available in systems using multicore Intel Xeon processors. This article explores the benefits that the Intel Atom processor C2000 product family brings to network appliances and other communications systems and uses implementation examples from Advantech and Portwell.

■ Real-time Ethernet, multi-protocol switch for PROFINET IRT

Innovasic introduced a Real-time Ethernet, Multi-protocol (REM) Switch for PROFINET IRT that can be embedded directly into industrial field device or controller applications. Tom Weingartner, Innovasic's Vice President of Marketing, discusses the various features of the REM switch including support of multiple protocols and Ethernet topologies. He also provides a brief overview of REM's hardware and software support and explains the demonstration of PROFINET IRT.

New perspectives in out-of-band manageability

By Peter Hoser, Fujitsu Technology Solutions

Out-of-band (OOB) manageability is a particularly important requirement in embedded computing, and in developing embedded mainboards Fujitsu Technology Solutions have placed great emphasis on this. Their new technology partnership with American Megatrends (AMI) creates even more comprehensive OOB management options.



Figure 1. The main benefit for users is the convenience enabled by AMI single-pane-of-glass philosophy which means that MegaRAC XMS provides a centralised dashboard for remote analysis and configuration of systems.

■ Kiosks and digital signage systems are two obvious examples of unstaffed embedded applications for which remote OOB management is a must. Whenever the operating system crashes, or switches off due to, say, a power cut, it should be possible to analyse, reconfigure and restart the system from elsewhere, independent of whether the OS is working or not. As a manufacturer of industrial-grade system boards designed for continuous 24/7 operation in challenging environments such as hot or cold outdoor locations, Fujitsu Technology Solutions have made a point of supporting all relevant system management protocols. This enables users to integrate devices based on its main boards into the OOB management system of their choice.

As there is no single industry-standard system maintenance software that caters to all the specific needs of embedded systems, designers and administrators so far have had to make project-based decisions about which tools to use. Both AMD and Intel processors offer the possibility of out-of-band manageability, but finding a comprehensive software solution for addressing the relevant interfaces in day-to-day practical operation is not easy.

While both of these major manufacturers use the wide-spread DASH protocol, Intel vPro platform also offers the proprietary

iAMT (Active Management Technology). DASH, an acronym for desktop and mobile architecture for system hardware, is a client management standard developed by the Distributed Management Task Force (DMTF), founded in 1992 by industry-leading IT hardware companies. Designed for web-based remote management, DASH is in its turn based on DMTF Web Services for Management (WS-Management). The fact that WS-Management was recently adopted as an international standard by the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC) in February 2013, underlines the important place DASH occupies in the market. However, when it came to setting up DASH-based software architecture for everyday system maintenance, users have been pretty much left to their own devices up until now.

Striving to give customers the most comprehensive support with design-in and maintenance of their mainboards, Fujitsu has been searching for an OOB manageability solution specially suited to embedded computing needs on all relevant platforms. This has now resulted in a technology partnership with American Megatrends, Inc. (AMI), a global leader in BIOS, remote management and network storage technology. Fujitsu have decided to recommend the AMI MegaRAC XMS manage-

ability solution for both their desktop and industrial mainboards. A full-functional version of MegaRAC XMS which supports a limited number of up to 3 nodes is already included on the drivers and utilities DVD which comes with each board.

The main benefit for users is the convenience enabled by the single-pane-of-glass philosophy of AMI which means that MegaRAC XMS provides a centralised dashboard for remote analysis and configuration of systems. An essential prerequisite for this is that MegaRAC XMS is platform-independent. It enables out-of-band management via DASH as well as iAMT. Apart from these protocols, structures such as asset management and host provisioning also feed into the MegaRAC XMS software. This also means that repetitive tasks that need to be performed on a large number of machines can be automated, thus freeing up the administrator time for other tasks.

Due to the fact that MegaRAC XMS was originally developed with a view to administering servers in corporation-wide networks, the software offers a variety of functionalities which go beyond out-of-band manageability in a narrow sense. These include monitoring of system health (with alert functions), remote control with cross-views of sensors and variables, and remote installation of software and

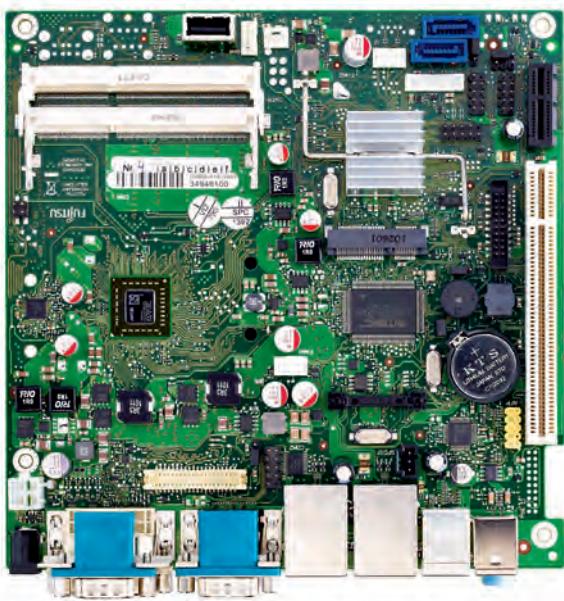


Figure 2. D3003-S mini-ITX mainboard series, monitored through the SX server management plug-in of MegaRAC XMS via DASH, was used in the industrial PC which AMI presented at Embedded World 2013.

patches. Another advantage of this software is its modularity. While the Server Management tool (SX) is used to control servers and embedded systems, MegaRAC XMS can be extended to include plug-ins for virtual machine management (VX), power management (PX), client management (CX), and in-band management (HX). Thus, the tools not only open up a single pane of glass on all remote embedded systems, but allow companies to administer different sorts of devices – kiosks, digital signs, but also servers and workstations – with one and the same technology. This allows more efficient workflows and opens up potential for saving license costs. Partnering with AMI, the aim of Fujitsu is able to offer their customers

an additional support and benefit for working with their mainboards. At Embedded World 2013, AMI presented, among other solutions, an example of an industrial PC based on Fujitsu D3003-S mini-ITX mainboard series monitored through the SX server management plug-in of MegaRAC XMS via DASH.

Fujitsu chooses an AMD Embedded G-Series chipset for these mini-ITX boards largely due to their DASH capability while the Atom platform offered by Intel for the same price segment does not support out-of-band management. By choosing AMD Embedded G-Series, Fujitsu managed to combine a good cost-performance ratio with the required out-of-band

manageability. Another reason for the D3003-S series being the first to be streamlined for use within the MegaRAC XMS architecture is that they are also available as a complete kit solution consisting of a mainboard, Mini-ITX housing, and a wide range of accessories. The fact that the kit solution now also encompasses system management software further extends the service philosophy.

Additionally, MegaRAC XMS is available for a variety of other mainboards. Based on various Intel chipsets, the D3076-S (iQ67), D3161-B (iQ77), D3128-B (iC602), and D322x-B (iQ87) boards are capable of both DASH and iAMT/vPro, as are the D323x-S industrial mainboards Fujitsu is currently developing. In all of these cases, users profit from the long experience of the company with both protocols as they have been supporting iAMT/vPro in their business PCs for nine generations now. This detailed experience makes a difference, because the fact that a manufacturer offers mainboards with iAMT/vPro does not necessarily guarantee they will work immediately. Users of embedded mainboards also profit from the design-in experience gained through this process. Likewise, AMI MegaRAC XMS is a software suited to both desktop and industrial applications.

While the MegaRAC XMS now offers a convenient tool for out-of-band management, Fujitsu are planning to offer their own manageability software DeskView for administering systems during operation of the OS. In addition to this, the company has developed a wide range of system management features of their own that already come with their mainboards. To take an example, several special features guarantee the safe operation of the D3003-S1, D3003-S2, and D3003-S3 mini-ITX boards.



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Figure 3. One reason for the D3003-S series being the first to be streamlined for use within the MegaRAC XMS architecture is that they are also available as a complete kit solution consisting of a mainboard, Mini-ITX housing, and a wide range of accessories.

Based on AMD Embedded G-Series platform technology, these models are used for highest reliability in challenging applications, including those in an extended temperature range, in the fields of kiosk, POS, and digital signage applications as well as automation, video surveillance and medical engineering. The own management features include the Watchdog. It controls both the operating system and boot process and performs a restart or shutdown in case of problems. The System Management Controller monitors and adjusts temperature levels and cooling fans independent of operating system or CPU. The System Guard software tool helps with visualising and setting the parameters for the System Management Controller. In addition, future mainboard generations will be designed from the outset for the best possible integration into the MegaRAC XMS environment. ■

Product News

■ congatec: Yocto for Qseven module with Freescale i.MX6

congatec is using the new Yocto project BSP for more stability for a large variety of customer requirements. The Yocto project was launched at the end of 2010 by merging the CE Linux Forum with the Linux Foundation. Yocto project supports ARM, Intel, MIPS and power architecture platforms on the hardware side. Many drafts, templates, tools and methods that may be used with the Linux based system are available for the developer, regardless of the hardware architecture.

[News ID 1231](#)

■ Axiomtek: IPSS compliant OPS digital signage player with 4th gen Intel Core processor

Axiomtek introduce the OPS885, an Intelligent Pluggable Systems Specification (IPSS) compliant OPS digital signage player. The OPS885 adopts the 4th Generation Intel Core i5 processor with the Mobile Intel QM87 Express chipset and provides superb graphics performance with 4K resolution.

[News ID 1291](#)

■ Diamond: rugged PCI/104-Express SBCs with interchangeable QSeven COM

Diamond Systems unveiled Quantum, a conduction-cooled PCI/104-Express SBC (single board computer) family with interchangeable, full size QSeven COMs processors and a highly integrated I/O baseboard. The processors available on the new Quantum SBCs include the 1 GHz AMD Fusion G-T40E CPU, the 1 GHz AMD G-Series eKabini GX-210HA SOC and ARM A9 i.MX6 single/dual/quad cores up to 1.2 GHz.

[News ID 1246](#)

■ VadaTech: licensing agreement on Micro-TCA.4 product with DESY

VadaTech has entered into a licensing agreement with DESY to manufacture MicroTCA.4 product. DESY is a research center of the Helmholtz Association, providing research and product solutions for the Photon Science, Accelerator and High Energy Physics communities. DESY has developed Digital Signal Processing Modules, RTM digital and analog converters, Piezo drivers, and RF Digitizers in the MicroTCA.4 format.

[News ID 1210](#)

■ DAVE: SOM based on Xilinx Zynq All Programmable SoCs

Smart Embedded Systems, a business unit of Abisys, announced the availability of BORA System-On-Module with Xilinx Zynq XC7Z010/XC7Z020. BORA is designed and manufactured by DAVE Embedded Systems of Italy. BORA is the high-end ARM dual-core Cortex-A9+ FPGA CPU based module by DAVE, designed with the recent Xilinx Zynq XC7Z010/XC7Z020 application processor.

[News ID 1326](#)

■ VIA: Pico-ITX board with choice of Android and Linux software development packages

VIA Technologies unveiled its new VIA VAB-1000 Pico-ITX board at Embedded World 2014. Powered by a 1.0GHz dual core VIA Elite E1000 Cortex-A9 SoC, the VIA VAB-1000 features a high-performance graphics and video engine optimized to deliver richer multimedia capabilities and a more immersive user experience in a wide variety of interactive kiosk, digital signage and HMI applications. To enable developers to leverage the capabilities

of Android for embedded applications, VIA provides a SMART ETK (Embedded Tool Kit) and a full set of software customization services that speeds up time to market and minimizes development costs.

[News ID 1211](#)

■ Schroff: specified power supply unit for CompactPCI Serial

The PICMG has defined the power supply arrangements for CompactPCI Serial as 12 V main voltage plus 5 V standby voltage. After collaborating with the principal board manufacturers, system customers and PSU manufacturers, Pentair has now created a 'quasi' standard for pluggable Schroff CompactPCI Serial PSUs and developed a first AC PSU with a wide input voltage range.

[News ID 1328](#)

■ AAEON: 1U rackmount network appliance with up to eight LANs

AAEON announces the FWS-7810 and FWS-7400 1U network appliances featuring support of 4th generation Intel Core processors at varying clock speeds in dual & quad core designs. Cooled by two rear mounted fans, the FWS-7400 comes configured with six Gigabit Ethernet ports with an option for two pairs LAN bypass. With three rear mounted fans, the FWS-7810 is equipped with eight Gigabit Ethernet ports. For greater flexibility, the FWS-7400 features one Network Interface Module (NIM) expansion slot to support additional GbE or Fiber Optical connections and up to 16GB of DDR3 1600 MHz of system memory is supported. The FWS-7810 can support up to 32GB of DDR3 1600 MHz of system memory and PCIe expansion slots.

[News ID 1271](#)

■ MEN: rugged COM Express with Intel Core i7

Rugged COM Express or VITA 59 is a new standard which is based on the proven PICMG COM Express standard. Due to mechanical modifications, the modules are now also able to meet the high requirements of critical markets regarding temperature, shock and vibration, EMC compatibility and resistance against dust and humidity. The Intel Core i7 processor family with a core frequency of up to 2.1 GHz and a Turbo Boost frequency of 3.1 GHz makes it possible to choose between 1, 2 or 4 processor cores. As many as 16 GB DDR3 DRAM are soldered to the board. In addition, Intel AMT, Open CL 1.1 and high-end graphics are supported. The adaptable BIOS with integrated Intel AMT support can be flexibly adapted to the final application without additional costs. The Board Management Controller supervises the board functions and temperatures.

[News ID 1302](#)

■ DFI: ATX motherboard supports multiple PCIe configurations

DFI announces the DL631-C226 ATX industrial motherboard based on 4th Gen Intel Xeon processors. It is DFI's first ATX board that supports the workstation Intel C226 express chipset for high computing applications. This ATX model comes with LGA 1150 socket for the Intel Xeon processor E3-1200 v3 series built on 22-nanometer process technology. These processors offer higher computing performance, they are more cost-effective, and they provide more energy-efficient power consumption.

[News ID 1318](#)

■ ADLINK reaches Intel Intelligent Systems Alliance Premier Level

ADLINK Technology announces its promotion by Intel to Premier Member in the Intel Intelligent Systems Alliance. The Intel Intelligent Systems Alliance is composed of companies that provide the hardware, software and firmware that make up today's advanced embedded technology solutions. As part of the Alliance, companies integrate existing toolkits with Intel's own software, as well as create new tools, and offer systems integration and other services that help their customers to create more value in their vertical industries.

[News ID 1339](#)

■ Kontron extends COM Express portfolio with E3800 and N2900/J1900 variants

Kontron launched two new COM Express compact Computer-on-Module families with Intel Atom E3800 series processors and Intel Celeron N2900 / J1900 series processors. The new modules extend the existing Intel SoC-based COM Express portfolio to embrace especially powerful compact variants with full type 6 I/O support including PCI Express, LAN, USB and Digital Display interfaces. In

total, Kontron now offers 16 different configuration options in this COM Express Computer-on-Module performance class.

[News ID 1281](#)

■ Lantiq and Würth: demo kit for "High Speed Connection to the World"

Lantiq and Würth Elektronik announce the availability of a jointly developed demonstration kit to provide an easy and fast way for implementing Ethernet in a broad range of products. The Evaluation Kit paves the way to easily add Ethernet hardware to an application or device and provides all necessary information to understand the demands of an Ethernet hardware design.

[News ID 1299](#)

■ Apacer: cloud-based SSD overcomes bottleneck of big data access

Apacer has launched a high-end cloud-based SSD - SFD (SATA Flash Drive) 25A, which surpasses SATA 2.0 interface SSD of enterprise server. With adoption of SATA 3.0 transmission interface, SFD 25A achieves double transmission capacity and large storage capacities up to 256 GB. SFD 25A is suitable for On-Line storage in cloud storage center to save the cost of server space so as to optimize its operating conditions featuring in high-speed, stability and power savings.

[News ID 1335](#)

■ Rutronik presents new COM form factor efus by F&S

The new form factor for Cortex-A CPUs by F&S Elektronik Systeme, efus, measures only 47 x 62mm. efus stands for easy, functional, universal, small: It comes with various interfaces, is expandable with wireless modules and suitable for universal use, e.g. for visualization, communication, control in industrial and medical applications. The first module of this new product family, efusA9, is available for development at distributor Rutronik by April 2014, mass production starts by the end of quarter 2/14. Further modules will follow within 2014. The efus product family, uses a common 230 pin MXM2 edge connector. The signals on the base board leading to the plug connector were routed by EasyLayout standard, the concept of no crossing lines or avoidable through holes.

[News ID 1330](#)

■ Acrosster: video demonstration of book-sized fanless Mini PC

To illustrate the high performance of AES-HM76Z1FL, Acrosster created a short film, explicating the multiple features of their ultra thin embedded system. From its exterior look, this book-sized mini PC embodies great computing performance within its small form factor. The arrangement of the I/O slot has taken product design and industrial applicability into consideration perfectly.

[News ID 1283](#)

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Rugged computer offers stunning graphics for on-board applications

By Kevin Hsu, Sintrones

Sintrones VBOX-3200 is a versatile on-board computer system for high-performance digital signage, infotainment, mobile communication and navigation applications in commercial and municipal vehicles.

This article explains why Sintrones selected the AMD G-Series APU, combining CPU and discrete level GPU in a single accelerated processing unit.



Figure 1. Optimized in-vehicle solution for digital signage, infotainment, mobile communication and navigation applications is based on the AMD G-Series APU.

In-vehicle computer technology is one of the fastest growing domains in embedded design today, spanning a diverse range of applications including digital signage, infotainment, mobile communication and navigation for commercial and municipal vehicles from buses to taxis, police cars, and railways, off-road applications and beyond. Whether the goal is to inform tourists about local attractions via seat-back video monitors, provide Internet access to passengers, track and coordinate the locations of maintenance or mass transit vehicles, or even remotely inspect municipal infrastructure with vehicle-mounted cameras, GPS-assisted in-vehicle computing systems can provide users with helpful, targeted information that optimizes travel experiences and/or transportation operations in real time.

Designing and implementing ruggedized computing systems for space-constrained in-vehicle installations can pose many challenges for system designers, especially if they want to integrate higher performance on an even smaller footprint. High-performance video and graphics capabilities can be especially difficult to achieve if trying to accommodate graphics cards or ad hoc disparate chipsets. These are generally ill-suited for in-vehicle installations, because their edge connectors take up more space and expose it to additional shock and vibration that can lead to system integrity issues.

In-vehicle computers also need to be especially sensitive to power consumption constraints. Low power draw is important if a computer is to be powered by, for example, a taxi vehicle battery. Thus, even if high performance is required, there is a certain limit of thermal design power (TDP) that cannot be exceeded.

The same applies to system cooling. Fan-cooled systems are vulnerable to airborne particulates and debris, as well as to shock, vibration and a wide temperature-range – all of which are common environmental factors for vehicle-based systems. The consequence is that for highest performance requirements fanless cooling technologies need to be implemented. To meet the steadily increasing design goals of improving performance for in-vehicle computing, OEMs require a tightly integrated, high performance processing platform with ultra-compact form factor that conserves system space and helps reduce susceptibility to shock and vibration as well as high and low temperatures.

A milestone in this area has been reached with the AMD Embedded G-Series APUs. APUs combine a low-power CPU and a discrete-level GPU into a single accelerated processing unit. Compact high-performance architectures like these reduce the footprint of a traditional three-chip platform to just two chips – the

APU and the companion controller hub. One benefit of APUs is that they can offload data parallel processing from the CPU to the HD-caliber GPU, including multimedia streaming. Freed from this task, the CPU can focus on compute, memory, and I/O requests with much lower latency, thereby improving real-time video and graphics processing performance via a fully optimized data path and shared access to the memory controller. The CPU takes care of the scalar processing, including memory, networking, and storage processing, and also runs the operating system, applications and user interface. The on-die GPU offloads graphics and multimedia processing using Single Instruction, Multiple Data (SIMD) parallel processing, driving high-definition video and graphics displays with great efficiency.

The integration of AMD Radeon HD graphics on the AMD G-Series APUs provides an additional hardware acceleration boost that optimizes the video pipeline, ensuring smooth video playback. These APUs support dual independent displays leveraging a combination of display technologies including DisplayPort, DVI, VGA, and HDMI. All this is combined on a single chip design which results in a lower TPD to performance ratio compared to multi chip implementations. The supported TDP profiles start at 4.5 watts and extend to 18 watts – with average power as low as 2.3

watts for the AMD G-T16R APU – enabling these APUs to allow OEMs to keep board-level total power consumption to less than 20 watts. Such low power profiles help to ensure that in-vehicle-solutions with APUs can be passively cooled.

Having such a highly integrated x86 processor capable of fulfilling all the required needs for in-vehicle computing is a good thing, but it is only one part of the solution. OEMs need system level solutions dedicated for on-board computing because they do not want to spend a lot of time handling processors and chips but just want to obtain a solution platform. The type of platform required is one that is designed in such a way that it can easily be inserted into tight spaces within vehicle cabins. It also needs to support a wide temperature range of -40°C to +70°C for thermally-demanding environments, as, in vehicles, the effects of sunshine or snowy weather can quickly lead to extreme temperature ranges.

In applications supporting independent dual displays that deliver, for example DVI+VGA and DVI-I+DVI-D, connectivity options with HD video and graphics for seat-back signage and infotainment installations are a great benefit. These dual-display systems can be utilized to present multiple layers of dynamic video content across in-vehicle displays in HD resolution. If touch-enabled interactive features are integrated, these systems can, for example, provide passengers with Internet access, to enable them to purchase movie or theater tickets, or to access interactive online tourism information. Systems equipped with onboard GPS transmitters can host location awareness applications. Public transport companies can market this technology to local businesses. Ad-

vertisements can be triggered to the display when the vehicles approach these companies' locations.

Sintronics is a company which has built a system embracing all these features. The result is the VBOX-3200, one of the most versatile on-board computer systems available today in this product category. It has been optimized for high-performance digital signage, infotainment, mobile communication and navigation applications for deployment in commercial and municipal vehicles. The system supports a wide temperature range of -40°C to approx. +70°C for thermally-demanding environments. The system has also received EN50155-, EN50121-3-2- and CENELEC certification and meets the Military Standard 810F and additionally comes with EN61373-certification. In other words it offers all the high shock- and vibration-resistance required for harshest environments and is even suitable for deployment in off-road vehicles. And by integrating the AMD APU into these systems, now for the first time both stunning dual independent graphics and housing in a small, very compact rugged box can be achieved.

Remarkably, the system design did not need to be specially tailored to serve as an ultra-rugged appliance. Designing a system for standard in-vehicles such as buses or cars would have run very much along the same lines. This makes it one of the first designs suited to all the different market segments at no extra cost for customers requiring ultra-rugged boxes in standard in-vehicle devices. The secret behind this multi-purpose design lies in the low power design of the APUs and the design expertise which results in the most efficient system TDP management. ■

Product News

■ Kontron: SMARC Computer-on-Modules with x86 processor

Kontron introduced its ultra low-power SMARC Computer-on-Modules with Intel Atom processor E3800 series. The SMARC-sXBtI Computer-on-Modules offer excellent graphics, high processor performance and x86 compatibility on the smallest SMARC footprint combined with very low power consumption (5 to 10 watts). Both the flat profile of the module and its mobile feature set are tailored for smallest portable handheld devices.

[News ID 1252](#)

■ ADL: Intel E3800 series PCIe/104 SBC

ADL Embedded Solutions announces its ADLE3800PC, PCIe/104 Single Board Computer. The ADLE3800PC is based on Intel's first SoC E3800 Atom product family which is built using

Intel's 22nm 3D Tri-gate process. It offers vastly superior compute performance and energy efficiency and has Intel's 7th generation graphics engine for stunning graphics performance. Improved power management capabilities result in standby power measured in milliwatts and standby time measured in days.

[News ID 1234](#)

■ Rutronik: Embedded platforms powered by 4th gen Intel Core U processors

The latest platforms from Advantech, based on the 4th generation Intel Core U processors, offer high graphics and low power. The Computer On Modules, Single Board Computers, Industrial Motherboards and Fanless Embedded Box PCs are available at distributor Rutronik as of now.

[News ID 1256](#)

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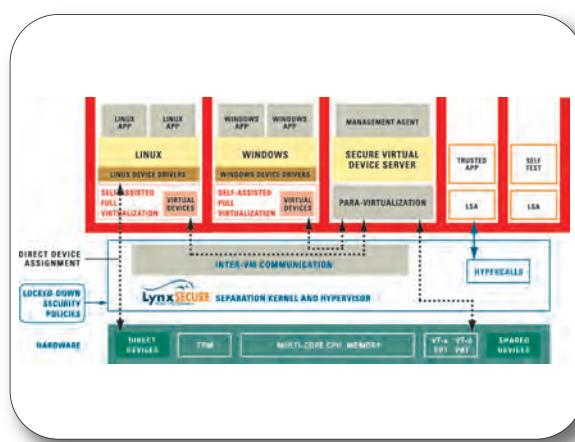
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LynxSecure Type Zero enables ongoing hypervisor evolution

By Will Keegan, LynxWorks

This article discusses the evolution of modern hypervisor architectures, from Type-2 to Type Zero, and describes the performance, reliability, and security benefits achieved through LynxSecure Type Zero architecture.



■ LynxSecure hypervisor sets a new stage in hypervisor evolution - Type Zero, offering the highest level of performance, reliability, and security capabilities in platform virtualization. Like other hypervisors, it provides the ability to host multiple operating systems on a single computing platform, including desktops, laptops, and servers. However, Type Zero differentiates itself from mainstream Type-1 and Type-2 hypervisors through its unique architecture and configuration tools.

Type-2 hypervisors are computer emulation applications that run on general purpose operating systems. A Type-2 hypervisor allows users to run multiple operating systems (OSs) simultaneously on a single platform. For example, a Windows 7 user can install a hypervisor application like VMware Workstation, to run a Windows XP guest OS on top of their Windows 7 host OS. As an application the Type-2 hypervisor is subject to performance, security, and reliability penalties.

The hosted hypervisor incurs performance hits because it competes with other user applications like web browsers and e-mail clients for system resources. Type 2 hypervisors are weak in reliability and security because they inherit the vulnerabilities of the user-controlled host operating system. Type 1 hypervisors are computer emulation software tightly integrated

with embedded OSs that run transparent to the end-user. Type-1 hypervisors gain a significant performance improvement over Type 2 hypervisors because they are self-hosted with embedded OSs that are optimized for virtualization. Type 1 hypervisors significantly reduce the attack-surface over Type-2 hypervisors by limiting access to the hypervisor to only system administrators, preventing end-users and user applications from tampering with the hypervisor.

Additionally Type-1 hypervisor vendors control all the software that comprises the hypervisor package including the virtualization functions and OS functions, like device drivers and I/O stacks. Control over the software package prevents malicious software from being introduced

into the hypervisor foundation. The limited access and strong control over the embedded OS greatly increase the reliability of Type-1 hypervisors.

LynxWorks introduces LynxSecure as a new class of hypervisor Type Zero, based on a new architecture that allows for higher levels of performance, reliability, and security over Type 1 hypervisors. The LynxSecure Type Zero hypervisor is built from the ground up with the minimum software components required to fully virtualize guest OSs and control information flow between guest OSs. The Type Zero architecture removes the need for an embedded host OS to support virtualization, allowing the hypervisor to run in an

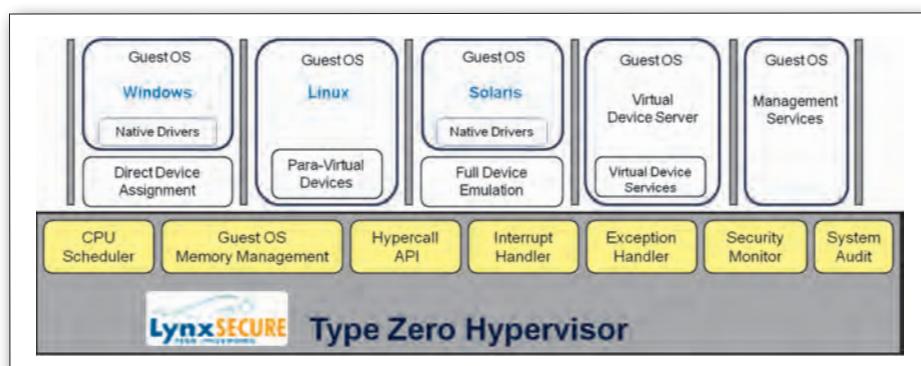


Figure 1. Type Zero hypervisor

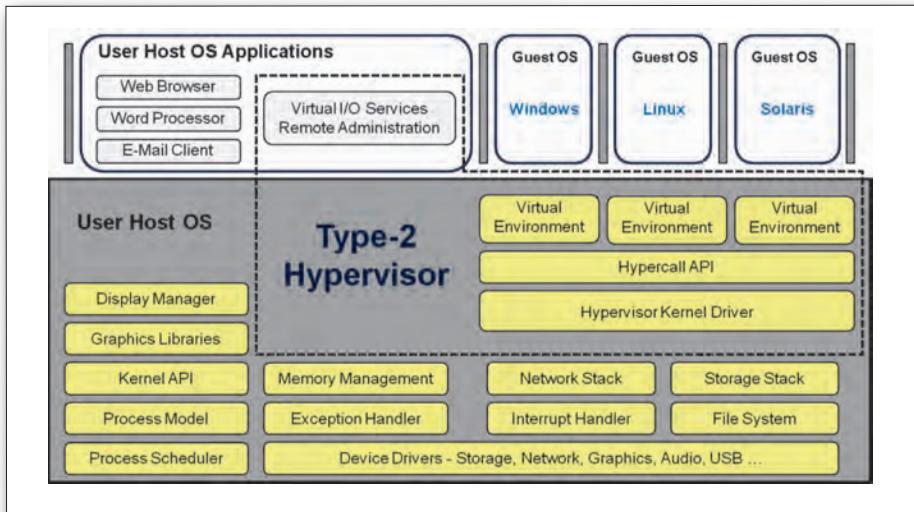


Figure 2. Type 2 hypervisor

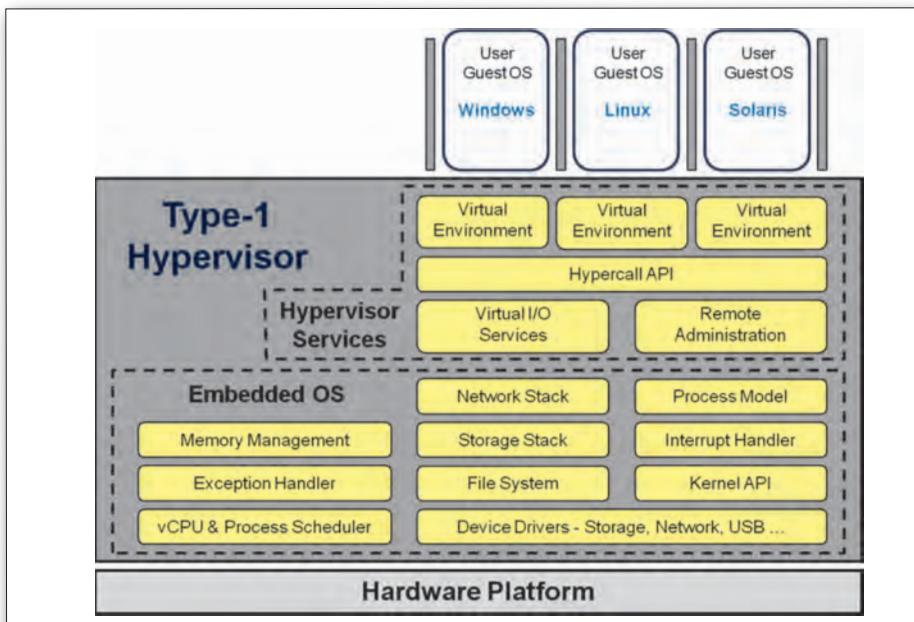


Figure 3. Type 1 hypervisor

Product News

Cadence: verification planning and management with Incisive vManager

Cadence Design Systems introduced an all-new Incisive vManager solution, a verification planning and management solution enabled by client/server technology to address the growing verification closure challenge driven by increasing design size and complexity. The Incisive vManager solution, with its metric-driven verification methodology, improves verification productivity by 2X or greater over traditional methods by combining executable verification plans, coverage optimization techniques, collaborative management utilities, deep failure and coverage analysis, and clear visibility to see when to shift resources.

[News ID 1218](#)

Enea's SoC platform consolidates ARM-based software systems

Enea is working with HP, ARM and Texas Instruments on a System-on-Chip platform for next generation mobile infrastructure and networking. Customers can now focus on their differentiating applications rather than solving interoperability problems related to the fragmentation and complexity of the underlying heterogeneous hardware. The SoC platform was developed with communication systems and Software Defined Networks in mind, providing excellent hard real-time and throughput characteristics on TI's KeyStone II-based device with components tested individually and integrated in one solution.

[News ID 1225](#)

un hosted environment. This drastically differs from Type 1 monolithic architectures where the hypervisor is integrated into a host OS, or Type-1 microkernel architectures where the hypervisor is controlled and assisted by a root or parent operating system. LynxSecure runs on a variety of computing platforms including servers, desktops, and laptops. It hosts guest OSs in both headless (no-display) and local display modes to suit the needs of several cloud environments and client end user environments.

LynxSecure offers increased levels of performance by scheduling the execution of guest OSs on CPU cores with an extremely light weight scheduler. It also gives guest OSs direct control over physical devices to achieve native I/O performance, and gives guest OSs the ability to intercommunicate over high speed point-to-point communication channels. LynxSecure is designed to meet the highest level of reliability requirements for aerospace, medical, military, and business applications. To achieve high reliability the hypervisor runs as a stateless executable with minimal dynamic functionality for a stable foundation, uses a real-time scheduler to precisely guarantee the availability of all guest OSs, and provides advanced built-in auditing and health monitoring capabilities to continuously monitor the operation of critical hardware and software components.

Type Zero provides greater security over Type-1 hypervisors by moving non-essential privileged components out of the hypervisor core, such as device drivers and I/O stacks, to reduce the system attack surface. Additionally, it enhances security with management and configuration tools that run outside the hypervisor to give administrators the ability to construct flexible security designs to explicitly control and monitor how the virtual guest OSs access data via virtual and physical devices. The last ten years have shown a trend in hypervisor design evolution where each stage of evolution shows progress towards shrinking and simplifying the core foundation of hypervisors to improve performance, reliability, and security.

The transition from Type 2 to Type-1 shows the hypervisor shift from running as an application on a general purpose OS to being tightly integrated with a minimized host OS. The transition from Type-1 to Type Zero shows the decoupling of the integrated hypervisor from the supporting host OS to running stand-alone. The LynxSecure Type Zero hypervisor distills the trusted portions of the hypervisor down to the fundamental elements, and provides the development tools necessary to build custom high-performance, safe and secure virtualization platforms. ■

E-paper displays suited for a multitude of applications

By Grahame Falconer, Densitron

Everyone is familiar with e-paper displays in Kindles and Kobo devices. However e-paper displays are suited for integration in many industrial, business and commercial applications. Densitron has the sole rights to market the e-paper range of displays in the UK from Pervasive Displays Incorporated(PDI), part of the Chi Lin Taiwan Display organisation.

■ These displays come in 1.44", 2.0", 2.7", 3.0", 4.41", 7.4" and 10.2" sizes. The technology was of course developed for eBooks but can be used in any application where power consumption is a major issue, as the displays only draw a small amount of power when they refresh and can retain content indefinitely without any power. They are also designed to be used in sunlight-readable conditions and with a very wide viewing angle. The display can therefore form the integral part of a solution for shelf labelling, digital signage, security and luggage tags, energy meters, conference room notice boards, hotel notice boards and museum information boards, to name just a few of the many and varied applications that Densitron and its partners are working on. PDI has partnered with E Ink, the industry leader in e-paper film, to produce so-named electrophoretic displays that are bistable in nature - they require no power to maintain an image on the screen. An electrophoretic display forms visible images by rearranging charged pigment particles using an applied electric field.

PDI assembles e-paper modules by adding the E Ink film on top of a Chilin active-matrix TFT backplane and then covering it with a protective sheet. This TFT backplane enables the E Ink film to be divided into pixels, and controlled to form a desired image. The panel is driven by chip on glass ICs and timing con-



Figure 1. Centro's timetable and real-time information system to provide this information on the display unit which consists of eight 10.2" E-Paper displays

trol software, which is stored and executed on a microcontroller on an attached printed circuit board (TCON). The timing control software is one of the most crucial parts of the system, creating complex waveforms to ensure good image quality. Good image quality is ensured by moving the charged particles to exact locations in order to display a white or black pixel. Temperature sensing is also employed on the TCON to negate the effects that temperature has on the viscosity of the fluid inside the microcapsules. When the fluid becomes more viscous at lower temperatures, the pigment chips move more slowly and this requires a different waveform to obtain the desired image. Many TCON options are available to provide USB, Serial, or wireless interfaces to e-paper modules, and also extension boards that provide interfaces to the most popular microcontroller development kits.

The eye catcher picture shows a bus timetable application developed by Densitron for IBI Group working on behalf of Centro (the West Midlands Passenger Transport Executive and Authority). Centro along with most transport providers/operators have a requirement to provide up-to-date and accurate timetable information on street. The system developed by IBI Group integrates with the Centro timetable and real-time information system to provide this information on the display unit, which

consists of eight 10.2" e-paper displays, all of which is done from a central control centre via GPRS communications. The system went live in June in the Oldbury area of the West Midlands.

Future plans for the system include integration of disruption and diversion information, road-work information, integration with other modes of transport, i.e. trains and light rail, and additionally the system could be used to get information to the general public quickly. For example if a child goes missing then a picture of the child can be distributed to the displays immediately asking for assistance from the public. Densitron building on its experience of low power timing control modules is also creating a family of products that connects the displays to the internet. The first of this new range of products will be a POE (power over ethernet) solution that allows any number of e-paper displays to be tiled to create a large digital sign. Current display sizes supported are 4.41", 7.4" and 10.2" which can be tiled to create a display to any size required with any number of displays incorporated. A simple backend system will allow the distribution of information over all the displays in the system.

The latest development is the creation of a Densipaper subsidiary providing WiFi-based E-Paper display solutions. This solution will

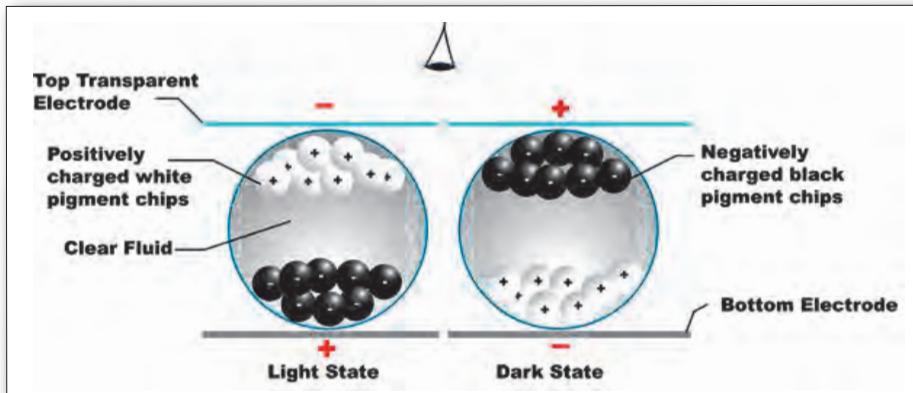


Figure 2. Principle of operation of an e-ink capsule

be based on the 4.41", 7.4" and 10.2" displays. This will be a packaged solution where the customer will purchase a number of units depending on their requirement and download the application software from the internet. When Densitron started to market e-paper displays the company had a lot of interest from organisations just wanting a plug-and-

play solution that they could immediately implement. The Densipaper units based on WiFi allow just such a solution, which can be plugged in and working in a matter of hours. This solution can be used in museums to update information on exhibits and allow the visitor to change the language on the display by using a provided NFC device. The units

would be attached to the wall beside exhibits, and require no wires for power or communication as they would be powered by battery and use WiFi for communications. Another application is in conference centres, universities and hotel suites. Again the units would be attached beside the door of each room, and be updated by a central control area to provide information to people using the room with a welcoming message.

Of course a major application for these devices would be for shelf labelling. This is a great fit for e-paper displays. For major supermarket chains this will be implemented by their IT department or system integrator. However the Densipaper units provide a plug-and-play solution to the smaller retailer wanting a system that can be implemented quickly and efficiently. The software will allow them to send labelling information via the in-store WiFi to all their shelf displays. Densitron provides the e-paper displays and their driving boards plus of course the full display units with WiFi boards. ■

Product News

■ Wibu-Systems: integrated security concept for intelligent production

With a mission to develop an integrated security concept for the protection requirements of industrial enterprises, the German companies "German Research Center for Artificial Intelligence (DFKI)" and WIBU-SYSTEMS have launched an intensive co-operation strategy. Together they are researching suitable protection mechanisms against a number of different threats, and developing adequate defense solutions to be implemented in a system prototype for the production line of the Smart-FactoryKL of DFKI. Industrial companies will then be facilitated in the adoption of intelligent production technologies, fully embracing the "INDUSTRIE 4.0" era in a secure way.

[News ID 1327](#)

■ Green Hills: Samsung KNOX hypervisor powered by INTEGRITY

Samsung Electronics and Green Hills Software announced that the INTEGRITY Multivisor hypervisor is now available as a certified security option in the Samsung KNOX mobile enterprise family. Targeting government and regulated enterprise certified security requirements, the new solution offers an industry-first in ultra-security. Informally referred to as 'KNOX INTEGRITY', Samsung KNOX Hypervisor powered by INTEGRITY integrates Samsung's advanced device management and Android hardening capabilities with INTEGRITY Multivisor, enabling multiple, strongly isolated instances of Android as well as additional security-critical functions that run di-

rectly on INTEGRITY Multivisor to meet the most demanding industry requirements for certification and accreditation.

[News ID 1269](#)

■ TI: customize and simulate analog designs with WEBENCH Schematic Editor

Texas Instruments unveiled WEBENCH Schematic Editor, a new editing and simulation feature that enables engineers to customize power management designs and simulate the circuit created within the WEBENCH environment. TI's cost-free WEBENCH tools have dramatically simplified and accelerated the design process. A complete design can be quickly created, optimized and simulated online with the powerful calculation algorithms and SPICE simulator provided by WEBENCH Power Designer.

[News ID 1334](#)

■ Tektronix: identical pricing for RF-capable and mixed signal oscilloscopes

Tektronix announced that its MDO4000B Series of Mixed Domain Oscilloscopes are now available at the same price point as MSO4000B Mixed Signal Oscilloscopes. The Tektronix Mixed Domain Oscilloscopes include a built-in spectrum analyzer along with 4 analog channels and 16 digital signal inputs — with the MDO4000B Series enabling engineers to capture synchronized analog, digital and RF signals for a complete, time-correlated system view, saving days or even weeks of debug time.

[News ID 1233](#)

■ ETAS: fail-safe software for networked vehicles

The functional safety of an embedded system depends on reliable basic software. Over a period of more than 20 years, the ETAS RTA real-time operating system has proved its worth in more than a billion ECUs—without a single error in operation. What's more, its speed and efficient use of resources has made it into one of the leading systems, capable of implementing AUTOSAR 4.x safety concepts at the operating system and basic software level. Clear and easy to use, ASCET model-based software development offers the possibility of early validation so that errors can be flagged very early on in development.

[News ID 1272](#)

■ AdaCore releases GNAT Pro 7.2 for ARM/Linux

AdaCore announced the release of its latest Ada cross-development environment, GNAT Pro 7.2, for ARM processors running Linux. This GNAT Pro ARM product provides a complete Ada development environment oriented towards embedded systems that require the flexibility and extensive services provided by Linux. Developers of such systems can now exploit the software engineering benefits of the Ada language, including reliability, maintainability, and portability. Incorporating more than 120 new features, this latest GNAT Pro tool suite implements the Ada 2012 language standard by default, and extends its coverage of ARM configurations to complement GNAT Pro products for VxWorks 6 ARM and bare-board ARM.

[News ID 1238](#)

■ R&S: RTE oscilloscopes with bandwidths from 200 MHz to 1 GHz

The new R&S RTE from Rohde & Schwarz is available with bandwidths from 200 MHz to 1 GHz. An acquisition rate of more than one million waveforms per second helps users find signal faults quickly. The scope's highly accurate digital trigger system with virtually no trigger jitter delivers highly precise results. The single-core A/D converter with more than seven effective bits (ENOB) almost completely eliminates signal distortion. With a sampling rate of 5 Gsample per second and a maximum memory depth of 50 Msample per channel, the R&S RTE can accurately record the long signal sequences required when analyzing the data content of serial protocols such as I2C and CAN.

[News ID 1251](#)

■ KW-Software: Raspberry Pi goes PLC

The entry into automation technology does not necessarily have to be expensive and complex. In time for this year's SPS IPC Drives show, KW-Software presents the IEC 61131 Starter Kit based on the Raspberry Pi. To use the Starter Kit, users simply need a Raspberry Pi (Rev. B) with PiFace and the Linux Debian Wheezy operating system as hardware platform. Only basic knowledge is required for its commissioning.

[News ID 1287](#)

■ SEGGER makes processor trace debugging affordable

SEGGER's J-Link software package, which comes with all J-Link and J-Trace models, now includes a trace decoder. Tool-chains for embedded systems development no longer need to create their own complex decoder. They can use the new Simple Trace API (Simple-TRACE) from SEGGER. Even free GNU-based offerings will be able to add Trace capabilities to their tool-chain with little effort. They need to implement the display of the data only, as the data is already analysed and neatly packaged by SEGGER.

[News ID 1221](#)

■ LDRA: Compliance Management System enables ISO 26262 compliance

LDRA releases the LDRA Compliance Management System (LCMS) to provide companies with the proper infrastructure enabling ISO 26262 compliance. LCMS for ISO 26262 walks customers through the fully compliant plans, document and transition checklists, standards and other lifecycle documents, and problem reports to help customers manage software planning, development, verification, and

regulatory activities of ISO 26262 Part 6, Product Development: Software Level (ISO 26262-6). LCMS for ISO 26262-6 details a process that ensures software functional safety at dramatically reduced project costs.

[News ID 1276](#)

■ SYSGO, Esterel and CoreAVI provide joint certified solutions for avionics

SYSGO with PikeOS, Esterel Technologies with SCADE Display, and Core Avionics & Industrial with OpenGL ES/SC Graphics Drivers collaborate to offer integrated and certifiable solutions for the design of critical embedded avionics display systems. These solutions benefit from the most recent technologies available in the COTS avionics market, while offering capabilities for high performance embedded OpenGL SC and OpenGL ES Human Machine Interfaces with DO-178C objectives up to level A in the aerospace industry.

[News ID 1249](#)

■ LDRA partners with Xilinx to bring code compliance to Zynq-7000 family

To streamline standards compliance for safety-critical application development, the LDRA tool suite has been integrated with the Xilinx Zynq-7000 All Programmable SoC and the Xilinx Zynq-7000 AP SoC Development Kit. Xilinx is leveraging LDRA structural coverage and standards compliance tools to enhance Zynq-7000 boot loader code and device driver code for key markets that require certification, compliance, and functional safety. LDRA tools are enabling Xilinx to provide additional value for developers of safety- and security-critical applications.

[News ID 1220](#)

■ Maxim: IO-link ambient light sensor

Using the Santa Cruz ambient light sensor from Maxim Integrated Products factories can quickly configure and monitor multiple red, green, blue and infrared ambient light sensors with the high accuracy required in industrial applications. To stay competitive and maintain high quality, modern factories must be agile, maximizing "uptime" while reducing costs. The Santa Cruz ALS solution enables connected factories. This reference system provides a wide, dynamic range of clear, RGB, and IR light, and temperature data. Santa Cruz is tuned to the response of the human eye for accurate system function relative to visible light. In addition, it is unsurpassed for light sensitivity and low latency.

[News ID 1282](#)

■ Wind River reinvents the RTOS for the Internet of Things

Wind River announced that it has reinvented the real-time operating system to address the new market opportunities created by the Internet of Things. VxWorks has been re-architected with a highly modular approach leading to the separation of the VxWorks core operating system from packages such as the file system or networking stack. As a result, individual applications can now be updated at any time without requiring a rework or retest of the entire system, increasing scalability and the ability to quickly adjust to market changes.

[News ID 1257](#)

■ Digia announces major update to Qt Enterprise Embedded

Digia has released a major update to Qt Enterprise Embedded, the fully-integrated solution that enables users to get started immediately with software development for an embedded device with a tailored user experience. The Qt Enterprise Embedded update introduces several new value-add features that further increase developer efficiency, application and device performance and ultimately shortens software embedded development time to just hours.

[News ID 1248](#)

■ Cadence expands ARM-based system verification solution

Cadence Design Systems announced an expansion of its ARM-based design system verification solution in order to drive shorter time-to-market for mobile, networking and server applications. This expanded solution from Cadence features several enhancements and speeds system design and early software development for ARM Cortex-A processor series based systems.

[News ID 1338](#)

■ XJTAG: XJDeveloper allows creation of projects for boards without netlists

XJTAG has unleashed version 3.2 of its boundary scan development system. This major new release extends the concept of boundary scan testing to allow engineers to test boards where they do not have access to a netlist. The flagship feature of XJTAG's version 3.2 release, the 'no netlist' feature allows users to create projects within XJDeveloper for boards without netlists, using just BDSL files for the JTAG devices. Connections between these devices are derived from a working board and automatically added to the project.

[News ID 1300](#)

More information about each news is available on www.Embedded-Control-Europe.com/magazine
You just have to type in the "News ID". —

■ PLS: model-based tests directly on the target platform

Tests directly on the target hardware with PikeTec's TPT model-based software tool are now possible as a result of coupling with the PLS Universal Debug Engine. The UDE provides the necessary functionality such as connection to the target system, FLASH programming, process control and reading and writing programme data etc. via the standard Component Object Model interface.

[News ID 1329](#)

■ Deutsche Telekom: operate machines through the cloud with M2M

Thanks to M2M, the operation and monitoring of machinery and equipment is becoming child's play for machine manufacturers and operators. With M2M Device-to-Cloud, Deutsche Telekom is expanding its portfolio of services for M2M communication with ultra-simple data and device management through the cloud. The new features were presented for the first time at Deutsche Telekom's stand at the Embedded World.

[News ID 1236](#)

■ Silicon Labs: new version of Simplicity Studio development ecosystem

Silicon Labs introduced a new version of the Simplicity Studio development ecosystem that provides unified support for Silicon Labs' energy-friendly 32-bit EFM32 Gecko microcontrollers and 8-bit MCUs. The Simplicity Studio platform has built-in intelligence to immediately detect the connected target MCU. Graphical hardware configuration tools automatically configure the MCU, freeing the developer from the time-consuming task of perusing technical documentation. Developers can get projects up and running in minutes with sample demos and application code examples.

[News ID 1254](#)

■ IAR unveils C-RUN runtime analysis product

IAR Systems announce its fully integrated and high-performance runtime analysis product C-RUN. C-RUN is an extension to the existing embedded development tools from IAR Systems and gives developers unique possibilities to analyze their code at an early step and improve development workflow in an instant.

[News ID 1227](#)

■ Altium: Tasking development tools support ON Semi's LC87 MCU family

Altium announces support for the LC87 microcontroller family from ON Semiconductor through a brand new TASKING compiler suite based on its highly respected Viper "VX" compiler technology. Viper is a modern compiler technology fully developed and owned by Altium. The use of Viper technology guarantees compatibility to other popular Tasking toolsets, which have established a solid "proven in use" reputation with highly efficient and robust code for a wide range of applications.

[News ID 1230](#)

■ XMOS launches xCORE-Analog development kit

XMOS announces the immediate availability of its xCORE-Analog sliceKIT development board, as well as the volume production of its xCORE-Analog multicore microcontroller products for industrial applications. xCORE-Analog combines the xCORE multicore, deterministic architecture with analog and digital interfaces to minimize the need for external components in products requiring analog functions and deterministic computing capability.

[News ID 1239](#)

■ Escatec: smart HMI stick opens up new simpler ways to wirelessly control machines

A major problem with many machines is that the Human Machine Interface is often a small basic control box with a small display and a few buttons that is hard to read and adjust. However, there is usually a USB port that engineers can plug into and link to a laptop for diagnostics and controlling settings. This port can now be used to create a much more user-friendly control interface by using a USB stick to create a short-range WiFi link to a tablet or smartphone that runs a custom app to control the machine. This solution will appeal to companies that want to create HMIs for new and existing machines with a more intuitive and easier-to-use interface at a minimal cost. Applications include industrial machinery, heating systems, air conditioning plants, production equipment, laboratory equipment, test and measurement devices, home automation systems, medical equipment, etc.

[News ID 1222](#)

■ ARM releases MDK for Infineon XMC1000

ARM announced that Infineon has licensed the Keil Microcontroller Development Kit Silicon Vendor Edition. Developers now get free access to professional software tools for the Infineon XMC1000 microcontroller series, further accelerating the transition from 8 and 16-bit architectures to 32-bit ARM Cortex-M0 processors.

[News ID 1243](#)

■ Vector Software opens additional office in Germany

Vector Software announced that the company is opening an additional office in Germany. The office is located in Munich, a location chosen to best serve key customers in southern Germany, as well as clients located in Austria and Switzerland. The last two years have seen a rapid adoption of the VectorCAST embedded testing solution within the automotive, industrial, and medical device industries in Germany, and the Munich office will be a great asset in providing technical and sales support to these customers.

[News ID 1296](#)

■ Green Hills: early access support for ARMv8-A based 64-bit architecture

Green Hills announces an industry-first embedded software development solution built on its INTEGRITY real-time operating system and comprehensive MULTI integrated development environment for the ARM Cortex-A50 processor series. With this support, engineering teams get a risk-reducing early start on their next-generation high-performance/low-power product designs in automotive, mobile devices, networking infrastructure, industrial, Mil/Aero and the Internet of Things.

[News ID 1262](#)

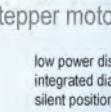
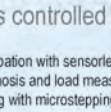
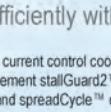
■ IAR: enhanced version of Embedded Workbench for ARM

IAR Systems releases a major enhanced version of its complete and high-performance development toolchain IAR Embedded Workbench for ARM. Highlights are multicore debugging functionality and support for automatic NEON vectorization which significantly strengthens development of complex applications. Multicore applications often interact in complex ways and are therefore challenging to debug.

[News ID 1223](#)





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■ Agilent: next-gen user interface for Infinium real-time oscilloscope

Agilent Technologies announced a next-generation user interface for its Infinium real-time oscilloscopes. It is the first oscilloscope user interface to take advantage of new display technologies and significantly enhance the user experience by offering faster documentation, personalized viewing and improved usability. Infinium oscilloscopes with the new user interface allow engineers to easily manipulate their data across multiple monitors and move windows, charts and measurement results to where they want them on the screen.

[News ID 1265](#)

■ ETAS: expanded portfolio with new solutions, services and business segments

ETAS offer global services for the design, implementation, and integration of embedded software in the form of Real Time Application Solutions. Although geared mainly toward ECUs for the automotive industry, ETAS also offers RTA Solutions for applications in other sectors. This means ETAS can provide premium software irrespective of the hardware solution—software that is tailored to each customer and meets required standards including AUTOSAR or ISO 26262. The new DESK-LABCAR is a remarkably compact, easily extendable, and cost-effective Hardware-in-the-Loop testing system that puts professional HiL technology in the hands of developers. Due to their high system complexity, calibration of modern powertrain ECUs requires an enormous investment of time and money. Using models to precisely recreate system behavior, the new ETAS ASCMO tool is a powerful, universally applicable solution that has been shown to reduce the need for measurements by up to 90 percent and fuel consumption by 2 to 4 percent.

[News ID 1267](#)

■ Data Modul: Mini-ITX baseboard for ARM/x86 Qseven modules optimized to drive large panels

Data Modul presents a new Mini-ITX Baseboard that fits perfectly for Digital Signage applications. This innovative design uses the Qseven Standard in order to build systems with ARM based CPU Modules or x86 based CPU Modules. This baseboard is optimized and certified for ARM Qseven: eDM-QMX6 (i.MX6 Quad Core), eDM-DMX6 (i.MX6 Dual Core), eDM-DLX6 (i.MX6 Dual Core lite); X86 Qseven: conga-QA3 Intel Atom E3845 Quad Core; conga-QA3 Intel Atom E382x Dual Core, conga-QA3 Intel Atom E3815 Single Core. With this configuration it's possible to develop slim and fanless systems with enough performance to drive large size TFTs.

[News ID 1216](#)

■ R&S: precise Ethernet interface verification with RTO oscilloscopes

Rohde & Schwarz has expanded the application field of its R&S RTO oscilloscopes to include Ethernet interface testing. The new R&S RTO-K22 and R&S RTO-K23 Ethernet compliance options allow users to perform standard-compliant automated tests on 10/100/1000BASE-T and 10GBASE-T Ethernet interfaces. All compliance tests meet IEEE and ANSI Ethernet test specifications. Rohde & Schwarz oscilloscopes are ideal for Ethernet compliance tests.

[News ID 1313](#)

■ Xilinx: DDR4 memory solution for UltraScale devices running at 2400 Mb/s

Xilinx announced availability of the high performance DDR4 memory solution for All Programmable UltraScale devices running at 2400 Mb/s. Based on an ASIC-class architecture, the UltraScale devices support massive I/O and memory bandwidth with dramatic power and latency reduction. Xilinx's robust memory solutions enable acceleration of design schedules and include the DDR4 interface among others.

[News ID 1332](#)

■ MEN: rugged COM Express standard module equipped with ARM i.MX6

The Freescale ARM i.MX 6 processor with Cortex-A9 architecture forms the core of the CC10C Rugged COM Express module. You can select from the different families of the i.MX 6 series – 6Solo, 6DualLite, 6Dual and 6Quad – and find an individual solution for different demands in calculation and graphics power. Since the i.MX 6 not only provides scalable CPU performance, but also a wealth of on-chip controllers and interfaces – e.g., Gigabit Ethernet, USB 2.0 or 5-Gigabit PCI Express, UART and CAN bus or interfaces for multimedia applications such as LVDS, DVI, audio and a camera connection –, the CC10C excels by its nearly boundless I/O flexibility.

[News ID 1301](#)

■ Infineon: easy switch from 8-bit to 32-bit with XMC1000 MCUs

At embedded world Infineon launched volume production of its XMC1000 microcontrollers that offer 32-bit performance at 8-bit prices and use the ARM Cortex-M0 processor. At the same time, Infineon presented new, highly compact VQFN package variants for the XMC1000 family and providing information on their new, free ARM Microcontroller Development Kit. The XMC1000 microcontrollers are consistently optimized in line with their target applications: sensor and actuator applications, LED lighting, simple motor drives (e.g. for household appliances, pumps, fans) and digital power conversion (such as uninterruptible power supplies).

[News ID 1226](#)

■ ADI unveils two more SDR platform solutions

Analog Devices announced two software-defined radio platform solutions and ecosystems. The AD-FMCOMMS4-EBZ is a transceiver FMC module and the newest addition to Analog Devices' expanding portfolio of single-channel SDR solutions. It includes the AD9364 RF Transceiver IC in a cost-effective 1 x 1 SDR rapid prototyping FMC module. The AD-FMCOMMS3-EBZ is also a transceiver FMC module and was engineered for 70 MHz to 6 GHz wideband tuning applications such as handheld and whitespace radios.

[News ID 1280](#)

■ Mouser: NXP LPC1500 motion controller makes motor control simple

Mouser Electronics is now shipping the new LPC1500 Motion Control Chip solution from NXP Semiconductor. The LPC1500 is a flexible controller capable of driving a variety of different motors including brushless DC, sensed, sensorless, and permanent magnet motors. The LPC1500 is optimized for fast and easy motor control in a variety of applications. The LPC1500 is powered by a 72MHz ARM Cortex M3 core combined with specialized motor control peripherals. Two 12-bit, 12 channel ADCs and a quadrature encoder interface provide enough support to drive two motors at the same time.

[News ID 1255](#)

■ Maxim: 4–20mA loop-powered temperature transmitter with HART protocol

Maxim Integrated's Novato smart temperature-transmitter reference design transmits temperature measurement over -200 °C to +850 °C range with better than ±0.1 % accuracy. Factories can now easily, and very accurately, measure and transmit industrial temperatures with the Novato reference design, a 4–20mA loop-powered temperature transmitter with the HART communication protocol from Maxim Integrated Products.

[News ID 1247](#)

■ TI: IoT-capable LaunchPad with on-board Ethernet MAC +PHY

Texas Instruments announces the latest addition to its popular microcontroller LaunchPad ecosystem – the Tiva C Series Connected LaunchPad. This Internet of Things, innovative platform enables engineers and makers to rapidly prototype a wide range of cloud-enabled applications, bringing expansive connectivity to any new or existing LaunchPad-based application. The Tiva C Series TM4C1294NCPDT MCU on-board adds advanced Ethernet technology and the largest memory footprint available in the LaunchPad ecosystem

[News ID 1317](#)

■ MSC to distribute Sharp displays

MSC Technologies is now an official distribution partner for the Sharp Devices Europe LCD portfolio. The distribution agreement, which is valid for Central and Eastern Europe, the Benelux countries and Spain, concerns the whole product range, starting from small-format displays of 8.9 cm and extending to 203 cm panels, some equipped with touchscreen functionality, achieving 2000 cd/m² brightness and 1:5000 contrast for highly demanding e-signage applications.

[News ID 1336](#)

■ Silicon Labs acquires low-power analog IC products

Silicon Labs announced the purchase of the full product portfolio and intellectual property of Touchstone Semiconductor an early-stage power management technology company and provider of high-performance, low-power analog IC products. Touchstone's low-power analog products and technologies complement Silicon Labs' embedded portfolio of energy-friendly microcontrollers, wireless products and sensors for the Internet of Things market.

[News ID 1307](#)

■ Toshiba: application processors integrate high-speed WLAN and NAND Flash

Toshiba Electronics Europe has announced it will offer a new range of application processors that incorporate IEEE802.11ac baseband - the standard for high-speed wireless LAN - and NAND flash memory. The TZ5000 series is the latest addition to Toshiba's ApP Lite family. The series adopts an original low-power design, reducing power consumption and heat generation when processing multimedia applications, such as HTML5, which usually imposes a heavy load on the CPU.

[News ID 1277](#)

■ Renesas: RX64M MCUs with 4 MB Flash and 512 KB SRAM for IoT applications

Renesas Electronics unveiled the RX64M group of microcontrollers. Part of the RX family, which covers a wide range of applications, from mid-range to high-end products, the RX64M MCUs provide a high-end MCU solution for applications that require the higher performance, on-chip memory and lower power. Since the new MCUs maintain compatibility with the existing product line, system designers working with current RX products can migrate easily to these new MCUs.

[News ID 1264](#)

■ DFI: type 6 COM Express basic module based on mobile HM86 Express chipset

DFI launches a new Type 6 COM Express Basic module, the HM960-HM86, in its mobile-based Intel HM86 product line providing low-power consumption and higher perform-

ance. This COM Express Basic module is powered by the BGA 1364 packaging technology supporting the latest 4th generation Intel Core processor family. The enhancements in CPU performance, media and graphics capabilities, security and power efficiency in the 4th generation Intel Core processor family are driving innovation.

[News ID 1244](#)

■ Digi: ConnectCore 6 module adds wireless M2M connectivity to devices

Digi International announced ConnectCore 6, a surface mount multi-chip module with built-in wireless connectivity. The ConnectCore 6 provides access to all of the features of the Freescale i.MX 6 Quad, i.MX 6 Dual and i.MX 6 Solo processors, making it the ideal solution for M2M applications.

[News ID 1260](#)

■ Advantech: ARM-based compact box for IoT edge computing

Advantech launches the UBC-200, an ARM-based compact box computer, intended to be used as a core computing element in the growing demand for IoT applications. UBC-200 is equipped with the Freescale ARM Cortex-A9 i.MX6 Dual/Quad CPU, 1 GB/2 GB DDR3 of onboard memory and 4 GB e.MMC flash memory for storage. It supports Full HD 1080P HDMI display, 1 x USB 2.0 port, Gigabyte Ethernet and a mini-PCIe interface for optional Wi-Fi or 3G expansion.

[News ID 1303](#)

■ Kontron: Pico-ITX and Mini-ITX embedded motherboards with E3800 series excel in graphics

Kontron announced two new embedded motherboards with Intel Atom processor E3800 series. These particularly energy-efficient SoC boards in the form factors Pico-ITX and Mini-ITX excel with their outstanding graphics and powerful processor performance while consuming only a few watts. The Pico-ITX and Mini-ITX form factors can easily be integrated into existing systems without any further design effort, making them ready to use right out of the box.

[News ID 1261](#)

■ Freescale: metrocell base station SoC drives next-generation LTE

Freescale introduces the next generation of its QorIQ Qonverge portfolio of base station-on-chip SoCs. Designed to help operators add capacity and deliver enhanced coverage in user-dense environments, the new B3421 base station SoC integrates digital front-end technology, which improves power amplifier efficiency and significantly reduces base station power and costs.

[News ID 1266](#)



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■ Fujitsu: 1-Mbit FRAM product with I2C interface

Fujitsu Semiconductor releases MB85RC1MT, its new 1-Mbit FRAM product with I²C interface. The new product represents the highest memory capacity of the company's line-up for the I²C serial interface. MB85RC1MT is offered in an industry-standard SOP-8 package that is pin-compatible with EEPROM and Flash memory. Featuring high endurance and low power consumption, the FRAM product enables frequent logging at low power, which is a perfect fit for factory automation and industrial instrument applications.

[News ID 1214](#)

■ CSR brings connectivity and GPS to mbed community

CSR has joined the ARM mbed platform, an industry venture designed to nurture the growth of the Internet of Things, as a component partner. The partnership provides the mbed community access to CSR Bluetooth, Bluetooth Smart, Wi-Fi and GPS connectivity solutions and makes it easy for them to be integrated into existing microcontroller projects.

[News ID 1293](#)

■ Wibu-Systems select Infineon security chips for USB tokens and memory cards

Wibu-Systems introduce USB Tokens and memory cards with security controllers from Infineon Technologies. CodeMeter, Wibu-Systems' solution for software protection, licensing and security, is ubiquitous throughout hardware devices, secure files, and the cloud alike. Over the history the company has broadened its focus to embrace not just ISVs offering B2B and B2C professional solutions, but also the industrial automation arena.

[News ID 1306](#)

■ IDT: WPC 1.1 and PMA 1.1 dual-mode wireless power receiver

Integrated Device Technology announced a dual-mode wireless power receiver compatible with both the Wireless Power Consortium's (WPC) 1.1 Qi standard, as well as the Power Matter's Alliance (PMA) 1.1 standard. The innovative solution enables OEMs to use a single wireless power receiver IC to develop mobile devices fully compatible with the latest versions of both Qi and PMA charging bases.

[News ID 1289](#)

■ iC-Haus: speedy sine evaluation at x1000 interpolation factor

For optical and magnetic length gauges featuring decimal gratings, iC-MQF offers a sine resolution of up to 4000 edges. The circuit incorporates a signal conditioning analog front end, a vector-tracking converter for real-time conversion without latency, as well as fault-tolerant RS422 driver stages which output the incremental signals. Reverse polarity protection is also embedded and covers all cable connections. Differential or referenced input signals from a few millivolts upwards can be connected up, such as those coming from MR bridge sensors or photo sensors, for which alternatively also a low impedance can be selected.

[News ID 1310](#)

■ Nordic BLE wireless chips expand Digi-Key's IoT solution lineup

Digi-Key announces a global distribution agreement with Nordic Semiconductor. Nordic Semiconductor is a fabless semiconductor company specializing in ultra-low power short-range wireless communication in the license-free 2.4 GHz and sub-1-GHz Industrial, Scientific, and Medical bands. Nordic's ULP wireless solutions enable customers to build wireless connectivity into everything from mainstream consumer RF remote controls through to the most advanced and innovative 'game-changing' wireless devices – while meeting or exceeding end users' expectations in terms of features, performance, and price.

[News ID 1240](#)

■ CoreAVI announces safety critical OpenGL drivers

Core Avionics & Industrial announced software and hardware solutions developed to enable the new AMD Radeon E8860 discrete graphics processing unit to be used by defense, aerospace, and other high reliability system manufacturers. CoreAVI offers temperature-screened versions of the AMD E8860 GPU complemented with a full suite of OpenGL SC / ES, video decode, and OpenCL software drivers for real time operating systems, complete RTCA DO-178C / EUROCAE ED-12C Level A certification packages and 20 year program supply management.

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