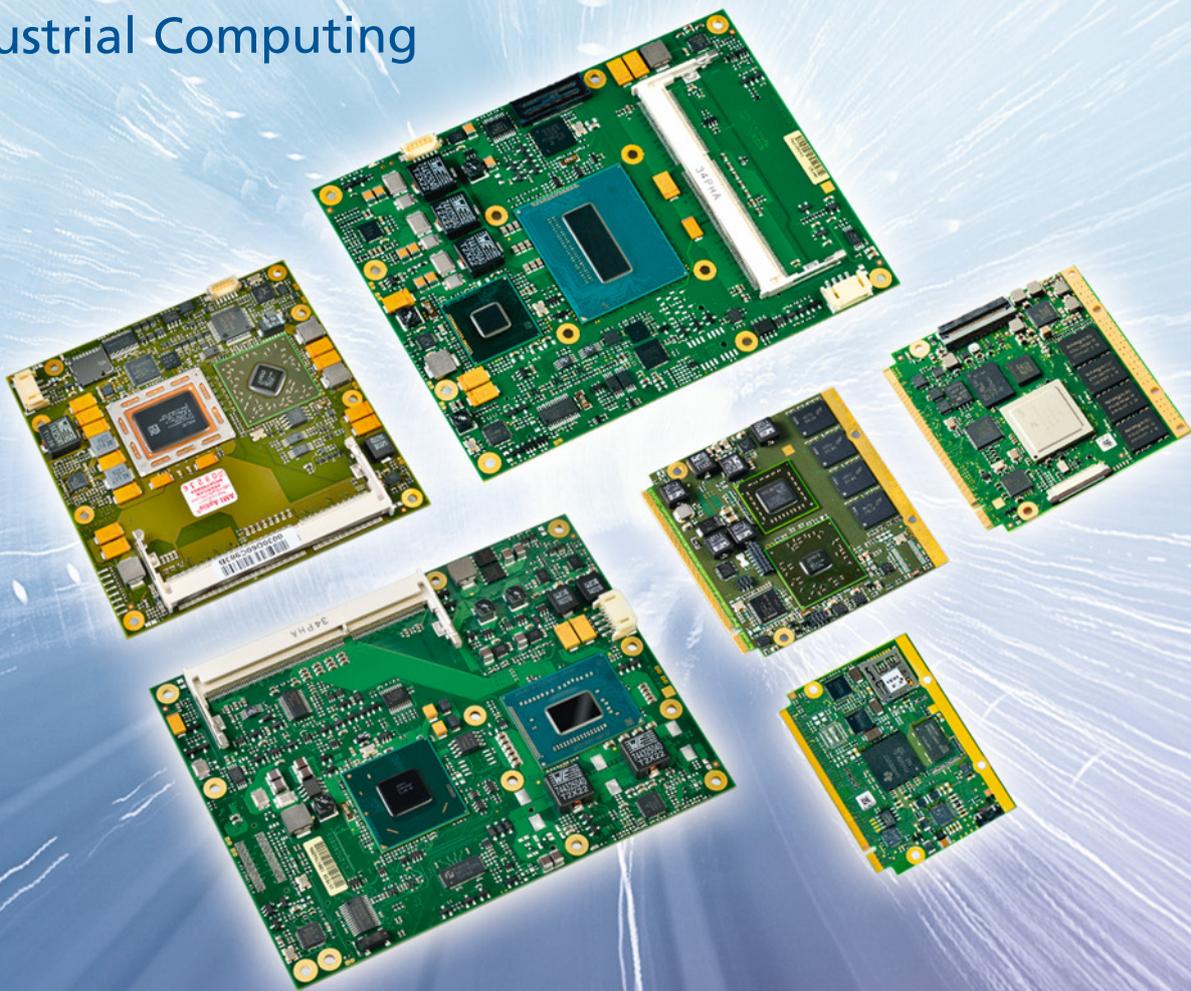


boards & solutions

the european embedded computing magazine

Special Features

- Defence & Aerospace
- Open Standards
- Industrial Computing



COVER STORY

Take advantage of a wide range of embedded computing solutions



Embedded-News.tv

The Video Portal for the European Embedded Market

Technical Videos, Video Interviews, Demos & more about:

- Chips & Components
- Tools & Software
- Boards & Modules



www.embedded-news.tv



FREE SUBSCRIPTION to boards & solutions

The european embedded computing magazine

Technical Articles and Product News about:

- Boards & Modules
- Open Standards & Technologies
- Tools & Software

www.embedded-know-how.com/bas-magazine



Embedded News & Know-how Newsletter

The weekly Newsletter for the European Embedded Market

Product News, Technical Articles & more about:

- Chips & Components
- Tools & Software
- Boards & Modules



More Info & Free Subscription:

www.embedded-control-europe.com/newsletter

sps ipc drives

Electric Automation
Systems and Components
International Exhibition and Conference
Nuremberg, Germany, 26–28 November 2013



Answers for automation

Experience at Europe's #1 platform for electric automation:

- 1,450 exhibitors
- all key players of the industry
- products and solutions
- innovations and trends

Your free entry ticket
www.mesago.com/sps/tickets

More information at
+49 711 61946-828 or sps@mesago.com



boards & solutions

Cover Story

Take advantage of a wide range of embedded computing solutions 4

Open Standards

CompactPCI Serial: the CPCI-S.0 specification takes off 6

Built from standard components – embedded systems for all purposes 10

Voice and video processing with PCI Express media acceleration card 12

Defence & Aerospace

Embedded computing for unmanned ground vehicles 16

HPEC: the new force in military/ aerospace embedded computing 20

Industrial Computing

Panel PCs transition to single-touch, multi-touch, and widescreens 22

Product News 25



COM Express™

MSC C6B-8S

The High-Speed Flagship

The MSC C6B-8S modules are based on 4th generation Intel® Core™ processors with stunning visual experience and amazing computing power. This new product family brings major performance gains for demanding embedded computing solutions. Low-power models together with optimized cooling accessories allow for easy system integration and faster time-to-market.

- Intel® Core™ Processors
 - i7-4700EQ (quad-core, 2.4/3.4 GHz)
 - i5-4400E (dual-core, 2.7/3.3 GHz)
 - i5-4402E (dual-core, 1.6/2.7 GHz)
 - i3-4100E (dual-core, 2.4 GHz)
 - i3-4102E (dual-core, 1.6 GHz)
- Intel® HD Graphics 4600
- Triple independent display support
- DisplayPort/HDMI/DVI, LVDS and eDP
- DirectX 11.1, OpenGL 3.2, OpenCL 1.2
- Resolution up to 4K x 2K
- Up to 16GB DDR3L-1600
- SATA 6Gb/s and USB 3.0
- Basic form factor (125 x 95 mm)



Cover Photo: MSC



Take advantage of a wide range of embedded computing solutions

By Wolfgang Eisenbarth, MSC

MSC pools its existing strengths and optimizes its portfolio of in-house developed and manufactured embedded module solutions, custom designs and IPC standard distribution products. The goal is clearly defined: we strive to offer every customer the best solution for his or her specific application.



■ For years now, MSC has been one of the leading manufacturers of Computer-On-Modules (COMs) based on open standards. The processor modules integrate all standard PC functions and are easily mounted via a standard connector on a baseboard, on which the application-specific functions are implemented. The standard modules are available in different form factors with scalable processor power and a wide range of interfaces. The advantage of COMs is obvious: through the use of powerful processor modules, designed for industrial applications, the development time of modern, complex embedded systems can be significantly reduced and the design costs optimized.

The COM portfolio not only comprises COM Express, ETX and Qseven modules with x86 and AMD processors, but also ARM-based solutions with Freescale and Texas Instruments (TI) processors in the Qseven form factor. The cost-optimized nanoRISC module family, which is based on a standard developed by MSC, is currently offered with TI and Samsung processors. All embedded modules are developed and manufactured in Germany. In order to be able to start immediately with prototyping and system integration, besides the embedded modules, evaluation boards and complete starter kits with or without display are available. The existing in-house BIOS/UEFI support and source code customization are also becoming

increasingly important. Thanks to the implemented MSC secure boot enhancements with encryption algorithms, the digitally protected memory components and the Trusted Platform Module (TPM), many products meet the requirements of the Trusted Computing Group (TCG). A special software support — for example, support for OpenCL to speed up-demanding image processing systems — is also a main focus.

OpenCL (Open Computing Language) version 1.1 enables the additional use of the processing power of graphics controllers for compute-intensive tasks. OpenCL support is available with the new MSC C6C-A7 COM Express Type 6 module family from MSC (figure 1). The modules are based on AMD Embedded R-Series accelerated processing units (APUs) and are characterized by very powerful graphics and high parallel computing performance. For demanding applications, the modules integrate the AMD R-460L 2.0 GHz (2.8 GHz Turbo) or AMD R-452L 1.6 GHz (2.4 GHz Turbo) quad-core processors. The thermal design power (TDP) levels are 25W and 19W, respectively. The two dual-core versions are populated with the AMD R-260H 2.1 GHz (2.6 GHz Turbo) processor or the AMD R-252F 1.7 GHz (2.3 GHz Turbo) processor — each featuring 17W TDP. The processors support the AMD64 technology and the AMD-V virtual-

ization technology. The AMD Fusion Controller Hub (FCH) A75 chipset was also selected. The modules support up to four independent HD displays via DisplayPort 1.2 or HDMI, MPEG-2 decoding, H.264 and VCE (video compression engine).

For quick evaluation and prototyping of embedded systems based on AMD APU COM Express modules, the company offers a complete starter kit with baseboard and a freely selectable module (figure 2). The compact baseboard with dimensions of 140 x 184mm has numerous interfaces including three DisplayPort and HDMI connectors, USB 3.0, Ethernet, VGA, HD audio, SATA and a PCI Express x4 slot. There are, however, a number of applications whose desired functionality and the choice of interfaces can already be covered 90-95% by a single board computer (SBC). In these cases, it makes no sense to develop a customer-specific baseboard. For example, if the required connections are only USB and LAN which are already implemented on the SBC, then the modularity of the COM technology does not take effect. The company also strives to find an optimal solution for these customers and, in combination with its distribution business, offers attractive possibilities. For this purpose, MSC has included numerous IPC standard products from different leading manufacturers in the distribution portfolio. This



Figure 1. The MSC C6C-A7, a COM Express Type 6 high performance module family is based on AMD's Embedded R-Series accelerated processing units (APUs).



Figure 2. The complete starter kit comprises a COM Express module with AMD APU and a compact baseboard that provides the most important connections.

thus broadens the scope of the overall product offering without creating inhouse competition. The customers want a wide range of solutions that are optimized according to their requirements and this is what the company strives to deliver. With its distribution products, this results in an extensive product portfolio in the embedded computing market. It could also be possible to offer an innovative SBC from another supplier — for example, in many different form factors — that MSC does not plan to develop and manufacture itself. It is thus possible to rapidly expand the product offering and

enables the company to focus on its own in-house key technologies. Through the synergies of solutions developed and manufactured by MSC and standard distribution products, where the company uses the strengths of other leading manufacturers, it can truly satisfy the needs of every customer. Furthermore, complete system solutions — for example, in combination with TFT displays offered by Gleichmann — can also be quickly implemented.

The distribution products contain industrial computer components with different form factors. The dimensions of the single board computers range from ATX (305 x 244mm), Micro-ATX (244 x 244mm), Mini-ITX (170 x 170mm) and 3, 5 inch to the smaller sized Nano-ITX with 120 x 120mm and Pico-ITX (100 x 72mm). Manufacturers on its line-card are Aeon, Advansus, Avalue, DFI-ACP, Fujitsu, Quanmax and VIA embedded. Industrial hard drives from Western Digital, Seagate and Toshiba as well as Optical Drives from TEAC are also offered.

The new fanless PICO-CV01 and PICO-HD01 Pico-ITX boards from Aeon offer a HDMI interface (figure 3). The PICO-CV01 type integrates the Intel Atom N2600 processor (1.6 GHz) and the Intel NM10 chipset. Up to 2 GB DDR3 memory can be added via the SODIMM socket. For the connection of displays, the board offers different interfaces like DisplayPort or VGA and LVDS. Main applications are in the industrial control and automation, security techniques, POS/POI and gaming markets. For demanding computing and graphics performance, the PICO-HD01 with AMD G-Series T40R/T40E single/dual processor and AMD A50M controller hub are offered. Despite the small dimensions of 100 x 72mm, the SBC has a variety of interfaces, i.e. SATA, Ethernet and USB 2.0.

High-reliability characterizes the Fujitsu industrial D3071-S mainboard which is also delivered. The board integrates a second generation i3/i5/i7 Intel Core processor. The Intel Q67 Express chipset, an Intel Dual GbE LAN controller, vPro functionality, an Intel HD Graphics/DirectX 10.1 Graphics controller and a Trusted Platform Module TPM V1.2. Multi-channel audio, SATA III and USB 2.0 are some of the important interfaces. ■

Product News

■ congatec: COM Express goes ultra-low power with Haswell U processors

congatec announces immediate availability of the conga-TC87 Type 6 COM Express compact module supporting 4th Generation Intel Core processors. It is a low-power single-chip solution, codenamed Haswell-ULT, with integrated chipset and graphics. Despite increased performance, the maximum thermal design power is a mere 15 watts. The 4th Generation Intel Core processors are an optimization of the existing microarchitecture.

[News ID 17722](#)

Expertise in Systems

- Know-how
- Design-support
- Professional manufacturing
- Technical support
- Continuity



We design and manufacture computer systems based on standard components according to customer specification. Experienced engineers advise and support our customers. Continuity and reliability are our strength.

powerBridge
Computer

www.powerbridge.de

ISO 9001 · ISO 14001 · 100% paperless company

CompactPCI Serial: the CPCI-S.0 specification takes off

By Peter Ahne, Kontron

At Embedded World Kontron exhibited five new boards and several already pre-integrated sample configurations for the relatively new CompactPCI Serial standard. Services for system-integration and migration completed its range of exhibits.



Figure 1. CPCI Serial system design

■ The CPCI-S.0 specification, which was officially adopted nearly two years ago, has aroused considerable interest in the industry. This is in particular because of the fact that CompactPCI has the highest acceptance of all of the market segments for industrial computers. However, larger OEM customers have delayed risking making the changeover. Support from global manufacturers of embedded computer technology has actually been lacking up until recently. Kontron is now changing this with an official announcement on supporting the PICMG specification CPCI-S.0.

The CompactPCI Serial standard is a further development of the existing PICMG 2.0-specification, which is characterized by serial communication over the backplane. Amongst items supported are our extension cards which can be connected either via Ethernet, PCI Express, SATA or USB. Any combinations of such cards are pluggable into specification-conforming system housings, whereby up to 8 of these can be supported. Solutions with a significantly greater number of extension cards are also realizable using matching bridges. This high degree of design flexibility enables significantly differing system-configurations to be realized such as: scalable multi-processor systems and CPU-clusters via PCIe or Ethernet, RAID systems, with up to 8 SATA lanes for SATA-hard disk-shuttles, for example for data recording of video monitoring systems, NAS-systems for data access from Cloud, which are realized

via a mix of Ethernet-networked CPO units and SATA-hard disk shuttles, multi-monitoring systems for controlling up to 32 displays e.g. for Infotainment, digital signage and control rooms, and flexible wireless configurations with WLAN, UMTS, HSDPA, LTE and GSM on up to 8 carrier cards, each having two radio modules.

Even mixed solutions which furthermore support PCI are possible. All system designs are characterized by a particularly high performance capability in a modular construction without cables. It is for example possible with CPCI-S.0 to transfer several gigabytes per second of data. By way of comparison: the highest possible data throughput via a parallel 32-bit/66 MHz PCI-interface in CompactPCI is 0.264 GB/s. This enormous increase in bandwidths therefore opens new possibilities which can be immediately exploited.

OEM and end-users can take advantage of the modular approach: an individual high-performance system is composed of a large fund of standardized modules. Even with a good overall system further integration is possible, and the development time is comparatively short and the reliability and quality extremely high. In addition, the support of hot-swap and redundancy is advantageous for system availability. Thanks to a sturdy mechanical system, CompactPCI Serial is also suitable for industrial applications as well as for use in railway, air

travel and military applications. Central systems capable of the highest performance become possible and these can, for example, as need be, take over the control of complete production lines. The high flexibility in system design enables systems, once they have been set up, to be upgraded later in more or less any conceivable direction, which makes the investments particularly future-proof.

The migration from CompactPCI over to CompactPCI Serial is in no way a piece of witchcraft from the mechanical point of view, as apart from the new connector on the backplane and the boards the fully proven mechanics of CompactPCI are retained. Existing system installations can be retained within the same space and receive an enormous boost in performance.

Developers of CompactPCI Serial-based systems benefit in addition from the optimization of the interoperability of the standard: there should be significantly more pins with fixed assignments for the serial connections than is the case in the existing standard with just 12 usable connectors. For this reason Kontron has decided to further promote openness and exchange ability among different manufacturers with the support of the CPCI-S.0-specification. What is more, the company will be actively involved in the future in further rounding-off the specification within the PICMG Group. The first customers from the field of production machines in the metal-processing

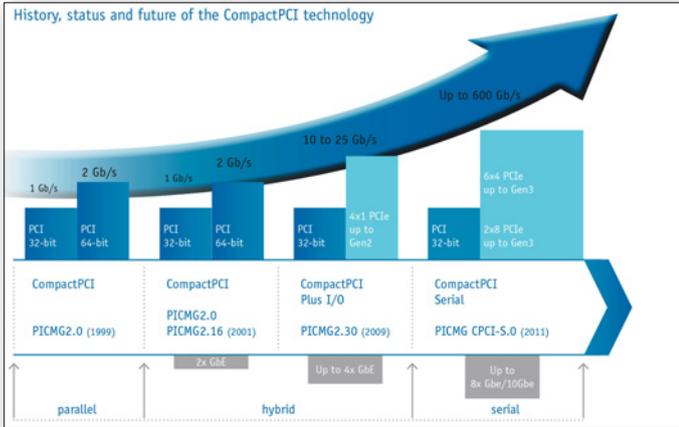


Figure 2. Since the initial specification came out in 1999 up to the latest version, the bandwidth of CompactPCI has expanded very considerably with CompactPCI Serial.



Figure 3. With a processor board, two network controllers, an XMC carrier and a SATA hard disk carrier, Kontron is offering the most important components for CompactPCI Serial.

industry and in the sector of image-processing have already announced that they wish to migrate their systems over to the new specification. Further conceivable application fields are in the infotainment and train safety fields. In parallel with the announcement of the support of CPCI-S.0, Kontron is also introducing several boards. Amongst these are the CPS3003-SA processor board, the CPS3101 hard disk carrier, the CPS3105 XMC-carrier and the

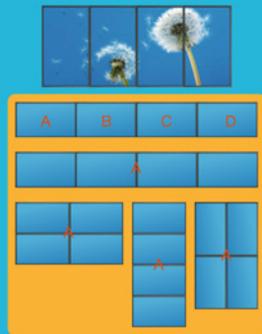
CPS53402 network cards with two GbE interfaces and CPS3410 with four 1 GbE interfaces. But the company is not only making these boards available as standard products. There are complete system integrations that can be supplied. This enables the application developer activities to be limited to the specification of the hardware requirements. The modular system will be supplied if need be fully integrated – including all of the necessary drivers. As far as

the chassis is concerned, for example, systems supplied by Schroff are used, or the company develops tailor-made individual designs. No matter whether the performance package consists of boards or systems, the functions and interfaces of the CompactPCI Serial designs will be characterized by the functions of the individual boards. In addition to hard disk carrier and network cards, note should be taken above all of the first Kontron processor board.

Empower Your Visualization

DSS-TN40

- AMD R-series
- HDMI x 4
- Compact & Light



4 Full HD Display



DSS-CV21

AEC-6401

- ATOM N2600
- Palm Size
- Only 20 mm
- Support HDMI, WiFi, LAN
- VESA Mounting



TKS-G21-QM77B



ACP-5217



AAEON Technology GmbH

Am der Trift 65D, 63303 Dreieich, Germany

Tel: +49 (6103) 37479-00

Fax: +49 (6103) 37479-49

Email: info@aaeon.eu

Web: www.aaeon.eu



The CPS3003-SA processor board is equipped with the highest performance-capable Intel core i7 processors of the third-generation as well as the Mobile Intel QM77 Express PCH. Customers can make use of different versions from the power loss-optimized 1.7 GHz Dual-Core version of the 2.1 GHz Quad-Core for the highest performance requirements.

The CPS3003-SA offers in addition, an even wider advantage as it enables hybrid system designs to be implemented together with the classic CompactPCI. Users can relatively easily transfer their systems

into a serial world without having to take existing CompactPCI peripheral cards out of service. Equally attractive is the new CompactPCI Serial carrier for XMC modules, which enables developers to fall back on the complete range of industrial XMC-cards. There is an XMC module for graphic or image processing, applications, various legacy I/Os, field buses and specific industrial Ethernet versions or even FPGA-based solutions. This diversity and flexibility also makes possible the highest application-specific high-performance systems by implementing standard components that are already on the market. ■

Product News

■ EKF: XMC module carrier

The CK2-SESSION is a peripheral slot board for PICMG CompactPCI Classic systems and acts as carrier card for a XMC-style mezzanine module. XMC modules can be considered as an improved replacement for PMC modules. While using the same form factor as PMC cards, XMC modules are provided with a PCI Express interface.

[News ID 17690](#)

■ Sealevel: single-port PCI Express serial I/O adapters

Sealevel Systems releases two new single-port PCI Express serial I/O adapters designed for avionics, satellite, radar, and other applications that require robust synchronous communications. Both boards use the popular Zilog Z85230 Enhanced Serial Communications Controller (ESCC) for maximum compatibility with a variety of interfaces and protocols.

[News ID 17696](#)

■ Eurotech: M2M Integration Platform to enable Satellite Technology

Eurotech announces the Satellite Applications Catapult, a UK government-funded technology innovation centre, has purchased a suite of Eurotech's multi service gateway devices and the Everyware Cloud machine-to-machine integration platform to provide new businesses and entrepreneurs with the infrastructure to develop and test new technology and applications.

[News ID 17780](#)

■ Kontron: Cab-n-Connect wireless access point selected by Row 44

Kontron announced that its Cab-n-Connect Wireless Access Point has been selected by Row 44 for its high-speed Wi-Fi installations. Kontron is already the exclusive provider of Server Management Units and the Modem Data Units to Row 44 for its In-Flight Broadband System deployments with its customers, including Southwest Airlines, Norwegian Air Shuttle and Mango Airlines.

[News ID 17787](#)

■ DFI: Mini-ITX with AMD R-series APU supports multiple expansion

DFI announces a new embedded Mini-ITX motherboard, the CM100-C, which is powered by the Quad-core and Dual-core AMD R-Series Accelerated Processing Units, including R-464L, R-460H, R-272F and R-268D, featuring 32-nanometer process technology with the cost-efficient AMD A70M Fusion Controller Hub.

[News ID 17781](#)

■ ADLINK: PC/104 single board with full ISA bus support

ADLINK released its newest PC/104 form factor single board computer offering, the CM1-86DX2, featuring an extensive I/O feature set and full ISA bus support. The CM1-86DX2 is ideal for control applications that require power efficiency, small form factor, longevity and industrial grade ruggedness. Based on DMP's Vortex86-DX2 single chip solution which integrates a powerful yet efficient CPU with graphics controller, audio controller and many other functionalities, the CM1-86DX2 provides all the standard peripheral connections of an embedded PC on a printed circuit board with dimensions of 96 x 90 mm.

[News ID 17669](#)

■ N.A.T. acquired assets of former MicroBlade

N.A.T. announce the acquisition of the assets of former MicroBlade, effective since July 15th, 2013. MicroBlade have been a key supplier for MicroTCA infrastructure products such as 19" chassis (Microbox) and MicroTCA compliant DC (Panther) and AC (Puma) power modules, holding several patents and rights on these products. Because of the complementary product portfolios both companies entered into a reciprocal distributorship agreement in 2009. This allowed N.A.T. to supply complete turn-key solutions to customers satisfying their needs for an sophisticated open standard platform.

[News ID 17692](#)



**EMBEDDED-PC
PC/104
MODULES**

PC/104 CONSORTIUM

Maintaining & Distributing PC/104 Specifications

- PC/104-Express & PCIe/104
- PC/104, PC/104-Plus & PCI-104
- EBX & EBX Express
- EPIC & EPIC Express

All specifications are FREE for download

Choose PC/104...

- Backward Compatible
- Forward Looking
- Latest PC Technologies

Visit us to learn about PC/104, search for products and more!

www.PC104.ORG

■ **VadaTech: 8U MicroTCA.4 chassis offers rear I/O options**

VadaTech now offers an 8U MicroTCA.4 chassis designed for High-Energy Physics and other applications that require rear I/O. The chassis features full redundancy, including dual fan trays, dual MicroTCA Carrier Hub slots, and quad Power Module slots. VadaTech worked to specifically address customers' concerns with other MicroTCA.4 chassis

[News ID 17718](#)

■ **DFI: ATX motherboard supports multiple PCIe configurations for high computing workstation**

DFI brings the Intel Xeon processor E3-1200 v3 series to the DL631-C226 ATX embedded motherboard. It is DFI's first ATX board that supports the new Intel C226 Express Chipset. This ATX motherboard comes with LGA 1150 socket for the Intel Xeon processor E3-1200 v3 series built on 22-nanometer process technology that delivers up to 5~15% CPU performance increase over the previous generations. These processors offer higher computing performance at more cost-effective and energy-efficient power consumption.

[News ID 17569](#)

■ **Axiomtek: slim 8.4-inch fanless touch panel computer adopts N2600**

Axiomtek's GOT5840T-832 is a 8.4" fanless touch panel computer with super slim and light design, for self-service kiosk in shopping center, supermarket and factory & building automation fields. The GOT5840T-832 supports an energy-efficient Intel Atom processor N2600 1.60 GHz with the Intel NM10 Express chipset.

[News ID 17707](#)

■ **N.A.T.: power module for MicroTCA applications**

The NAT-PM-AC600 is a high-density and high-efficiency power module for MicroTCA applications. Supplying 600W it is the market's most efficient PM in its single-width full-size form-factor to run today's complex communication systems made of latest processor generations and an increased number of Advanced Mezzanine Cards. The NAT-PM-AC600 provides electrical support for the expected workload of 12 AMCs, 2 Cooling Units and 2 MicroTCA Carrier Hubs. It is a hot-swappable, fully redundant and highly efficient AC/DC power module. The module's single-width design offers perfect thermal performance and therefore is ideally suited for all air-cooled MicroTCA solutions. The NAT-PM-AC600 is fully compatible with any standard compliant FRU being insertable into a MicroTCA chassis.

[News ID 17645](#)

■ **Ecrin Systems names Sarsen as distributor in the UK and Ireland**

Ecrin Systems announces the appointment of Sarsen Technology as its distributor in the United Kingdom and Ireland. Sarsen will be supporting all sales and marketing activity for Ecrin Systems in the UK, and will also provide first line technical and applications support. Founded in 1976 and headquartered in Crolles, France, Ecrin Systems designs and manufactures a range of rugged COTS systems and industrial computers for Mil/Aero and Homeland Security market sectors.

[News ID 17656](#)

■ **Advantech: full spectrum of embedded platforms with 4th gen Intel Core U processors**

Advantech launches its latest platforms based on the 4th generation Intel Core U processors including Computer On Modules, Single Board Computers, Industrial Motherboards, and Fanless Embedded Box PCs. Featuring stunning GT3 graphics performance and 15W Low Thermal Design Power, the new platforms are an ideal solution for portable, battery-operated applications with high graphic requirements, such as medical imaging, digital signage, gaming and more.

[News ID 17761](#)

ONYX HPEC+GPGPU+SWaP

COTS MIL-STD-810/461/DO-160

Multi-mission Rugged Computer





■ **COMe based Core i7 4th Gen System, Ready to Application**

No NRE, Time to Market and ROI optimized

SWaP Rugged Computer Units invade Ground Vehicles, UAVs, aircrafts, helicopters, underwater robots... They need to be compact, light, powerful, and cheap; but also they have to offer reliability, security and dependability. With Built in Test services into ONYX, ECRIN Systems innovates and makes our soldiers' life safer.

- > Multi-Core INTEL i7 3rd and 4th Gen, evolutive
- > GPGPU AMD E6760, with 600 GFLOPS intensive computing
- > 4 Graphic Monitor outputs
- > 4x PAL/SECAM/NTSC Analog Video sensors
- > 2x HD-SDI Digital Video sensors
- > 2x HD-SDI H.264/AVC Encoding capability
- > 3x GigE LANs
- > Cable-free, Fanless, MIL-DTL-38999 connectors
- > ITAR free
- > -40°C/+71°C Operating Temp
- > MIL-STD-810, MIL-STD-461 & DO-160 qualified
- > MIL-STD-1275 filtering ready, IP-67 Ingress
- > Power-on BIT option
- > Long Life Management
- > Scalability, Flexibility



Tel : +33 1 69 07 83 22 - www.ecrin.com



Built from standard components – embedded systems for all purposes

By Christian Ganninger, Pentair-Schroff

Depending on the area of application, embedded systems are subject to highly varied requirements in terms of mechanical stability such as shock and vibration resistance, IP and EMC protection and cooling. With its systems based on modular Schroff system platforms, Pentair offers possibilities for fulfilling these different requirements. Systems can be assembled from a wide portfolio of off-the-shelf components for any level of ruggedness required.

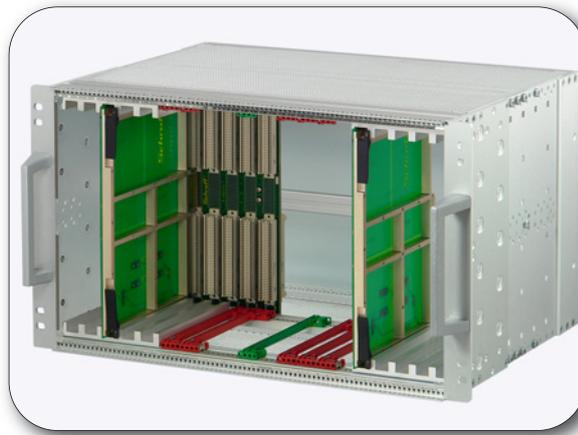


Figure 1. Individually configured subrack-based system

■ Some applications for systems such as in railroad and traffic systems, defense or for use near rotating machines, demand relatively high shock and vibration resistance levels. A suitable Schroff system platform, together with the broad selection of off-the-shelf components, enables standard systems to be created with shock and vibration resistance levels from 2 to 40g. Individual configuration of the mechanical system basis, using Schroff 19" subracks, with side panels of various thicknesses (screw-fixed or tox-cold welded), 19" brackets and corner profiles and various versions of horizontal rails such as a lightweight horizontal rail with single-point fixing, a heavy rail with two-point fixing or a version with three-point fixing, enables shock resistance levels of up to 25g to be achieved. This is mostly sufficient for many mobile applications, in defense systems and similar environments.

Where higher robustness levels are called for, another system basis is used. The enclosure platform developed for this is formed of aluminum components (base, top cover, side, front and rear elements) bolted together. A hole grid in the side components, top cover and base allows other optional parts such as mounting brackets to be attached. The front and rear elements are symmetrically designed and have identical hole positions and bolt-on dimensions. Various cut-outs can be integrated here for sockets, switches etc. The guides for

the PCBs are milled into the base and top cover of the case. This modular enclosure platform is designed for shock and vibration levels of up to 40g for non-military applications. For some time Pentair has also been offering system platforms for use in defense systems. This Titan ATR system also achieves shock and vibration resistance values of 40g. The systems can also be equipped with high IP and EMC protection. The cooling of the components is realized with conduction cooling. Additionally there is a mechanical system basis that combines these two platforms: 19" subracks plus high IP and EMC protection plus conduction cooling. Such a system used, say, as a laboratory system for conduction-cooled boards, can also be constructed from off-the-shelf components. These platforms offer users the possibility of testing the technology or application with the conduction-cooled boards initially in the lab. The same components can then also be built into a Titan ATR system.

By their nature, ordinary subracks do not have high levels of IP or EMC protection since they are very open. Protection of the system components installed in them is generally provided by fitting the subrack into a cabinet. The fronts of the systems are then provided with appropriate EMC gaskets. If the systems themselves have to offer high EMC protection, they must be given a practically solid cladding. The Titan and Titan

ATR system meet this requirement, though in their basic configurations they are built without appropriate gasketing. Where requirements are higher, either a pure IP gasket or a combined IP and EMC gasket can be (retro)fitted into a groove provided for this purpose.

In most cases the cooling requirement and the type of cooling are selected on the basis of two criteria: the level of dissipation loss and the location of the installation. If the boundary conditions are met, air cooling by convection or



Figure 2. Completely closed Titan ATR system: high shock and vibration resistance, high IP and EMC protection and high heat dissipation capacity

forced air cooling are the methods of choice in many cases. In cost terms these are also the best value. Should such cooling methods be insufficient, however, conduction cooling and water cooling come into play, at either cabinet or system level. This may be the case e.g. if the system must offer a very high IP or EMC protection level, which precludes effective air cooling.

In the laboratory systems described, the plug-in boards are conduction-cooled in one area and the heat then extracted by fans on the side of the system. The ordinary system boards are cooled by the fans only. The Titan ATR system offers a still more effective possibility for cooling. Here again we have a combination of conduction and air cooling. Heat is drawn from the PCBs via a simple board frame or a closed frame (clamshell) to the surface of the case, fitted with cooling fins. A sheet metal cover is placed over the heat sinks and a fan with suction chamber is fitted at the rear of the case. The presence of the cover creates an air channel. The internal fan now blows the air through the heat sinks and out of the system. In case no particularly high level of IP protection is required but high protection against direct contact is necessary at board level, a further

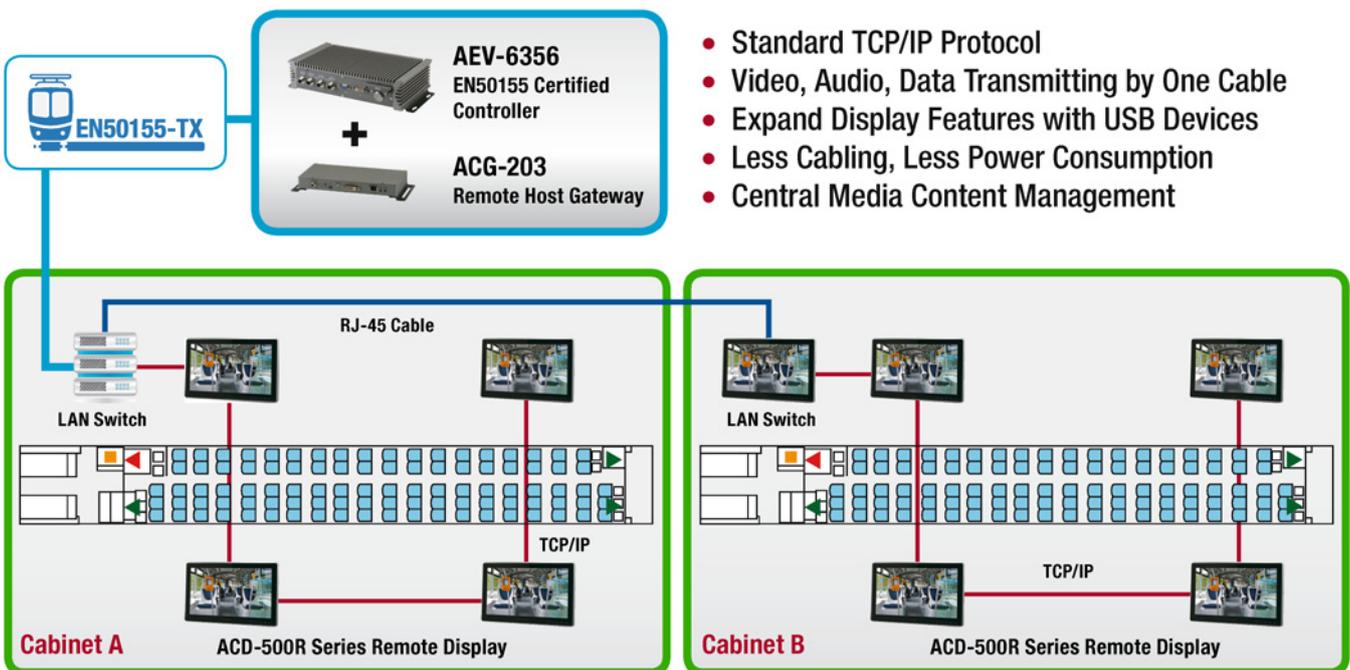


Figure 3. Robust laboratory system for normal and conduction-cooled boards

cooling solution is available. Here the boards are enclosed e.g. in a clamshell that has suitable air openings top and bottom. Air is then forced through these air channels and the heat drawn away from the boards. Another option is to use liquid cooling of hotspots on the boards combined with forced air cooling. For a complete system, backplanes and power supply units are naturally also required. Here also the customer can choose from a wide spectrum of off-the-shelf components. Easily modifiable

standard backplanes are available for various bus technologies (e.g. VME, VPX, VXS, CompactPCI, CompactPCI Plus IO, CompactPCI Serial) plus a selection of standard PSUs that meet the capacity demands of various applications. The wide portfolio of off-the-shelf components for the mechanics, cooling, IP and EMC protection solutions and standard backplanes and PSUs thus enable systems to be configured to the various ruggedness levels entirely as specified by the customer. ■

One Controller Empowers Numerous Remote Displays



Voice and video processing with PCI Express media acceleration card

By **Brian Carr**, Emerson Network Power

High density voice and video processing is increasingly in demand for network applications hosted on rack-mount servers or appliances. This article offers an alternative to the conventional host media processing (HMP) solution. Using a PCI Express media acceleration card and embedded voice/video firmware offers improved performance while taking up less space, consuming less power and costing less.



■ “The world isn’t getting smaller, there’s just less in it,” said Johnny Depp as Captain Jack Sparrow in the third installment of the Pirates of the film series - At World’s End. The good captain is right about the world getting smaller but completely wrong about there being fewer things in it! In fact, there are more things being connected in the world and more that need to be communicated with. The explosion of connected devices has driven a massive expansion of global communications networks. As those networks transition to an all-IP environment, service providers and network operators are finding a need for IP media servers and new advanced flow management devices such as session border controllers, QoS analytic engines and intelligent flow optimizers. Many of these are developed and deployed on 1U or 2U standard rack-mounted server (RMS) architectures for simplicity. The role of IP media gateways and media servers is clear but as the developers and users of border flow management devices consider where to go next, one obvious step is to build some advanced media stream processing into the platform. One key concern is scalability. According to most analysts, mobile data and especially mobile video is expected to grow exponentially over the next three to five years, so the pressure is on to find cost- and power-efficient ways to scale media processing to suit. Some of the issues that confront equipment developers are as follows.

A good example of a flow management application is the session border controller (SBC), an often-quoted example of a class of equipment known as network security gateways. These are characteristic of “bump in the wire” devices that form a bridge between trusted and untrusted networks or enterprises. Their job is to analyze and characterize incoming IP traffic, block undesirable or unauthorized flows, and let through approved traffic. In communications networks, a lot of this traffic is media streams.

As this is a gateway point, many SBC users are also interested in providing additional media format translation in addition to the stream management. Even simple requirements like DTMF tone monitoring require that the media streams are decoded and analyzed.

The ability to have voice transcoding within the box helps simplify the communications flow for an operator, hence provides a competitive advantage for the equipment vendor. Unfortunately, voice and especially video stream processing in real time at high channel counts is a strenuous task, so adding this function can impose a significant reduction on the processing power available to the main service leading to a reduction in capacity. Adding media processing functionality to an application can be done in a number of ways: 1) an

additional system or device linked to the original appliance, 2) an internal software solution, adding functionality to existing software, and 3) an internal media processing accelerator offering hardware-accelerated transcoding. In the SBC plus voice transcoding example, using an external media gateway is perhaps the simplest to envisage. The border gateway terminates principal traffic streams, and redirects media to the external gateway for transcode via external ports. Media can come back into the border gateway for egress filtering. The disadvantage is that this is costly, uses rack space and extra power, takes up valuable physical network interfaces off the border gateway, and still requires application development that controls and configures media stream handling on a stream-by-stream basis.

Taking the media server plus HD video example described, using an external HD conferencing device will be complex to manage, will take up additional rack space and power, and could be high cost. The service application would need to be able to manage both systems in parallel, potentially increasing complexity, management overhead, and OPEX costs. Upgrade paths to newer compression schemes such as H.265 may be limited. The other two solutions allow for this function to be taken inside the box. An internal software solution, for instance using commercially available “host media pro-

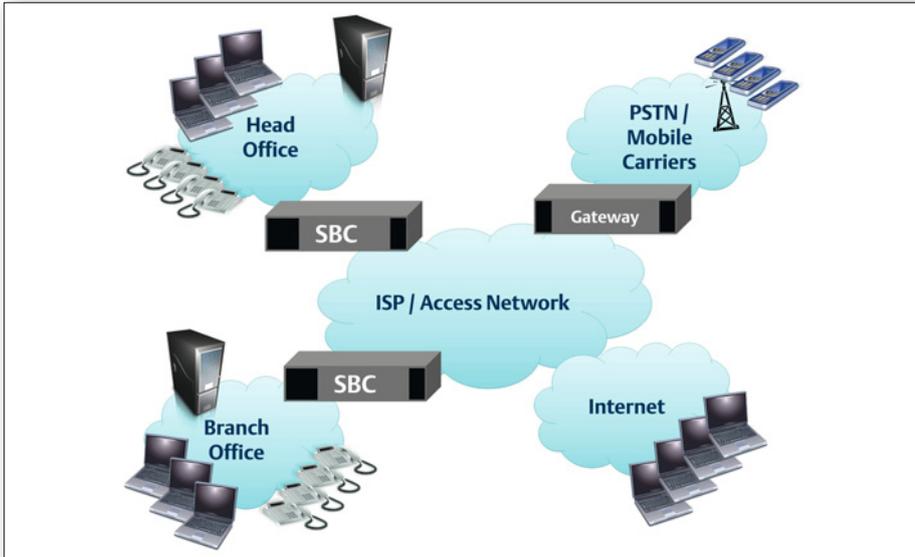


Figure 1. Session border controllers are gateways between heterogeneous networks.

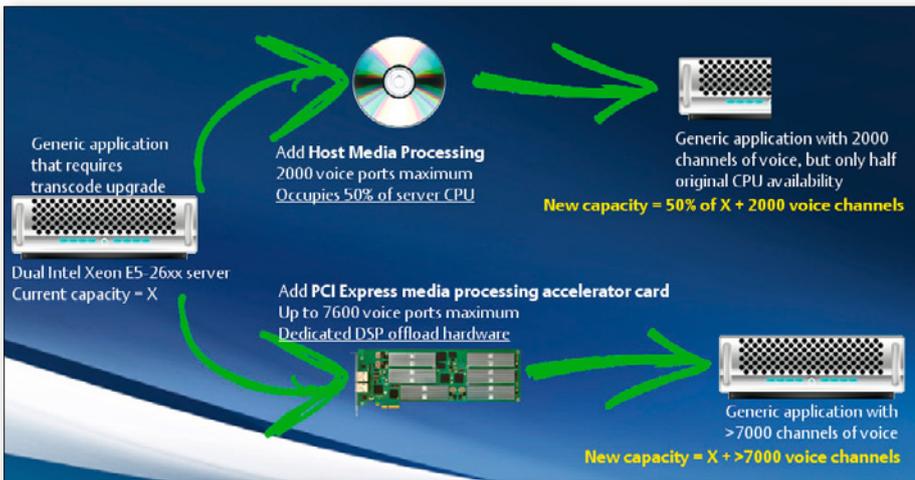


Figure 2. A conventional host media processing (HMP) solution can compromise server performance.

cessing” software, necessarily makes use of internal processing resources. In the case of voice transcoding, this may be a great solution for a moderate number of simultaneous channels, however it does not scale effectively. At upwards of 1200 simultaneous channels of G.729 encoding, the software solution approaches 50% utilization of a typical server, starving the original application of processing resource. Effectively this means that additional servers would be required to offer higher densities of voice transcoding, and the cost of the commercial software that is usually charged on a per-channel basis soon mounts up. Although it is possible to add more servers to address this issue, accepting a reduction in capacity even for an improvement in functionality is often difficult to manage from a product line perspective. It results in a downgrade of capacity within the same product offering, so cannot really be viewed as adding functionality. Matters get even worse when considering field

upgrades since a customer must accept that a given installation would no longer be able to carry the same traffic.

A more elegant solution to the problem is to use a plug-in media processing accelerator to offload both audio and video processing from the server host. This keeps the function internal to the network element and avoids the loss of central processing resource that would otherwise be required to run a fully software solution. Ideally this would be able to take account of new voice and video compression schemes as they emerge. In this case, using a plug-in media processing accelerator offers a true upgrade path.

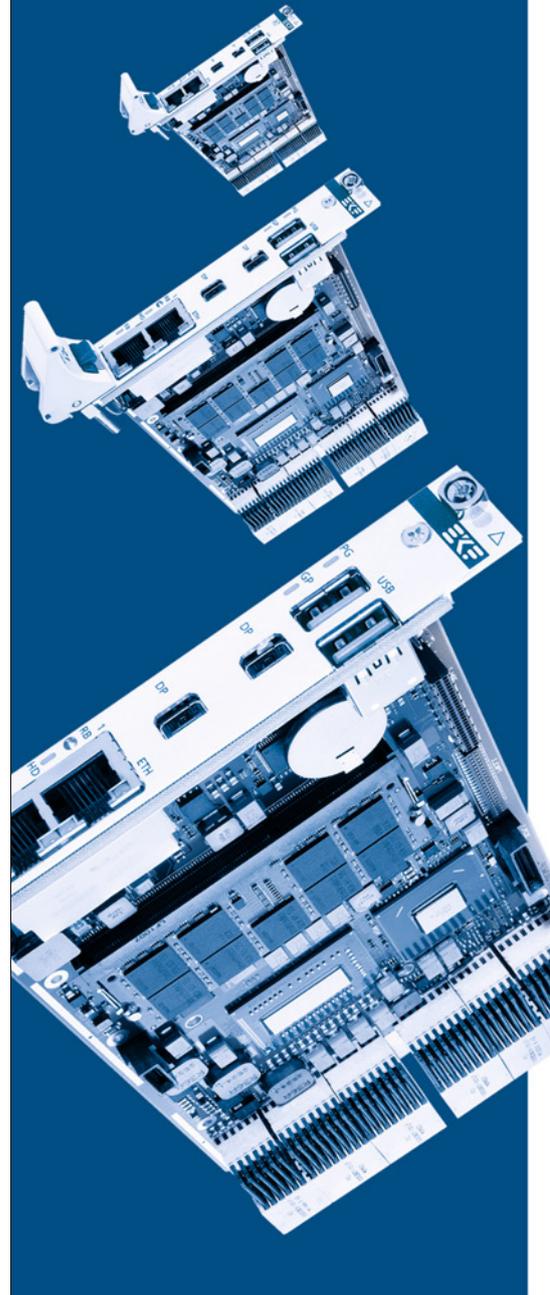
It is now possible to deploy PCI Express media processing boards that offer high performance voice and video transcoding based on digital signal processing (DSP) technology. Some boards even offer voice and video processing

CompactPCI® Serial

THE SERIAL FUTURE

SC1-ALLEGRO

- Intel Core i7 3rd Gen.
- 16GB DDR3 with ECC
- Dual Display Port 4HP (2 of 3)
- 2 of 4 USB 3.0 in 4HP
- 16x PCIe Gen. 3, 12x PCIe Gen. 2
- 4x Gigabit Ethernet
- Multiple SATA 6/3 Gb/s Ports
- Mezzanine / Sideboard Options and more...



EKF Elektronik GmbH

+49 (0) 2381 6890-0
www.ekf.com · sales@ekf.de



firmware optimized for their DSP array. Application developers can interact with these boards via a simple object-oriented application programmers interface (API). The transcoding performance scales linearly according to the number of DSPs that are fitted – options from 4 DSPs to 12 DSPs are available. But even with 4 DSPs and consuming less than 25W of power, Emerson offers the PCIE-8120 card, which delivers a voice transcoding performance comparable to a typical server consuming 300W or more.

An example may help illustrate the value of using acceleration. Consider a packet processing application that, in a server based on dual Intel Xeon processors, can support 4000 concurrent sessions or streams. The market now demands to add voice transcoding capability. As outlined already, one option is to use a commercial host media processing solution.

This requires approximately 50% of a dual Intel Xeon server capacity for 2000 transcode streams. As a consequence, adding this capability reduces the available processing power for the original application by 50%. The resulting solution is now only a 2000 stream processing device. To get back to the 4000 stream capacity, a customer must buy two units, so power consumption and rack space is doubled. The alternative is to add a PCI Express DSP accelerator board. This takes care of the processing-intensive workload, thus maintaining the original performance. In fact,

compared to a host media processing solution that is limited to approximately 2000 sessions per server, a single Emerson PCIE-8120 is capable of transcoding over 7500 bidirectional voice streams or over 300 mobile video streams in hardware, and multiple boards can be fitted to a single server.

When considering the PCI Express accelerator card route, design engineers should ensure their shortlisted solutions support the following 3GPP, ITU-T, IETF and other voice codecs: Uncompressed telephony: G.711 -law/A-law with Appendices I and II, Narrowband compression: G.729AB, G.729.1, G.723.1A, G.726, G.727, Wideband compression: G.722, G.722.1, Wireless network: GSM EFR, AMR and AMR-Wideband; EVRC and EVRC-B, and Internet voice: iLBC, SILK (Skype), Opus. In addition, each voice channel should support echo cancellation, announcements, conferencing, mixing, and a full range of tone detection and relay functions.

HD (or other) video streams can be redirected within an appliance to a PCI Express accelerator card and transcoding and conferencing can happen without making any use of existing processing resource. For example, a single Emerson PCIE-8120 can handle up to six 4-party video conference bridges where each participant uses H.264 720p at 30fps. It can also handle resizing to and from 1080p. Design engineers should ensure the solution they choose supports the most common video com-

pression schemes used in communications, such as H.263 (legacy) and MPEG-4 for CIF, and H.264 at resolutions up to 1080, and is easily upgradeable as newer compression schemes emerge. Many rack-mount servers are available in fully NEBS compliant, hardened versions, so the accelerator card should be designed for NEBS carrier grade and data center environments, so offering a common solution for both enterprise and telecom environments. In fact, Emerson also offers the ATCA-8320 ATCA media processing blade - based on the same technology - allowing OEMs to achieve even higher scalability up to multi-bladed AdvancedTCA systems while protecting software investment.

High density voice and video processing is increasingly in demand for applications such as session border controllers, media gateways/servers or media resource functions, video or content optimization, video communications servers, and interactive voice and video response systems. We can see that using a PCI Express media processing accelerator card, such as Emerson PCIE-8120, rather than additional servers has a lot of benefits. It takes up less space, it consumes much less power, it can easily be retro-fitted to existing deployed systems as a true feature addition, and it costs less than a comparable server + commercial host media processing combination for the same performance. Consequently, it offers a lower total cost of ownership and a much simpler upgrade and deployment experience. ■

Product News

■ ADLINK: dual channel 3G-SDI video/audio capture card

ADLINK announces the release of its first SDI video/audio capture card, the PCIE-2602. Based on the PCI Express x4 interface, unparalleled features enable 2-channel acquisition of 3G-SDI for low latency and uncompressed video data signals up to 1920x1080p/60fps, providing lossless full color 4:4:4 video and up to 12-bit video data for critical applications such as medical imaging, intelligent video surveillance and analytics, and broadcasting.

[News ID 17634](#)

■ AMP introduces new custom video solution

Advanced Micro Peripherals introduced a new program called Rapid Synthesis Video Platform, or simply RSVP. With AMP's new RSVP program, video systems developers gain a competitive edge while cutting their time to market and development costs. RSVP achieves this by making AMP's video technology available as a set of off-the-shelf hardware and software components.

[News ID 17778](#)

■ IBASE: 3rd gen Intel Core processor-based PICMG 1.3 CPU card

IBASE rolls out the IB965 PICMG 1.3 CPU card supporting the Intel Q77 Express Chipset and 3rd generation Intel Core processors. Supporting high performance, manageability and power efficiency, the IB965 is optimized for demanding applications in the medical field, industrial automation, transportation and gaming sectors.

[News ID 17666](#)

■ powerBridge: 4th gen Intel Core i7 VPX board with up to 16 GB RAM and XMC site

powerBridge announced the CONCURRENT Technologies 3U VPX board TR B12/msd which provides a 4th Generation Intel Core i7. The board has an up to 2.4 GHz Quad Core CPU, up to 16 GB DDR3L-1600 ECC RAM, up to three independent graphics interfaces, Gigabit Ethernet, PCIe, SATA 6Gbit/s, USB and RS-232/422/485 ports. The TR B12/msd is available with front I/O or XMC site from powerBridge Computer.

[News ID 17601](#)

■ DFI: Type 6 COM Express module with HM86 Express chipset supports 3 display outputs

DFI brings the 4th generation Intel Core processors to the HM960-HM86, Type 6 COM Express Basic module, in its Mobile product line based on Intel HM86 Express chipset. In system memory, support is provided for up to 2 16GB of DDR3L 1333/1600MHz low voltage memory interfaces for faster communication between components. The onboard memory storage, an optional SSD device, offers the persistent function of data storage.

[News ID 17661](#)

■ Schroff: creating individual subracks or cases through modification

For many customized solutions, modifications are required. The Pentair route to an individual subrack or case is through Schroff ServicePLUS. This series of options includes a range of services such as configuration, assembly, modification, solutions, etc. For the design of individual subracks and cases the modification and assembly services are of particular interest.

[News ID 17630](#)

■ **Vecow: fan-less embedded system with 2 fiber SFPs**

Vecow announces fan-less embedded controller ECS-7000-6F is still based on 3rd Gen Intel Quad-Core series processor (6M Cache, up to 3.30 GHz) same as all ECS-7000 series product family. Featuring 6 GbE LANs for 4 coppers and 2 SFP sockets, ECS-7000-6F also supports DDR3L and DDR3 maximum dual channel 16GB ram, 5 display input, 6 GbE LANs for 4 coppers and 2 SFP sockets, CFast, two 2.5" SATA 6Gp/s SSD | HDD trays, 4 COM, 4 USB 3.0 ports, JST connector, and 2 miniPCI-express, plus with overvoltage protection and Trusted Platform Module.

[News ID 17510](#)

■ **Acrosser: fanless Mini-ITX mainboard with Atom D2550**

Acrosser announces the new Mini-ITX mainboard, AMB-D255T3, which carries the Intel dual-core 1.86GHz Atom Processor D2550. AMB-D255T3 features onboard graphics via VGA and HDMI, DDR3 SO-DIMM support, PCI slot, mSATA socket with SATA & USB signals, and ATX connector for easy power in. AMB-D255T3 also provides complete I/O such as 6 x COM ports, 6 x USB2.0 ports, 2 x GbE RJ-45 ports, and 2 x SATA port.

[News ID 17762](#)

■ **Kontron: 10/40 GbE switch enhances data throughput in network-centric OpenVPX applications**

Kontron presents a new 10/40 Gigabit Ethernet switch that is designed to significantly enhance and standardize data throughput in network-centric OpenVPX applications. The outstanding feature of the fully managed Layer 2/Layer 3 Switch Kontron VX3920 is its 24 high-throughput 10 Gbit/s ports to the data plane. These can be scaled through channel bundling

even up to 40 Gbit/s bandwidth. By using this new rugged switch for inter- and intra-system communication, OEMs can achieve an enormous performance boost for their applications.

[News ID 17769](#)

■ **MEN: Box PC turns into 19" system solution**

Simple inventions have always been the best. On first sight, the new 19-inch-compatible insertion frame for MEN's Box PCs may appear simple, but it has considerable advantages for even more flexible application possibilities. Freely configurable interfaces combined with a CPU board with scalable performance, fast transformation of a Box PC into a Panel PC and different but always conduction-cooled housing sizes – these advantages of the modular Box PC family were not enough for MEN.

[News ID 17567](#)

■ **IEI: digital signage layer with 1920 x 1200 resolution**

IEI introduced the IDS-H61 embedded system with Intel Celeron dual-core processor. It presents as a high performance digital signage player. The IDS-H61 comes integrated with Intel HD Graphics with full HD video decoding capability to deliver high-performance graphics. The IDS-H61 embedded system featuring DisplayPort, DVI/VGA, Gigabit Ethernet and USB 2.0 port is designed to connect with multimedia output display to fulfill customers' requirements.

[News ID 17583](#)

■ **Rutronik: µATX mainboard family with 4th Gen Intel Core chipsets from Fujitsu**

Rutronik offers Fujitsu's new family D322x-B of µATX mainboards with LGA1150 sockets. The mainboards support the 4th generation Intel Core processor family. The new mainboards D3220-B with Intel B85 Chipset, D3221-

B with Intel Q83 Chipset and D3222-B with Intel Q87 Chipset are now mass-produced using the latest versions of the respective chipsets.

[News ID 17613](#)

■ **MEN: box PC for wireless applications offers nine antenna slots**

The robust BL50W box PC has been developed especially for wireless applications in trains, buses, construction and agricultural machines or airplanes. Despite its compact design it offers sufficient space for nine antenna slots in total as well as a multitude of application-specific I/O. Equipped with four PCI Express Mini Card slots controlling up to eight SIM cards and a GPS interface, the BL50W leaves nothing to be desired in terms of wireless communication – even when there are frequent location or tariff-related provider changes.

[News ID 17677](#)

■ **VadaTech: rugged conduction-cooled MicroTCA ecosystem**

VadaTech has released a complete ecosystem of boards and chassis in the MicroTCA architecture that is conduction-cooled. Designed for rugged applications, the products include Air Transport Racks, MicroTCA Carrier Hubs, Power Modules, and Advanced Mezzanine Cards.

[News ID 17679](#)

■ **Wind River: VxWorks 653 used in over 300 programs**

Wind River has announced that the total number of Wind River VxWorks 653 Platform design wins has reached 300 programs. VxWorks 653, a COTS platform for delivering safety-critical, integrated modular avionics applications, is used by more than 165 customers on over 60 aircraft.

[News ID 17667](#)



At the heart of computing.

Designed to improve lives. Our embedded computer modules are peerless in the medical sector.



The conga-TS87 is the perfect solution for you:

- COM Express Rev. 2.1 module with Type 6 pinout
- 4th Gen. Intel® Core™ i7 processor up to 2.4 GHz
- 3x DisplayPort 1.2, up to 4k resolution (QFHD=3840x2160@60Hz)
- Up to 13% higher computing performance*
- Up to 32% higher 3D graphics performance*
- * Compared to previous generation



Embedded computing for unmanned ground vehicles

By Mike Jones, ADLINK Technology

The aggressive roadmap for unmanned ground vehicles demands a common, standards-based high performance embedded computing (HPEC) architecture. ADLINK with other embedded platform vendors is working to meet the requirements for HPEC systems of the future, answering.



Figure 1. Lockheed Martin SMSS, currently deployed in Afghanistan

■ The only constant is change and innovation. This is particularly true for modern standards of warfare and as a consequence, for suppliers of defense technology. The military plot has changed. Fewer ground troops are supported by self-navigating vehicles (Unmanned Ground Vehicles, UGV) furnishing reconnaissance data. Network based tactic decisions are the driving force behind the development of systems and applications to optimally support modern warfighters.

Finally, strategic battlefield operations are highly dependent on the availability of real-time data to be accessed and shared by commanders, who can then spread dedicated data to their front fighters. The diversity of UGVs on the battleground is ever increasing, and will include types which have been discussed in the roadmap of Unmanned Ground Systems¹. On the electronics side it turns out that continued reduction of SWaP (Space, Weight, and Power) is a critical demand – combined with a standards-based reduced foot print, flexible I/O and high performance of embedded computing power (HPEC).

The support of autonomous ground mobile computing requirements for vehicle operating functions such as vision, communications and autonomous navigation, in parallel with support for payload functions such as custom

sensor input or weapons management, will place a high burden on the current crop of rugged HPEC offerings. Will the answer be more custom-fit proprietary solutions, a mix of smaller dedicated processors or the evolution of standards to meet the needs of an autonomous vehicle future? The optimistic answer is that the evolution of technology standards, COTS and engineering innovation will be help usher in the age of vehicle autonomy in all forms of military engagements.

Today UGVs are either tele-operated by a remote human driver, or run semi-autonomously. At this stage of UGV development, there is a range of capability for autonomous operation. For example, the UGV can either be slaved to another human-operated vehicle in a convoy scenario, or follow a tracking beacon or geographic waypoints using onboard sensors, GPS and computing power to guide progress. HPEC can play a big role in the evolution of autonomous capabilities as they head toward full independence. In addition, the needs of payloads, such as Improvised Explosive Detection (IED) devices, will become ever more sophisticated. Autonomous operation will need situational awareness provided by payload computing as UGVs become fully autonomous. To support progress toward full autonomy, the US Army RS JPO has developed a functional plan for multiple types of UGVs, in-

cluding multiple classes of vehicles and unmanned ground vehicle platforms. Specifically, the classes known as self-transportable and appliqué will have the most influence over the HPEC evolution. The RS JPO Unmanned Ground Systems Roadmap was created with key technology enablers for UGV growth over time. Some of these enablers will have a unique evolutionary/revolutionary HPEC requirement, especially as applied to the sub-segments of autonomous navigation, power, vision, architecture and payload support. To support this roadmap, HPEC solutions will soon require performance upgrades beyond what is available today. Within the UGV self-transportable and appliqué classes there are specific programs with unique capability sets that require technology enablers in order to adhere to the roadmap. These programs include the following.

Project Workhorse: UGV program deploying in Afghanistan that involves a self-transportable utility platform in the form of the Army-sponsored Squad Mission Support System (SMSS) from Lockheed Martin. The SMSS is an autonomous ground vehicle that can carry up to a half-ton of squad equipment and can be remotely operated via satellite to perform autonomous operations such as follow-me, go-to-point and retro-traverse. The SMSS sensor suite integrates light detection and ranging (LIDAR), infrared (IR) and a colour camera.

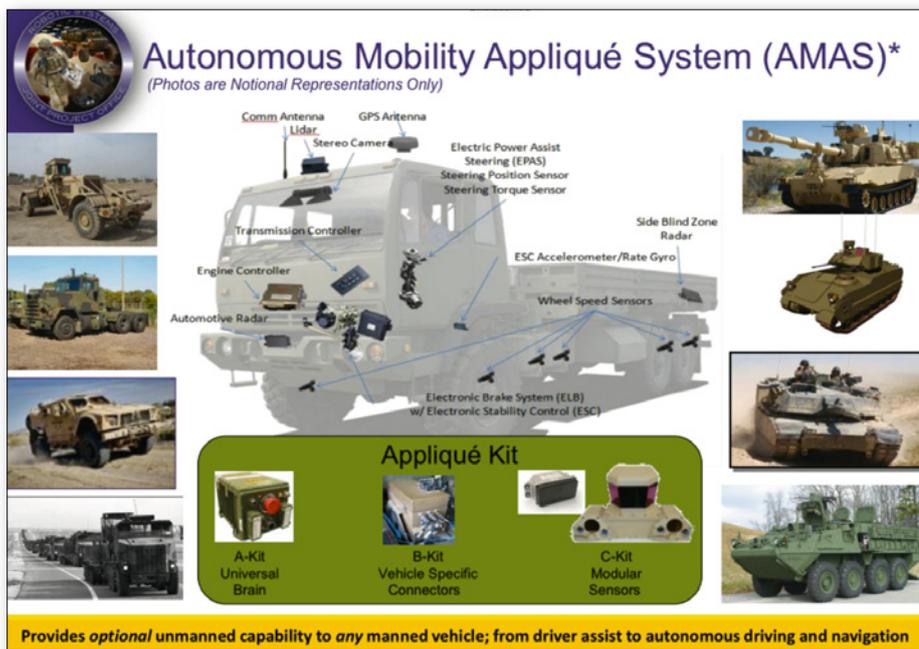


Figure 2. Examples of how the AMAS kits can be used in a variety of military vehicles to promote varying levels of autonomy.

The vehicle can lock-on and follow any person by identifying his 3D profile captured by the onboard sensors. The SMSS can autonomously navigate through a pre-programmed route using GPS waypoints. Evolution of this class of UGV will require improvements in onboard computer power consumption and more and better sensor integration, while also providing equal or higher computes with a reduced detectable emission signature (figure 1).

Convoy Active Safety Technology (CAST): Autonomous Mobility Appliqué System (AMAS) in the form of an add-on or appliqué retrofit kit to virtually any existing manned vehicle, permitting a wide range of autonomous behaviour. Capabilities range from remote operation to driver assist to fully autonomous driving and navigation. The AMAS will be produced using a common open architecture and delivered in multi-kit form: an "A-Kit," which is the universal brain; a "B-Kit," which contains the vehicle-specific sensors, aggregation and connectors; and the "C-Kit," which is oriented toward payload management. With the AMAS, more processing means more autonomous capability; to meet the scale of expected demand, the kits should be delivered in a smaller, standard footprint and take advantage of standardized connections, lowering system costs (figure 2). A common need across programs is the function of autonomous operation and payload support. For the AMAS technology illustrated in figure 3, autonomous operation is achieved using a combination of multiple sensors, onboard processing, drive-by-wire functionality and additional payload control.

While these programs are currently underway, the Army's RS JPO technology roadmap demands enhanced capabilities for future revisions of these programs that support the following. Integration of higher definition IR cameras, more onboard image enhancement for visible spectrum cameras, future integration of both visible and IR data in real time, more camera/sensor inputs that can support higher bandwidth. Algorithm support for object detection and avoidance, intelligent object detection and tracking, stereographic imaging, and processing (eventually reaching object identification). HPEC computing support for the above, along with integration of multi-sensor payloads such as IED detection, weapons management, manipulators and sensor cross-cueing. Future common standards-based architecture for UGV computing (per the RS JPO and its Interoperability Initiative - currently at IOP v.0).

For UGVs to achieve improved autonomous operation, the technology roadmap calls for progress in sensor capabilities in terms of input speed, multiple sensor data aggregation, real-time data processing and results dissemination to the controller subsystems. With the sensor requirements and payload-specific support, such as side-looking radar for IED detection, the demand on a single HPEC solution is great. In addition, the push for open standards across the entire scope of product architecture will drive adoption of less proprietary physical hardware, connectivity and software solutions, thus creating the potential for more competitive interchangeable and evolutionary options.



- Low Power Consumption
- High Performance
- Energy Efficiency

Avalue Embedded Platforms

- 

ESM-QM77 | COM Express
Intel® Core™ i7/ i5/ i3 COM Express Type 6 Module with QM77 Chipset

 - One SODIMM Up to 8GB DDR3 1333/ 1600, Support CRT, LVDS, DP, HDMI, DVI, SDVO, Audio, GbE, 7 PCIe x1, 1 PCIe x16, 4 SATA, 8 USB 2.0, 4 USB 3.0, 8-bit GPIO
- 

EPI-QM77 | EPIC Module
Intel® Ivy Bridge EPIC Module with Intel® QM77 Chipset

 - One SODIMM Up to 8GB DDR3 1066/ 1333, Triple Display, 2-CH LVDS, 1 DVI-I, 1 HDMI, Dual GbE, 2 SATA III, 2 COM, 16-bit GPIO, 2 USB 2.0, 4 USB 3.0, Support iAMT 8.0, mSATA
- 

ERS-CDV | Rugged System
Fanless Rugged Embedded System with Intel® NM10 Express Chipset

 - Intel® Atom™ D2550 1.86GHz CPU, Dual View, VGA, HDMI, 5.1-CH Audio, Dual GbE, 1 CF, 1 SATA, 2 COM, 6 USB, 16-bit GPIO
- 

OPM-CDV | Open Pluggable Module
Fanless Open Pluggable Module Compliant

 - Intel® Cedarview N2800 1.86GHz CPU, Interchangeable Qseven Module and Carrier Board, Onboard 1G DDR3 1066, 1 HDMI, 1 GbE, 1 Line-out, 1 COM, 2 USB, 1 Mini PCIe, Support 2.5" HDD/ SSD
- 

OPC-15W6 | Open Frame Module
15.6" Open Frame Panel PC Module

 - 15.6" Full-HD TFT-LCD Display, PCAP (Multi-Touch), Fanless Design, Intel® Core™ i7-2610UE 1.5GHz CPU, Open Frame and Bezel Free
- 

APC-18W5 | Multi-Touch
18" Intel® Atom™ D525 Fanless Multi-Touch Full Flat Panel PC

 - Intel® Atom™ D525 w/Intel® ICH8-M Chipset, GbE, 5.1-CH Audio, 2W AMP, 1 CF, 1 COM, 2 USB, 1 Mini-PCIe, Timer-Power-On, Wide Voltage +12V ~ +28V Input, ErP Power, IP-55 Compliant Front Panel, Programmable Function Key
- 

LPC-1507-PCT | Multi-Touch
Fanless 15" XGA TFT Multi-Touch Panel PC

 - Intel® Atom™ D2550 1.86GHz CPU, HDMI, Audio, GbE, 1 CF, 1 COM, 2 USB, Wide Voltage +12V ~ +28V Input, ErP Power, Full Flat Front Panel, Supports 2-points Multi-touch, IP-65 Compliant Front Panel



MORE PRODUCT INFORMATION
sales@avalue.com.tw

Tel: (886) 2 8226 2345 FAX: (886) 2 8226 2777

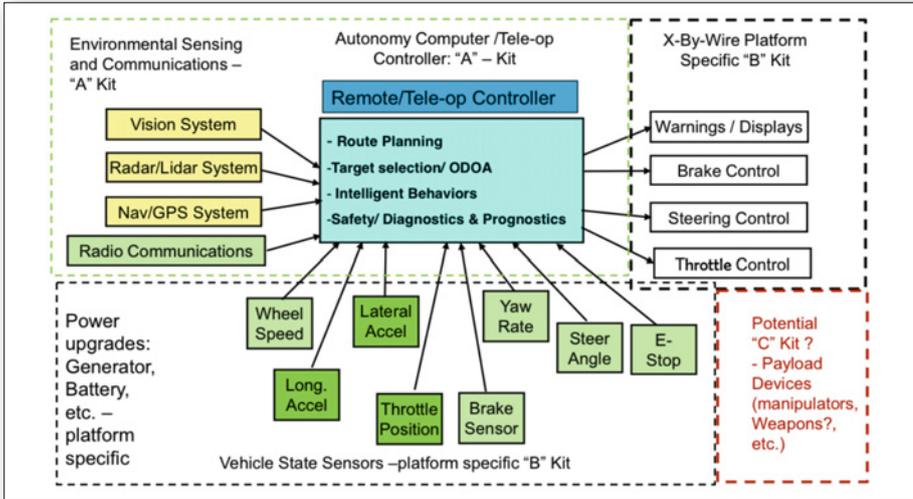


Figure 3. For the AMAS technology autonomous operation is achieved using a combination of multiple sensors, onboard processing, drive-by-wire functionality and additional payload control.



Figure 4. The Adlink HPERC is a sealed, rugged COTS computing platform incorporating industry standard technology and long-life processing architecture.

Computing requirements in UGVs are being driven by imaging used in support of machine vision and the advent of complex payloads for IED detection. There are military UGV programs that need an ability to perform autonomous navigation during the day, as well as the night. They require the ability to navigate in stealth mode (where perception sensor energy is not emitted). Using a pair of thermal infrared (TIR) cameras, stereo ranging and terrain classification can be performed to generate an annotated map of the terrain. TIR is a convenient option, since a single TIR camera may already be a part of the sensor suite of many vehicles. A HPEC is provided to analyze the thermal image data and perform the terrain mapping.

For the evolution of autonomous operation relying on TIR offered in UGVs, the image processing that is critical to control functions like autonomous navigation will need to increase as the sensor data streams increase. To achieve useful machine vision, a camera sensor

fusion will likely include IR, colour CCD and LIDAR capability in a single turret. Each of these cameras will operate between 15 to 60 fps and can today generate uncompressed 516 Mbits/second of image data per camera, growing to 1.3 Gbits/second and finally 3.48 Gbits/second. Camera data might not be compressed at the source, so as not to degrade the level of image processing that can be rendered by the HPEC interfaced using the RS-170 or RS-422 video signal standard. As data rates increase, CameraLink, GigEVision or CoaXpress will replace the mentioned interfaces.

The RS JPO roadmap calls for new obstacle and collision avoidance algorithms, which rely heavily on recursive calculations best done on GP-GPUs or specialized FPGAs. For example, recent research done for UAV image processing using GP-GPU based algorithms has shown a 99.5% increase in performance over running the same algorithm on an Intel CPU. In all cases, the GP-GPU rendered the results in less

than 50msec. Given a fully autonomous vehicle scenario where a human operator is not involved, and vehicle operation decisions must be made in real-time at speed; having an HPEC equipped with GP-GPU capability that can correlate all the inputs and successfully execute the mission is imperative. Hence the use of multiple types of higher definition cameras running at a higher resolution; higher bandwidth will drive the design of rugged HPEC computing that supports future UGVs.

A complete anti-IED payload system requires an IED-detection component, an IED-assessment component and an IED-defeat component. The payload processing must be accomplished in real-time to achieve the desired level of safety for the UGV and its mission. As with autonomous navigation and machine vision, the real-time detection of the changes in the data coming from the detector components will require a large amount of either GP-GPU or FPGA processing.

Today, a divide and conquer approach is used to separate vehicle control, sensors and payload processing. Separating functions into kits as described with AMAS technology is a good approach to the future growth of HPEC in UGVs. For example, a fully autonomous vehicle with a payload of ground penetrating radar could not execute all of its processing tasks with a single HPEC solution. By sub-dividing the problem into compute and function nodes, a scalable long-term solution emerges. Having standards for the UGV solutions that regularize the HPEC physical box size, supported I/O and connector types will enable interchangeability and evolution as HPEC solutions grow and change.

Evolving UGV requirements need raw processing speed and execute algorithms that are highly recursive, creating the need to have HPEC solutions that combine generic COTS Intel CPU processing and a closely coupled GP-GPU into a single solution.

As mentioned, the RS JPO is promoting the use of standards in the fielding of UGV solutions, current market 3U and 6U VPX provide rugged HPEC solutions. Emerging standards in smaller footprint HPEC solutions include the VITA Technologies standard known as VITA 75. VITA 75 takes a fundamentally different approach from other small form factor standards, in that it concentrates on the physical box, a set of standard enclosure dimensions, connectors and I/O pin assignments, rather than on specifying the individual computer modules inside. VITA 75 subsystem profiles are composed of up to four separate sub-profiles: VITA 75.0 component of subsystem profile (base profile), VITA 75.11 component

of subsystem profile (front panel profile), and VITA 75.2x cooling and mounting, consisting of a VITA 75.2x dot specification followed by profile nomenclature specified by VITA 75.2x. VITA 75 solutions are especially well-suited to address UGV HPEC requirements, as they provide designers with a set of standardized footprints that are generally smaller than equiv-

alently equipped OpenVPX 3U or 6U solutions, while also offering a standardized connector scheme that allows for sub-system interchangeability at the vehicle-level and provides for evolution of the vehicles sub-system in a predictable fashion. Adlink HPERC (High Performance Extreme Rugged Computer) system is typical of this type of VITA 75 solution. It

provides a solid foundation of Intel i7 processing closely coupled to either an embedded NVIDIA or ATI GP-GPU, as well as a wealth of camera and vehicle data bus and I/O support. This solution can readily provide the necessary image processing and I/O required for UGV applications both today and in the future. ■

Product News

■ DSM: modular 4-U 19-inch industrial PCs with industrial mainboard or slot CPU

The 19-inch Infinity I4 systems with 4-U height are available from DSM Computer in three different models with Industrial ATX Mainboard, PICMG 1.0 or PICMG 1.3, the latter two as slot CPU. For flexible applications, the high-performance computers can be equipped with various microprocessor types and chipsets of the latest generations. The robust IPCs have a housing depth of 408 mm or 508 mm, respectively.

[News ID 17584](#)

■ ECRIN: ONYX rugged computer adopts Core i7 4th gen

After Sandy Bridge and Ivy Bridge versions in 2012, ECRIN Systems announces ONYX jumps on Intel Core i7 4th Generation. COM Express Internal architecture allows ONYX excellent support to successive evolutions of multi-Core Intel processors. Without changing anything inside the box, simply substitute the CPU module, and ONYX keeps at the forefront of performance and technology. This flexibility guarantee our customers a perfect management of long life cycle, while offering high scalability to serve more and more complex and intensive computing power applications.

[News ID 17749](#)

■ NEXCOM: industrial Wi-Fi access point with preinstalled security protection

NEXCOM's SWF 1210 is an industrial Wi-Fi access point built with security features to protect small and medium enterprises from security threats posed by BYOD (Bring Your Own Device) trend. The SWF 1210 offers enterprise-level encryption and authentication to prevent unauthorized access. To keep security threats at bay, the SWF 1210 can detect and block malware, prevent intrusion, filter predefined applications and websites, ensuring SMEs network is securely connected by ubiquitous wireless devices.

[News ID 17483](#)

■ Amplicon: fanless embedded industrial PC can house up to 16GB DDRIII memory

The Amplicon Impact-E 200 is a compact, yet powerful embedded industrial PC, housed in a lightweight chassis and designed to increase heat dissipation. The Impact-E 200 is an exciting new addition to the renowned embedded series by Amplicon. The Amplicon Impact-E 200 builds upon the strong foundations of the Amplicon Impact-E series to deliver the power of the Ivy bridge mobile iCore processor and the amazing feature set of the Intel QM77, all packaged in a fanless compact chassis.

[News ID 17767](#)

■ AAEON: embedded Box PC with Intel Atom N2600

AAEON unveils the TKS-P20-CV01 fanless embedded Box PC with Intel Atom N2600 1.6GHz processor and up to 2 GB of DDR3 800MHz system memory in an extremely space efficient palm-sized form factor. The compact and highly affordable TKS-P20-CV01 weighs in at only 800 grams and is ideal for data collection and control in energy utilities, building automation and demanding industrial automation environments, where fanless low-power consumption designs are required.

[News ID 17742](#)

■ BVM: Mini-ITX SBC supports Intel 4th Gen i7/i5/i3 processors

The new ASRock IMB-181-L motherboard from The BVM group is one of the first Mini-ITX SBCs to be based around the latest Haswell 4th generation 22nm Intel Core i7/i5/i3 quad core processors. The Haswell units integrate the CPU, Platform Controller Hub and video controller into a single BGA package, offering a TDP reduced by up to 50% below the previous Ivy Bridge generation. Running under the Intel Q87 Chipset, the Haswell processors support up to 16GB of system memory at 1600MHz in two banks.

[News ID 17528](#)

msi IPC

We Customize for Your Solutions



MS-98D1 EPIC Mainboard

- Atom™ D2550/N2800/N2600 Dual Core
- DDR3 SO-DIMM up to 4GB
- 2 independent displays (VGA, DVI, Dual LVDS)
- Dual Intel GbE LAN; dual Mini-PCIe
- SATA 2.0, mSATA, 6 COM, 6 USB 2.0
- Wide input voltage: 9-36 VDC



MS-9A61/62/63 Panel PC

- 15/17/19" TFT LCD w/ touch panel
- IP65 front panel for water-/dust-proof
- Flexible storage interfaces (HDD/SSD/mSATA/SATA DOM)
- Support DC-in 12V
- Open-frame or with bezel (optional)

HPEC: the new force in military/aerospace embedded computing

By Michael Stern, GE Intelligent Platforms

Increasingly, the world's armed forces are in the business of electronic data collection. This is creating significant challenges – but with High Performance Embedded Computing (HPEC) those challenges can be met.



Figure 1. GE IPN251 combines an Intel Core i7 processor and an NVIDIA CUDA GPU on the same board.

■ Everyone is talking about big data – the vast amounts of data increasingly available to commercial organisations from a huge number of sources. The data is not only extensive, but complex – creating significant challenges in capturing, storing and manipulating it, and turning it into useful, actionable information. Traditional computing tools and methodologies are insufficiently powerful or capable to deal with the problem. Addressing that problem saw the rise of High Performance Computing (HPC). HPC is, in effect, the direct descendant of what used to be known as supercomputing – applying multiple processors in parallel to a problem.

The history of supercomputing can be traced back to Seymour Cray, who designed the Control Data 6600 – which is widely regarded as one of the first supercomputers – almost 50 years ago. Central to supercomputing was the principle of parallelism – multiple computers working simultaneously on elements of the same task – implemented in a variety of ways. Dividing a task into multiple parallel sub-tasks as multiple threads allowed the power of multiple processors to be applied to those sub-tasks. That parallelism is now built into everyday consumer desktop PCs and Laptops. The first desktop dual-core CPUs came to market around eight years ago, becoming popularised with the launch of the Intel Core 2 Duo proces-

sor in 2006. The Intel range now includes quad-core and eight-core processor platforms while, over at Freescale, the QoriQ architecture also delivers up to eight cores.

Along with shrinking die size – in which increasing numbers of transistors are packaged more closely together with smaller and smaller gaps between them, enabled by ever-more sophisticated manufacturing processes – the implementation of multiple cores has become the key driver of computing performance. Specialist multicore processors that also rely on their inherent parallelism have also been developed for applications such as networking. Here, the Cavium range of multicore Octeon processors have been designed specifically for applications such as packet processing – the application of a range of algorithms to a packet of transmitted data that aid in routing, traffic management, security and even billing. Speed is of the essence – and the ability to perform multiple tasks on the same piece of data concurrently is a significant contributor to that speed.

Over time, supercomputing migrated from a very few processors operating in parallel to a point where thousands of processors were being applied, cross-connected in order to deliver rapid solutions to highly complex problems. That's what HPC does – but it does it in

vast, air-conditioned data centres, tended by technicians in clean white coats. The military/aerospace world is facing similar big data challenges. Electronic warfare applications such as ISR (intelligence, surveillance, reconnaissance) are seeing the deployment of increasing numbers of sensors – radar, sonar, video and so on – capturing more data that is more complex at higher speeds. As with commercial computing, the challenge is to turn that data into actionable information. In the case of military/aerospace applications, however, turning that data into information goes beyond mission critical: it is often a matter of life and death.

But if data volumes and complexity are similar challenges in the commercial and the military/aerospace worlds, there is of course a significant difference between the two. Military organisations around the world are looking to deploy the most processing performance possible in the smallest spaces. The growing trend towards increasing numbers of unmanned vehicles is putting constraints on size, weight and power (SWaP) unlike anything that has been known before. What is needed is massive parallelism in silicon rather than in servers – and nowhere has parallelism in computing been exploited more completely than in graphics processing. Graphics processing lends itself extraordinarily readily to the use of multiple cores because it is computationally

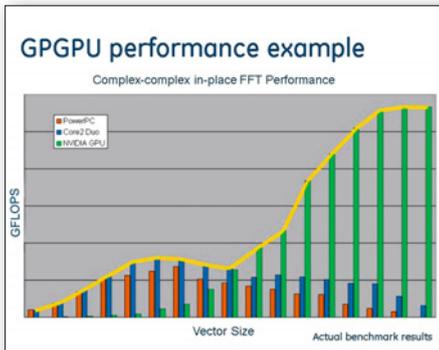


Figure 2. In an FFT typical of mil/aero applications, a GPU can substantially outperform a traditional processor (GE).



Figure 3. GPGPU enables the same processing performance in a much smaller space/weight – or significantly more performance in the same space/weight.

intensive, because it can readily benefit from parallelism or concurrency – and because graphically-rich applications typically require response times that are measurable in milliseconds. That is why the most recent graphics processing units (GPUs) like the latest Kepler architecture solutions from NVIDIA feature no fewer than 384 cores.

What has become clear is that the number of applications that can benefit from significant degrees of parallelism in processing stretches far beyond graphics – and this has given rise to the term „GPGPU“, or general purpose processing on a graphics processing unit. GPGPU leverages the power of GPU technology to deliver outstanding performance in areas as wide-ranging as medical science, fluid dynamics and finance. Military/aerospace applications are notorious consumers of processing power, so it is no surprise that HPEC is rapidly establishing itself as a key technology. It offers the possibility of substantially increased functional capability – while simultaneously reducing size, weight and power (SWaP).

For example: a subsystem capable of delivering close to 600 GFLOPS of compute performance would, until not long ago, have occupied four cubic feet of space, weighed 105 pounds, and consumed 2,000 watts of power. Today, using the parallelism inherent in GPGPU technology, that same level of performance can be achieved from an enclosure occupying just 0.8 cubic

feet, weighing only 10 pounds and consuming a mere 200 watts of power. Given the increasing need for sophisticated computing capabilities to be deployed within the physical and power constraints of a broad range of military vehicles – including unmanned vehicles – the attractions are obvious.

High Performance Embedded Computing may have GPU as a key technology – but the two are not necessarily synonymous. HPEC needs the best processing power it can get – and there are applications where alternative processors, such as FPGAs and DSPs, offer a valuable alternative. Similarly, multi-computers designed for digital signal processing applications have a place in HPEC. For application control, they might include the latest generation of multicore processors from Intel and Freescale. The chances are that these will be combined. HPEC systems are invariably hybrid systems with parallel-core GPUs working in tandem with multicore CPUs. Those might be a mixture of boards of different types housed in a chassis – or, as is the case with GE's IPN family, might be a single board that combines the latest Intel Core i7 quad-core processor with the latest NVIDIA GPU.

But for all these parallel processors to communicate effectively – not only with each other, but also with the surrounding subsystem – requires an appropriate system architecture which has the principle of flexible, high speed interconnection at its heart. Specifically designed for the rigours and performance demands of military/aerospace applications is the VPX architecture, with its focus on high speed interconnect. Offering an order-of-magnitude increase in data rates over VME, the architecture which almost single-handedly created the embedded computing industry and to which VPX is the natural heir, it can move over 100 GBytes per second from board to board.

Supporting VPX are switched fabric technologies such as Gigabit Ethernet, PCI Express, Serial Rapid I/O and InfiniBand. The latter is particularly interesting because of its penetration of the TOP500 high performance computing clusters, where it has become the leading interconnect. This illustrates a key point. With highly constrained defence budgets, and increased pressure on timeliness, COTS (commercial off-the-shelf) solutions are now even more compelling for the military. For HPEC to fulfil the requirements of minimal risk, rapid time to market and low cost, it must leverage the same technologies as are found in the HPC world. The reasons are simple. Extensive deployment of architectures and technologies in the HPC world means that there is a widespread ecosystem of development tools and skills. Whether those are tools and skills

for InfiniBand, or tools and skills for GPU technology, the growing focus of military organisations on reducing program risk, program cost and time-to-market is well-served by an infrastructure of toolkits, for example, that notably saw one traditional embedded computing application ported to NVIDIA CUDA GPGPU environment in only a couple of weeks – and delivering a substantial increase in performance with dramatic reductions in time to market and SWaP.

The most recent developments in HPEC are showing the promise to deliver significant increases in GPGPU performance, even beyond the outstanding performance GPGPU is already delivering in military/aerospace applications. Since GPGPU computing emerged in 2007, the performance gains offered by GPUs have been offset to a degree by a critical bottleneck: moving the data to and from the GPU over PCI Express. In the past, the GPU was only able to DMA (direct memory access) to/from system memory, routed via the CPU. If the data originated from another PCI Express endpoint, such as an FPGA, 10 GigE NIC, or InfiniBand HCA, the data would first have to be DMA'd to system memory, then in many cases copied in user-space between unshared driver buffers, and then finally DMA'd into the GPU for processing. Because of the additional hops in system memory, this datapath incurred additional latency and decreased bandwidth, which precluded the GPU from being deployed in many real-time applications.

However, beginning with the latest generation of Kepler family GPUs and CUDA 5.0 from NVIDIA, a new feature called GPUDirect RDMA enables third-party PCI Express endpoints to DMA directly to and from the GPU, without the use of system memory or the CPU – resulting in dramatically lower latencies and more efficient PCI Express utilisation, as well as decreased CPU overhead. GE IPN251 provides support for GPUDirect RDMA.

Some have claimed that the definition of High Performance Embedded Computing is elusive. In fact, the definition could not be clearer. HPEC is about deploying the most amount of computing power into the smallest space possible. It achieves this feat by exploiting the parallelism that is increasingly a feature of processor silicon nowadays and that is supported by technologies such as VPX and InfiniBand and by the rapid growth in appropriate tools and people skills. HPEC may be a relatively recent phenomenon – but it is increasingly becoming the approach of choice to solve the most demanding challenges faced by military/aerospace organisations, and will continue to take advantage of the commercial technologies that are being applied by the largest businesses of the world. ■

Panel PCs transition to single-touch, multi-touch, and widescreens

By Christian Lang, DSM Computer

The new Panel-PC family from DSM Computer includes not only systems with 43 cm and 38 cm diagonal single-touch screens but also a 47 cm widescreen with LED backlight and multi-touch. Which panel PC suits which applications?



■ The Apple iPad and the Apple iPhone were the pioneers. Thanks to modern tablet PCs and smart phones, every user is now familiar with modern touch screen technologies as a human-machine interface. The touch screen as intuitive input/output medium can be operated very effectively with a finger or a pointer. And we do not want to forgo the advantages of this simple human machine interaction (HMI), to which we have quickly become accustomed, for the operation of industrial displays and panel PCs. Nowadays, various proven touch screen technologies are available for deployment depending on the display application. A touch screen consists of a touch sensor, a touch controller for processing the signal and a software driver. The surface of the touch sensor is made of optical glass or a flexible polyester. Touching the surface produces, for example, a resistance or field change that can be used to determine the touched position.

The resistive single-touch technology that requires pressure produced by a finger or some other object on the surface is the most popular technology (figure 1). The touch-sensitive surface consists of two conductive layers made of indium tin oxide (ITO). The opposing layers are separated from each other using small spacers. Whereas the rear layer is applied on a stable surface, the front layer is normally on a

flexible polyester. A small test voltage for control purposes is applied to both ITO layers. When the flexible polyester is touched, both layers are pressed together and a current flows briefly. The resulting voltage change allows the position of the pressure point to be determined exactly. Simple 4-wire technology includes four channels that serve as connection to the controller, where both ITO layers are used to determine the contact point. 5-wire technology achieves a higher accuracy.

The most powerful argument for the use of touch screens is their low cost of manufacturing. The precision of the position determination suffices for many applications. Any object can be used to operate the touch screen, even a gloved hand. The flexible polyester layer, however, is subject to wear because of the mechanical force. Touch screens have a high resistance to dirt and are largely resistant to spilt liquids, aggressive chemical cleaning agents and other external effects, such as grease, moisture, dust and dirt.

Resistive touch technologies are increasingly being replaced with projected capacitive touch (PCT or PCap) touch screens that do not require any force on the surface (figure 1). The displays integrate a dual-layer coordinate network consisting of electrodes that use voltage to produce a uniform electrical field. Touching

with a conductive object issues a charge transport that causes the electrostatic field between the electrodes and the capacitance to change. Because the capacitance in the complete coordinate network is measured continually and the inputs of the individual fingers can be registered separately, capacitive touch screens offer multi-touch capability. For the PCT technology, a glass plate is placed in front of the display. The ITO layer is located on the rear of the glass plate and projects the capacitive field to the glass plate. The relatively expensive PCT touch screens are very resistant to dirt, heat, cold and moisture and more robust than resistive systems (table 1). Even scratches in the surface do not impair their function. The glass surface increases the service life greatly and, depending on the controller setting, also permits operation with thin gloves. Outdoor deployment is possible.

Nevertheless panel PCs with resistive single-touch screens are still very popular in the automation market and, thanks to their many advantages, continue to be ideal for some future applications. The monitors normally have a width-height ratio of 4:3 or 5:4. For this reason, DSM Computer also offers two new panel PCs with single-touch. Panel PCs with 15" or 17" display diagonals and resistive single-touch are still the high runners in the market. Modern design and flat construction

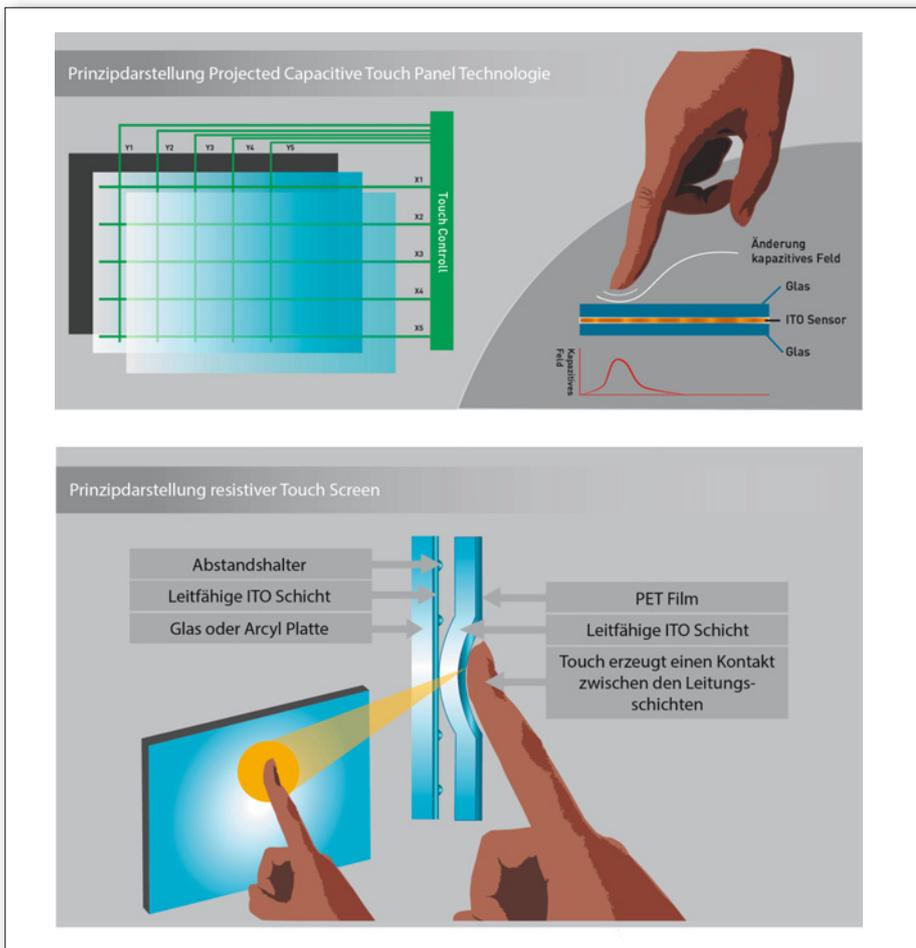


Figure 1. The principle of resistive and PCT touch screen technologies

are becoming ever more important and not the least reasons for developing new products. The PN17-A2 flat ultra-slim panel PC has a 43cm (17 inch) TFT display with 5-wire single touch screen; the PN15-A2 model has a similar 38cm (15 inch) display (figure 2). The luminance of the displays with LED backlight is 350 or 400cd/m², respectively; the maximum resolution is 1280 x 1024 (PN17-A2) or 1024 x 768 pixels (PN15-A2).

However, modern panel PCs with multi-touch and widescreens are becoming ever more important for harsh industrial deployment. The wide-screen format increases the display area by approximately one third and so provides more space for visualization and operation. The PCT technology offers the familiar ease-of-use known with smart phones also for industrial panel PCs, while satisfying the high requirements that industry places on robustness and longevity. The PN18-A2 wide-screen panel PC has a 47cm (18.5 inch) TFT display with LED backlight and PCT multi-touch (figure 3). The display system is suited for the harsh industrial environment and is characterized by its wear-free and scratch-resistant dual touch screen (two-finger operation) that has a flat surface without any dirt-accumulating

edges. On request, a multi-touch screen for operation with more than two fingers can be provided. The maximum resolution is 1366 x 768 pixels with luminance of 300 cd/m². The contrast is specified as 1000:1. DSM Computer also offers the widescreen panel PC with integrated A/D converter as pure multi-touch display. The robust, ultra-slim panel-PC family is based on the current Intel dual-core Atom D2550 processor platform with two computing cores (1.86 GHz) and the Intel NM10 chipset. Thanks to the energy efficiency of the processor, the display systems do not require a fan when operating in the temperature range 0°C to 45° C. The main memory is equipped with an SO-DIMM slot with a 2 GB DDR3 1333/1066 SDRAM.

Because the panel PC family is modular, the rear parts of all ultra-slim systems are identical. Space-saving installation is important because the panel PC is normally used for operation and visualization, for example, using the appropriate SCADA software, and is connected via Ethernet to the actual plant control. The computer is protected with a high-quality, solid aluminum industrial housing. The series aluminum front cover conforms to the IP65 degree of protection. On request, the front



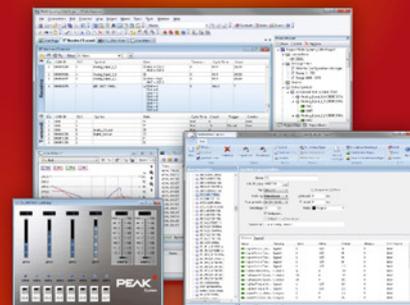
PCAN-Router DR **NEU**

Universal CAN converter in DIN rail casing with 2 high-speed CAN channels and galvanic isolation.



PCAN-cPCI

CAN interface for CompactPCI slots with galvanic isolation. Available as dual-channel or four-channel version.



PCAN-Explorer 5

Universal CAN monitor, symbolic message representation, VBScript interface, integrated data logger, functionality upgrades with add-ins (e.g. Instruments Panel add-in).



Figure 2. The ultra-slim panel PC PN17-A2 has a 43 cm TFT display; the PN15-A2 model has a 38 cm monitor.



Figure 3. A 47cm TFT display with LED backlight and multi-touch function characterizes the PN18-A2 widescreen panel PC.

can also be supplied in stainless steel and so also satisfies high hygiene standards, for example for applications in the food-processing industry. On customer request, the front can be

panel PCs are designed for cut-out assembly. The standardized Vesa 100 support also allows the devices to be fastened to the outside of controllers for plants or machines.

Technology		Resistive	PCT
Multi-touch		-	Yes
Touch object	Each object	Finger, conducting pointer	
Protective screen	-	1 - 2 mm	
Maintenance/calibration	Periodically	None	
Relative service life	0	++	
Transmission	+	++	
Outdoor deployment	Not normally possible	Possible	
Typical applications	1 - 20 inch small monitors	2 - 80 inch monitors	
	Low cost	Mobile devices, automotive, industrial	

(Source: WP Touch Flyer, German Flat Panel Display Forum)

Table1. Comparison of resistive and PCT touch screen technologies in various applications

approximately 50mm, the robust panel PCs offer a wide range of interfaces via various extension I/Os. In addition to the serial connections, USB 2.0, DVI-I and audio, two LAN interfaces that support the EtherCAT protocol are supported as standard. The integrated 2.5 inch SATA II solid state disk (SSD) and the compact flash memory are accessible externally and can be replaced easily. As an option, the SSD can be replaced with an industrial 2.5 inch hard disk drive (HDD). The panel PCs have a 12/24 VDC wide-range input power supply. DSM can also supply an external 60W power pack with 90–264 VAC.

The ultra-slim Panel PCs conform not only to the CE standard but also to FFC Regulations Class A. All products are subjected to a burn-in prior to delivery. DSM Computer offers a warranty period of two years. Thanks to their robustness and their long service life, the systems are suitable for plant construction applications, for process visualization and control as well as deployment in the food and beverage area, etc.

With the ultra-slim panel-PC family, DSM Computer offers systems with resistive touch and conventional display sizes for applications that require an optimum price-performance ratio. The fields of application for capacitive ultra-slim multi-touch panels are increasing rapidly because of the many advantages, such as the higher light transmission, higher resolution and accuracy in the position determination (depending on the quality) and improved user-friendliness with gesticulation control. ■

Product News

■ **AAEON: 21.5" and 18.5" fanless multi-touch panel computers**

AAEON announces the fanless 21.5" ACP-5217 and 18.5" ACP-5187 multi-touch information panel computers with Intel Core i7/i5 or Celeron Processors and Intel QM77 chipset. These models feature IP65 Waterproof front bezels with Anti-scratch Multi-touch Projected Capacitive Touch Screens (hardness 7H) and IPX1 back cover, which provides protection against spilled water.

[News ID 17729](#)

■ **BVM: fully featured fanless PC is ready-to-run out of the box**

The latest uIBX-210 from the BVM Group is a complete PC housed in a very small rugged extruded aluminium enclosure. Ready to run out of the box, the machine can be supplied with WES2009, WES7 or Windows 7 Professional OS pre-installed on the internal HDD or SSD. The PC is based on the Intel 3rd Generation Atom N2600 1.6GHz processor, with

the Intel NM10 chipset and supports up to 2GB of DDR3 memory.

[News ID 17676](#)

■ **Fujitsu: new family of industrial mainboards in ATX, ATX and Mini-ITX form factor**

Fujitsu announce a new family of industrial-grade mainboards with LGA1150 sockets for the 4th Gen Intel Core processors. The new product family of the Fujitsu Industrial Series includes one board each with the form factors ATX, ATX, and - for the first time - Mini-ITX, all with an Intel Q87 chipset; as well as a cost-optimised ATX board with an Intel H81 chipset. All mainboards follow a family concept with the same drivers.

[News ID 17496](#)

■ **Christ-Elektronik: CODESYS touch-panel PC based on Windows CE**

Due the growing demands in the control and visualization field and the simultaneously in-

creasing spread of CODESYS Soft-PLC solution from 3S-Smart Software Solutions, the product management of Christ Elektronik decided to develop a special CODESYS product line. The panels, based on the successful Touch-it CE panel series, is now available to order. Take advice of our technical sales.

[News ID 17593](#)

■ **Advantech: industrial-grade, Mini-ITX motherboard with latest AMD R-Series**

Advantech announces the introduction of a new industrial-grade, Mini-ITX motherboard supporting the latest AMD R-Series processors. AMD R-Series feature intelligent performance, power efficiency, and integrated AMD Radeon HD 7000 graphics with DX11 and dual HD decoding 1080i+1080p support. AIMB-224 is capable of SATA RAID 0, 1, 5 & 10 to ensure reliable storage and system protection for gaming-intensive applications, retail, medical, digital signage and many more.

[News ID 17612](#)

■ **Acromag: COM Express module offers SODIMM hold-down that allows memory upgrade**

Acromag's XCOM-6400 COM Express Module provides a high-performance processor in a package that is small, light, and power-efficient. The XCOM-6400 is a Type 6 Basic COM Express module that is available with a choice of Intel's 4-generation Core i7 or i5 Haswell CPU and Intel's 8-Series QM87 PCH chipset.

[News ID 17687](#)

■ **DFI: COM Express Compact Type 6 based on Intel QM67 Express chipset**

DFI introduces a new Type 6 COM Express Compact form factor, the HR908-B, in its Mobile product line based on the Intel Core QM67 Express chipset. HR908-B is DFI's new model that supports the low-power and cost-efficient 3rd/2nd generation Intel Core and Intel Celeron processors with BGA 1023 packaging technology.

[News ID 17714](#)

■ **MSC: ARM Cortex-A9 MPUs with up to 10 MB of on-chip RAM**

MSC will offer the new products in the RZ/A1 Group of ARM Cortex-A9 embedded microprocessors from Renesas Electronics. With up to 10 MB of on-chip RAM and various peripheral functions such as camera input, hardware-accelerated graphics output, OpenVG 1.1 and audio, the new embedded MPU solutions are ideally suited for creating sophisticated human machine interface implementations.

[News ID 17508](#)

■ **Acromag: PCIe bus adapter board interfaces PMC mezzanine modules to a PC**

Acromag's APCe8670 carrier card provides an easy and efficient solution to interface a PMC mezzanine module to a PC across the PCI Express bus. Engineers can plug Acromag's FPGA modules or other PMC modules onto the carrier card to perform a variety of signal processing functions. A bridge chip handles the PCI-X to PCIe conversion between the plug-in PMC module and the host computer.

[News ID 17678](#)

■ **congatec: low-cost entry to 4th gen Intel Core processors on COM Express**

congatec announces expanded processor support for the conga-TS87, a pin out Type 6 COM Express module based on the 4th Generation Intel Core 2-chip solution. The most significant innovation is the introduction of Intel Advanced Vector Extensions (Intel AVX) 2.0 for improved floating point instructions in signal and image processing. In addition to the existing quad-core Intel Core i7-4700EQ processor, other variants such as Intel Core i3-4100E (TDP 25W) are now also supported at an attractive entry price. Extended and consistent scalability is achieved by the new Intel Core i5-4100E processor. A total of five processors of the 4th Generation 2-chip solution are now available on COM Express.

[News ID 17727](#)

■ **MSC: newest Intel dual-core processors on COM Express modules**

MSC now offers its high-end MSC C6B-8S COM Express Type 6 module family with the just introduced dual-core variants of the fourth generation Intel Core™ processors. The powerful modules are characterized by highest computing and graphics performance with simultaneously low power dissipation. Besides the first module with Intel Core i7-4700EQ (2.4GHz, 3.4GHz in turbo boost mode) quad-core processor, four more economical Intel Core i3 and i5 variants with two processor cores are now available. The COM Express products are offered with Intel Core i5-4400E (2.7/3.3GHz), i5-4402E (1.6/2.7GHz), i3-4100E (2.4GHz) or i3-4102E (1.6GHz) processor. The thermal design power (TDP) is 37W or 25W. Depending on the type, the processors support the Intel AMT 9.0 Technology, Intel 64, the Intel Virtualization

Technology, VT-d Virtualized I/O, Intel's Trusted Execution Technology, the Intel Advanced Encryption Standard and the Intel Turbo Boost Technology. The Intel Advanced Vector Extensions 2.0 Technology allows for high-end imaging applications. The powerful 4600 (GT2) Intel HD graphics integrated into the processor die offers a significantly improved video and graphics performance over the third generation of Intel Core processors. Accelerated coding and decoding functions for high resolution videos, DirectX 11.1 and OpenGL 3.2 are supported. OpenCL 1.2 allows for the additional use of the graphics engines for applications with extensive use of floating-point computations.

[News ID 17728](#)

■ **Amplicon: PROFINET enabled Ethernet switches**

Amplicon have announced the release of the new EDS-405A/408A-PN Industrial grade, PROFINET enabled, managed Ethernet switches. The EDS-405A/408A-PN switches are specifically designed for use in PROFINET PLC applications, this allows users to directly integrate and manage the switches in a SCADA system without the need for additional configuration or any modifications.

[News ID 17545](#)

■ **NI redesigns CompactRIO from inside out**

National Instruments announced the new cRIO-9068 software-designed controller, which is completely redesigned but maintains full NI LabVIEW and I/O compatibility with the CompactRIO platform. The controller integrates state-of-the-art technologies including the Xilinx Zynq-7020 All Programmable SoC, which combines a dual-core ARM Cortex-A9 processor and Xilinx 7 Series FPGA fabric.

[News ID 17641](#)

ELMA
Your Solution Partner

Elma. Embedded where reliability is imperative.

We engineer reliable electronic equipment for aerospace, telecommunications, industrial applications and science. We know what „mission-critical“ means. We guarantee functionality even under the most challenging circumstances. We are ready for the next project.

We are ready for your project.

System Platforms • Backplanes • Enclosures & Components • Rotary Switches

Please call us for more information:
+49 (0)7231 9734 0 • www.elma.com • info@elma.de

■ **DAVE: Dual Cortex-A9 and FPGA CPU module**

BORA is the new top-class Dual Cortex-A9 + FPGA CPU module by DAVE, based on the recent Xilinx Zynq XC7Z010/XC7Z020 application processor. Thanks to BORA, customers are going to save time and resources by using a compact solution that includes both a CPU and an FPGA, avoiding complexities on the carrier PCB. The use of this processor enables extensive system-level differentiation of new applications in many industry fields, where high performance and extremely compact form factor are key factors.

[News ID 17611](#)

■ **MSC: COM Express modules with 4th gen Intel Core processors**

MSC Vertriebs GmbH introduced its MSC C6B-8S COM Express Type 6 module family with highest computing and graphics performance. The modules integrate a fourth generation Intel Core processor and will be offered in different performance and pricing classes. The first available MSC C6B-7S module is based on the Intel 8-Series PCH QM87 and the Intel Core i7-4700EQ quad-core processor with 6MB L3 cache. The processor is clocked with 2.4GHz or 3.4GHz in the turbo boost mode. The thermal design power is 47W or 37W.

[News ID 17585](#)

■ **AAEON: 8.4 inch fanless SVGA touch panel computer**

AAEON releases the latest offering in its line of cost effective Industrial Panel PCs, the compact size AHP-1083 HMI system. Providing higher luminance, this durable and fanless 8.4" Panel PC is designed specifically for sensitive environments where quality is a prime issue and a winning combination of ruggedness, computing performance and brilliant imaging functions makes it ideally suited for industrial and building automation applications.

[News ID 17598](#)

■ **Janz: rugged embedded PC system**

Janz Tec announces their own rugged embedded PC system to be available by the end of the year. Based on the GE Intelligent Platforms rugged COM Express embedded processor modules a system with a new cooling concept and housing design is in development stage that can fulfill high and extreme demands in terms of temperature, density, shock and vibration. Like all other systems of the emPC product family Janz Tec will give extensive support for popular embedded operating systems and the preconfigured CODESYS runtime environment.

[News ID 17581](#)

■ **Diamond: rugged 4-port opto-isolated serial PCIe MiniCard**

Diamond Systems introduced a rugged, low cost 4-port multiprotocol opto-isolated serial port module in the popular PCIe MiniCard form factor measuring 30 x 51mm. The DS-MPE-SER4OPT offers 4 RS-232/RS-485 opto-isolated serial ports in a PCIe MiniCard form factor. Each port offers 16C550 compatibility and ultra-deep 256-byte TX/RX FIFOs. Maximum data rates are 1Mbps in RS-232 mode and 10Mbps in RS-485 mode. The board is available preconfigured for 4 RS-232 ports, 4 RS-485 ports, or a combination of 2 RS-232 and 2 RS-485 ports. I/O signals are provided on two miniature latching connectors, with 2 ports per connector.

[News ID 17753](#)

	COMPANY	PAGE
Advertisers Index	AAEON	7/11
	ADLINK	28
	Avalue	17
	congatec	15
	Ecrin Systems	9
	EKF Elektronik	13
	Elma Electronic	25
	MEN Mikro Elektronik	27
	Mesago	2
	MSC	3
	msi	19
	PC104 Consortium	8
Peak System	23	
PowerBridge Computer	5	

boards & solutions

Editors

Jürgen Hübner
phone +49(0)8092-2477413
fax +49(0)8092-2477429
jh@iccmmedia.com

Wolfgang Patelay
wp@iccmmedia.com

Tony Devereux
devrex@teyboyz.freemove.co.uk

For Reader Inquiries and Address Changes please contact:

info@iccmmedia.com

Sales & Marketing Director

Manfred Blumoser
phone +49(0)8092-2477411
fax +49(0)8092-2477429
mb@iccmmedia.com

Claudia Mellein
cm@iccmmedia.com

Christiane Lockner
cl@iccmmedia.com

Sales Office - UK and USA, Benelux, Scandinavia

Blue Sky Communications
Malcolm Cameron
21 Cliffe Avenue
Westbrook,
Margate, Kent CT9 5DU, UK
phone +44 (0)77 88-10 84 11
fax +44 (0)80 82-80 10 57
mc@blue-sky-communications.com

Sales Office - Asia

Jean Cheng, jean@i-media.com.tw
Vivian Hung, vivian@i-media.com.tw
Innovative Media Information & Services
7F-3, No. 26, Sec. 2, Ming-Quan East Rd.
Taipei 104 Taiwan
phone +886 2 2563 1186

Head Office



ICC Media GmbH
Rauwagnerstr. 5
85560 Ebersberg / Germany

Editorial Office UK

36a Blackacre Road
Theydon Bois
Essex, CM16 7LU

Copyright© All rights reserved.
No part of this publication may be reproduced or transmitted in any form or by any means without the prior express written permission of ICC Media.
Although we make every effort to present up-to-date, accurate information, boards & solutions will not be responsible for any errors or omissions or for any results obtained from the use of such information. The magazine will not be liable for any loss caused by the reliance on information obtained on this site. Furthermore, boards & solutions does not warrant the accuracy or completeness of the information, text, graphics in this magazine. The opinions expressed in the articles are those of the authors and not necessarily the opinions of the publisher.

■ **Moxa: 19-inch fanless panel computer for hazardous areas**

Moxa has launched its new Zone 2 panel computer, the EXPC-1319, designed especially for use in oil and gas installations and other hazardous industrial locations. After extensive testing, the EXPC-1319 has demonstrated compliance with UL Class 1 Division 2, ATEX Zone 2, and the IECEx hazardous locations standards. The EXPC-1319 features a wide, basic temperature tolerance of up to 60°C and as low as -40°C when ordered with Moxa's Intelligent Heating System.

[News ID 17675](#)

■ **Acrosser: Mini-ITX industrial mainboards for diverse application**

ACROSSER introduces 2 Mini-ITX mainboards, AMB-D255T1 and AMB-QM77T1. Both products feature low-power consumption and outstanding system stability, making them suitable for system integration for multiple industrial uses. With a total board height less than 20mm, the slim fit feature of AMB-D255T1 makes it a perfect application almost everywhere. With single layer I/O ports and external +12V DC power input, AMB-D255T1 can easily be equipped even in limited spaces like digital signage, POS or thin client systems.

[News ID 17537](#)

■ **APLEX: stainless steel Panel PC with IP65 rating**

APLEX Technology announces the availability of its newest stainless steel panel PC - APC-3X97B series that comes with IP65 certificated and is powered by Intel Atom D2550 to provide low power consumption. The stainless steel chassis design makes it exceptionally suitable for strict hygiene regulations for food/chemical industry, medical, restaurant/kitchen applications, storage management and outdoor /information segment and so on. Aplex APC-3X97B series has LCD size in 15", 17" and 19" for selections.

[News ID 17697](#)

■ **Axiomtek: OPS compliant signage players powered by Intel Core processors**

Axiomtek has introduced two brand-new OPS compliant signage players, OPS871 and OPS871-HM, powered by the 3rd Generation Intel Core processors. They can be easily slid into OPS-compliant displays, which allow digital signage manufacturers to deploy systems faster, with lower costs for development and implementation. Both signage players significantly provide superb graphics performance, full HD content playback, and dual display presentations. The OPS871 and OPS871-HM deliver greater interoperability and address digital signage market fragmentation.

[News ID 17505](#)

■ **ELMA: CompactPCI serial backplane with five slots**

ELMA Electronic presents a new backplane within CompactPCI Serial technology. It has one CPU and four peripheral slots and its well-proportioned design allows even more compact high-performance systems in the future. With the new backplane, ELMA enhances its existing product range by another contribution to the increasingly important CompactPCI Serial technology. Its high-speed connectors support data transfer rates of up to 12 GB/s on all five slots.

[News ID 17660](#)

■ **GE: 6U VME SBC with 4th gen Intel Core i7 architecture**

GE Intelligent Platforms increased the number of products it offers based on the quad-core 4th generation Intel Core i7 architecture with the announcement of the XVR16 6U VME rugged single board computer. The improved capabilities of the XVR16 will allow it not only to address existing command/control applications, but also to be deployed in more demanding High Performance Embedded Computing (HPEC) signal processing applications such as ISR (intelligence, surveillance and reconnaissance), sonar and radar.

[News ID 17659](#)

■ **X-ES: Freescale QorIQ T4240 or T4160-based 6U VPX module**

Extreme Engineering Solutions introduces the XCalibur1840, a 6U OpenVPX module featuring the Freescale™ QorIQ T4240 or T4160 communications processor. Freescale's Power Architecture e6500-based T4240 and T4160 processors combine multiple 1.8 GHz dual-threaded cores, large caches, and high-performance networking capabilities with the next-generation AltiVec single-instruction multiple-data engine to provide high-performance processing for both control and data plane tasks from a single system on a chip.

[News ID 17534](#)

■ **DDC: 28V, 16-channel LRM solid-state power controller**

Data Device Corporation introduces a new 16-Channel, Line Replaceable Module Solid-State Power Controller. The RP-26231000N1 provides a total continuous current output of 250 amps, and includes 16 channels with 10 amp and 25 amp maximum capacities. The card is packaged in a VITA 48/REDI compatible form factor that enables cost-effective, two level maintenance operations, along with fast and easy field replacement in deployed vehicles, minimizing downtime and service costs.

[News ID 17582](#)



Play it Safe!

Rugged Computer Boards and Systems for Harsh, Mobile and Mission-Critical Environments

- Safe computers for rail, road and air, up to SIL 4 / DAL-A
- Modular box and panel PCs for industry & transportation
- Powerful system solutions on CompactPCI® / PlusIO / Serial
- Rugged standard Computer-on-Modules (ESMexpress®, ESMMini™)
- EN 50155- and e1-certified Ethernet switches and fieldbus interfaces

Driven by Safe Electronics



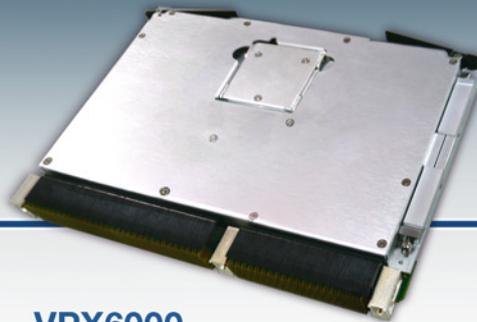
The Reliable, Flexible and Available VPX Solution

Continued Innovation in COTS and Customized Rugged Defense Platform



VPX3000

- Intel® 3rd Gen Core™ i7 Processor
- 8GB soldered DDR3-1333 ECC memory
- MOD3-PAY-2F2U-16.2.3-3



VPX6000

- Dual Intel® 4th Gen Quad-Core™ i7 Processors
- 16GB soldered DDR3-1600 ECC memory per node
- MOD6-PAY-4F1Q2U2T-12.2.1-8



ADLINK
LIPPERT ADLINK Technology GmbH

www.adlinktech.eu



Tel: +49 621 43214-0 | Fax: +49 621 43214-30 | E-mail: emea@adlinktech.com