Intelligent Embedded Computing



New Era of Intelligent Embedded Computing

Advantech offers a comprehensive portfolio of embedded boards, systems, peripheral modules and software services, and with the arrival of the intelligent computing era, we're committed to providing even more valuable embedded solutions to our customers.

Global Leadership in Embedded Design-in

By partnering with industrial embedded leaders such as Intel and Microsoft, Advantech enables customers to differentiate their offering and concentrate on developing innovative embedded solutions with less effort and faster time to market.

ADVANTECH Enabling an Intelligent Planet



April 2013 No.10



Driving 25 Billion Connected Intelligent RISC Platforms



- RTX 2.0 Ruggedized RISC Standard
- SUSIAccess 2.0 Cross-platform Solution for Remote Device Management
- Windows Embedded 8 Bringing A Smarter Embedded System
- Doing More with Less: Successful Applications Built on MI/O Extension

Hot Products

New Embedded Platforms with 3rd Generation Intel[®] Core[™] i Processors





ARK-DS762

MIO-9290

AIMB-273

▶ Page 29

The Right Formula for Building Intelligent Systems **Computer on Modules**

Planning

Expert-Integrated COM Design-in Services for Long Term Success

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Advantech Computer On Module series includes COM-Express, ETX and Qseven, all supporting fanless operation in various small form factors while supporting CPUs ranging from Intel Atom to Intel Core i series. Advanted of Monor Monor Services covers all your needs from design-in process, volume production, to product lifecycle management, all backed up by our expert integration team. We make complex COM technology easier while our customers make their applications successful.

SOM-5892

Processor

i7/i5/i3/Celeron®

Intel[®] Core™ 3rd Gen.

Intelligent Chip Inside

iManager 2.0

125x95mm

95x95mm



SOM-6765 Intel[®] Atom™ Processor N2600/N2800/D2550 with **NM10**



Remote Management SUSIAccess

COM-Express Basic COM-Express Compact COM-Express Mini Qseven



SOM-7565 Intel[®] Atom™ Processor N2600 with **NM10**



70x70mm

SOM-3565 Intel[®] Atom™ Processor N2600 with NM10

ntegration



114x95mm



Design

SOM-4466 AMD G-Series Processor with A55E



Validation

Enabling an Intelligent Planet

No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R. O. C. Tel: 886-2-2792-7818 Fax: 886-2-2794-7304

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Cover Story

Driving 25 Billion Connected Intelligent RISC Platforms

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- System Protection
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System Monitoring
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Enabling an Intelligent Planet

Multi-Platform Support

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Driving 25 Billion Connected Intelligent RISC Platforms

ccording to a recent report and survey released by AIDC, the embedded computing market is expected to grow to 25 billion devices by 2020. Currently the numbers show 1.9 billion traditional PCs, 2.6 billion mobile phones, and similar quantities in the consumer electronic device space. However, what we see today is only the tip of the iceberg; there are still huge business opportunities to be had below the waterline. How should we embrace so many potential market opportunities? The device requirements needed for each market and application area is substantial, with growing demand now and into the future for higher volume business applications. These devices serve a range of environments, from indoor to rugged outdoor use, and often must be built with smaller dimensions and low power consumption. The capabilities of existing x86 solutions fall short in meeting these requirements. From our perspective, RISC-based computing offers a viable solution for the near-future markets.

Over the past few years, the best-selling RISC-based products such as smart phones, tablet PCs, e-book readers, and game consoles like Wii have had a tremendous impact on many facets of our everyday lives. Along with the evolution of RISC computing technology, functionality is becoming more efficient and more powerful. Furthermore, we believe that RISC will be aiming to scale up to the laptop market, and from there, desktops and even servers. What are the attributes that have made RISC-based systems a success in the market? There are three major factors: (1) Tenfold performance growth within a few short years; (2) Continuous optimization to achieve ever lower power consumption; and, (3) Full hardware and software compatibility maintained across future enhancements.

Advantech is committed to contributing to the embedded computing industry, from leveraging its resources to meet growing demand in RISC-based computing, to implementing RISC-based architectures, to continuously developing RISC-based industrial computing platforms. We are also aggressively building up eco system partnerships with IP/Silicon vendors, software vendors, and system integrators, as well as working on early product design engagement and development. Recently Advantech joined the SGET consortium to define the SMARC and Qseven form factor, and we have also proposed new specifications for RTX (RISC Technology Extended) and UBC (Ubiquitous Computer) rugged applications to meet demand across vertical markets.

In addition to hardware platforms, Advantech also provides the three levels of RISC software support to customers to help them accelerate application software development: Software Package Evaluation, Board Support Package (BSP), and Custom Design Service.

To further supplement RISC platform and software package development, we also offer design assistance through a service called RISC Design-in Services, which helps customers with product planning, design, validation, and integration. Our top priority is to help customers achieve the most advantageous Time-To-Profit for their projects.

Opportunity favors those who are prepared and Advantech is well-prepared. We are ready to embrace this new era as technology enables an intelligent planet. Join us in partnership to take advantage of the latest business opportunities as we strive to reach a milestone of 25 billion connected intelligent devices.



Miller Chang Advantech Embedded Core Group Associate Vice President

Cover Story

Embracing the Intelligent Planet with RISC-based Platforms

NAIGH & ES

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By Aaron Su, Product Director, Advantech

Past requirements in industrial applications and development have caused qualitative changes in the ARM architecture. The requirement for past RISC architectures such as ARM was "stability" in executing dedicated tasks, which is a simple yet essential requirement for industrial automation systems. But recently, because of the increased demand for smart phones and other consumer electronics, the ARM architecture processor has gradually developed into a highly efficient, multi-core design, while applications have gone from traditionally simple designs to multi-tasking and diversified designs. But this also gradually brings it in line with the traditional idea of the x86 architecture, and it also causes considerable confusion for customers who are accustomed to using traditional x86 platforms.

The ARM architecture is widely adopted in the field of industrial automation, especially with more economical industrial designs. However, the enhanced performance of the ARM architecture has elevated expectations among customers who see increasingly overlapping performance results with the x86 architecture. Currently, ARM's multicore processors are achieving better and better performance. but this means power consumption is also higher than before, to the point where multi-core ARM processors require cooling solutions such as heat sinks. And if performance continues to improve, then "active" thermal solutions like fans might be required and there will be little differentiation between the two architectures. What's more, x86 systems have improved in power consumption efficiency, blurring the line between the two even more. Of course, this represents a huge break from the traditional idea of low power consumption from these processors. So it's important that the design of RISC architectures should not only be driven by "performance maximization" goals, but "application optimization" should also be targeted.

Some of the IPC manufacturers that focus on the x86 architecture, with an eye towards automated equipment, have also begun to launch low power consumption versions of their products. This also seems to put pressure on RISC architectures such as ARM. And, despite the active efforts of the x86 camp, there is still much room for improvement in reducing power consumption. Of course, power consumption is still the central consideration for compact embedded application, and there are even vendors who are willing to reduce product performance in order to maintain their advantage in power consumption; and this shows the real value of the RISC ARM architecture. Another advantage of RISC architectures such as ARM are their fast boot-up times. Start-up speed is an important consideration when specifying systems for many embedded system applications. For example, vehicle applications must immediately get to work after the engine starts-unlike PCs that force users to wait for the operating system to start up, and this is why the position of RISC architectures such as ARM are still unshakable in certain fields.

RISC Is Ideal in Smart Nodes where Low Power Is Paramount

From the perspective of power consumption and response times, RISC-based platforms such as ARM still have a considerable advantage in embedded applications since additional value can still be found by expanding RISC architectures into new application areas. From Advantech's perspective, RISC architectures such as ARM can make great contributions in both intelligent systems and overall linking devices in networks. Massive amounts of data will become the new area of focus in the Intelligent Planet era, so how will initial integration and decision-making be applied to this intelligent network to reduce the burden on the back-end data center while making the system smarter and more efficient? Advantech believes that ARM and other RISC architectures can be used as a "basic level" intelligent device to share the load of data analysis. "Smart nodes" in intelligent cloud networks will bring new opportunities for ARM and other RISC architectures. For example, a smart electrical power network creates information through various sensing devices. If we want to organize that information, perform preliminary analysis or real-time decision making, then smart nodes will be needed. A smart node would need processing power and be able to think and perform preliminary analysis on information, with some time-sensitive decisions being made by the node itself.

RISC Is the Interface to the Intelligent Planet Network

More and more smart node devices will be needed in the Intelligent Planet and Internet of Things (IoT) era. In such an environment, with a large number of applications, ARM and other RISC architectures will shine because the ARM architecture is exceptional in terms of power consumption and size. There are huge market opportunities for ARM and RISC because power consumption requirements will always be a top priority, and due to the complexity of deployment, small size and stable performance are vital.

From the perspective of cloud computing, "intelligence" in the cloud needs to be tiered. This is an environment where ARM and x86 platforms can integrate operations. In a cloud computing architecture, entry-level intelligent systems will basically be dominated by ARM while middle level and advanced computing needs will be taken care of by x86. Each intelligent system must find its optimal application, so the possibility of a monopoly appearing is slight.

With such a distributed computing architecture, smart nodes will contribute in linking different devices on the cloud side. For example, traditionally, communication interfaces used in factory automation are usually buses such as RS-485. In the design of an intelligent system, the decision-making part must be able to communicate directly with the device, and devices must be able to communicate with each other. Thus, an interface must be used that can convert traditional communications systems into systems with Internet Protocol (IP) identities, allowing them to communicate with the back end and across different interfaces. Integrated communication is essential for the intelligent planet network. In the future, smart nodes will be an important intermediary communication point that will convert various I/O into IP addresses-thereby standardizing the interface of the intelligent planet network and creating seamless links.

Using the ARM architecture to act as an intermediary integrator is quite appropriate. ARM systems will be at the bottom layer of the intelligent planet network, and will be found in the largest number of devices. Therefore, it can be confidently predicted that the new business opportunities will be limitless.



Driving Growth through RISC Standards



By Aaron Su, Product Director, Advantech

Looking back on the history of IT development, it seemed to follow a certain pattern and then evolved into mainstream Ltechnologies and products like the personal computer. PCs emerged in the 1980s and brought about today's booming IT industry because of standardization. At the time the PC was launched, every manufacturer had its own design standards and many were incompatible with each other, resulting in a bottleneck in product development, both for hardware and software. Even though there were many solutions, no one gained a large enough market share to make new product investment. Consequently, PC industry growth was very slow and limited in the beginning, and only a few people could afford the product. But when IBM worked out the PC/AT specification with Microsoft's MS-DOS operating system and licensed it to other vendors, "IBM compatible" PCs sprang up like mushrooms and further accelerated the progress of science and technology. Through standardization, the industrial model shifted from a "customized product to serve a specific user" to "a standard product to service a wide range of customers". This transformation was a necessary step for each leading technology, and standardization was the key factor that drove its popularity.

Qseven 70*70 mm SMARC 82*50 mm

When most people decide whether or not to adopt a new technology or product, the first consideration is the performanceto-cost ratio (P/C), which is an important factor and very easy to understand. But in fact there are many factors that affect customers' decision-making processes. For example, will this new technology be around for a long time, does it have sufficient user information and support, and is there room for future development? Those hidden elements may not be easily found by customers, but they deeply affect them. If manufacturers cannot address these issues, a new technology or product will ultimately remain a "niche" product and won't be universally adopted.

Standardization Is the Key to Success

Featuring low-power consumption, small size, and wide operating temperature range, RISC-based products offer a better P/C rate for embedded applications. However, ARM solutions are not widely applied in the real world and even though customers may want to adopt the ARM architecture, they are often unable to find sufficient information to conduct a feasibility analysis. The lack of a standard makes customers cautious about using hardware and software with an ARM architecture. For these reasons, standardizing ARM products (including hardware, software, and form factor) will not only eliminate customer concerns, but will also boost widespread adoption of RISC-based ARM solutions.

If ARM products could be standardized, customers could avoid future expansion or upgrade issues and wouldn't be tied to just a few suppliers. This will also enable a more efficient use of vendors' resources and speed up the development of ARM technology and applications. Just imagine, when subsequent ARM products are released and all support the PCI-Express interface, and relevant I/O ICs also follow the specification of the PCI-Express interface, then ARM SOC and I/O IC suppliers will be able to develop their products simultaneously without worrying about compatibility and suitability issues. In addition to functions, standardizing the size of a module's form-factor benefits customers as well. When the form factor is standardized, customers will have different options from suppliers while their I/O board or chassis continues in service; thus enhancing the effective use of resources and saving project development costs. Therefore, standardization is regarded as the key to popularizing ARM solutions!

Advantech RISC Solutions Meet a Full Range of Form Factors

Now is a critical time for RISC ARM solutions, so Advantech actively participated in the specification definitions for Oseven and SMARC to promote RISC industrial standards, and fully support the drive to create a standard specification under the SGET Association. Oseven and SMARC form factors which are gradually spreading out in the market place, target applications such as compact mobile devices which require lower power consumption, or which are powered by battery pack. MXM type connectors are used for these two form-factors for connecting functions on the carrier board, so customers are able to make their carrier board exactly fit their chassis design with the correct I/O connector location. Moreover, SMARC supports $3V \sim 5.25V$ voltage, therefore customers are able to power their mobile device directly by a single cell battery ($3.6 \sim 3.7V$) or 5V DC input without an extra buck switch design on the carrier board. This significantly helps reduce the design effort on the customer side and increases the efficiency and reliability of the customer's mobile device. However, these standards do not vet meet the needs of all applications. Take rugged applications for example, customers may need a product with anti-vibration and anti-corrosion features as well as being able to work in an extreme temperature environment, but products based on Qseven and SMARC standards which feature 1.2mm PCB and use "golden fingers" as signal connection, are unable to completely satisfy such demands. Therefore, Advantech proposes a relatively rugged form factor to overcome this, and that form factor is RTX 2.0. By using a board-to-board connector, the RTX 2.0 standard provides 400-pins through four connectors to satisfy all kinds of application requirements. Such an approach offers better vibration and corrosion resistance than golden finger connections and can better deal with the challenges of harsh environments. The PCB thickness is greater as well; RTX 2.0 PCB has a thickness of 2.0mm to deliver improved anti-vibration and anti-bending performance. Apart from the mechanical differences, the electrical characteristics also allow RTX 2.0 to tackle varied conditions with more flexibility due to its wide-voltage, single supply input. This can reduce the complexity of system design because customers no longer need to specify particular voltages for the ARM module.

Looking to the future, there are many challenges that must be overcome before RISC solutions can be applied over a wide range of applications. As a leader in the industrial computer field, Advantech has an obligation to play an active role in this trend and believes it to be one of our tasks to focus on the establishment of standardization. We look forward to creating a simple and more robust RISC development environment for our customers.

Advantech Full Spectrum of RISC-based Platforms

			A. Print		The second second
Model	ROM-3420	ROM-5420	ROM-7420	UBC-DS31	REB-740
Category	RTX-COM	SMARC-COM	Qseven-COM	Signage Player	Box PC
Processor	Freescale i.MX6 Dual Core	Freescale i.MX6 Dual Core	Freescale i.MX6 Dual Core	Freescale i.MX6 Dual Core	Freescale i.MX6 Dual Core
Features	• DDR3 1GB / Flash 4GB • 24 bit LVDS / TTL • CAN / PCIe	• DDR3 1GB / Flash 4GB • 24 bit LVDS / HDMI/ VGA • CAN / PCIe	• DDR3 1GB / Flash 4GB • 24 bit LVDS / HDMI/ VGA • CAN / PCIe	• DDR3 1GB / Flash 4GB • HDMI / VGA • USB/ Gigabit LAN/ UART	 1 Mini PCIe Socket OPS Expansion w/ VGA, 8GPIO, 4 UART, 1 I2C, 1 I2S, 1 SATA Supports +12/19/24 VDC-in
Dimension	68 x 68 mm	82 x 50 mm	70 x 70mm	191 x 129 x 30 mm	112 x 78 x 30 mm



RISC Design-in Services

By Becky Yang and Vicky Chang, Product Managers, Advantech

With the spread of industrial computing, a whole range of new applications have been developed, resulting in a fundamental change in the IPC industry. In the past System Integrators (SI) were used to completing projects without outside assistance but now such working models have moved on. Due to diverse market demands and intense competition, cooperation for (both upstream and downstream) vertical integration has become a much more effective way to create competitive advantages. As a result, ARM-based CPU modules were born out of this trend. Concentrating all necessary components on the CPU module and placing other parts on the carrier board in response to market requirements for specialization, provides greater flexibility while retaining its low power consumption credentials.

Challenges in Modular Design

Advantech has been involved in the industrial computer industry for many years and found that customers usually have the following questions when implementing modular designs.

General I/O design capability

Although customers possess the ability for vertical integration and have enough know-how and core competitiveness in the professional application field, the lack of expertise and experience in general power and I/O design causes many challenges for them, especially integrating CPU modules into their carrier board.

The acquisition of information

Even if the individual client is able to obtain sufficient information to make the right decision for the specialized vertical application, some customers encounter difficult problems dealing with platform design in general and communicating with CPU or chipset manufacturers, thereby increasing carrier board design difficulties and risk as well as seriously impacting on time to market and lost market opportunities.

8

Software development and modification

Compared to x86 architectures, RISC architectures use simpler instruction sets, therefore the software support for x86 platforms cannot be used on RISC platforms. System integrators need to develop software for their system and do the hardware and software integration themselves. Unlike x86 platforms, RISC platforms have less support for Board Support Packages (BSP) and drivers as well. Even though driver support is provided, SIs still have to make a lot of effort to integrate it into the system core. Moreover, the BSP provided by CPU manufacturers are usually for carrier board design, so it's difficult for SIs to have an environment for software development.

In view of this, Advantech proposed the concept of Streamlined Design-in Support Services for RISC-based Computer On Modules (COM). With a dedicated professional design-in services team, Advantech actively participates in carrier board design and problem solving. Our services not only enable customers to effectively distribute their resources but also reduce R&D manpower cost and hardware investment. By virtue of a close interactive relationship with leading original manufacturers of CPUs and chipsets such as ARM, TI and Freescale, Advantech helps solve communication and technical support difficulties, and that can reduce the uncertainties of product development too. Advantech's professional software team also focuses on providing a complete Board Support Package and assists customers to build up a software development environment for their RISC platforms. Advantech RISC design-in services helps customers overcome their problems to achieve the most important goal of faster time to market.

Streamlined RISC Design-in Services

Along with our multi-stage development process which includes: planning, design, integration, and validation, Advantech's RISC design-in service provides comprehensive support to the following different phases:

Planning stage:

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, including product features, specification, and compatibility testing with software. So, Advantech offers a RISC Customer Solution Board (CSB) as an evaluation tool for carrier boards which are simultaneously designed when developing RISC COMs. In the planning stage, customers can use this evaluation board to assess RISC modules and test peripheral hardware. What's more, Advantech provides standard software Board Support Package (BSP) for RISC COM, so that customers can define their product's specifications as well as verifying I/O and performance at the same time. We not only offer hardware planning and technology consulting, but also software evaluation and peripheral module recommendations (such as WiFi, 3G, BT). Resolving customer concerns is Advantech's main target at this stage. Since we all know that product evaluation is the key task in the planning period, especially

for performance and specification, so we try to help our customers conduct all the necessary tests for their RISC COM.

Design stage:

When a product moves into the design stage, Advantech will supply a design guide of the carrier board for reference. The carrier board design guide provides pin definitions of the COM connector with limitations and recommendations for carrier board design, so customers can have a clear guideline to follow during their carrier board development. Regarding different form factors, Advantech offers a complete pin-out check list for different form factors such as Oseven, SMARC and RTX2.0, so that customers can examine the carrier board signals and layout design accordingly. In addition, our team is able to assist customers to review the placement/layout and schematics to ensure the carrier board design meets their full requirements. For software development, Advantech RISC software team can assist customers to establish an environment for software development and evaluate the amount of time and resources needed. If customers outsource software development to a 3rd party, Advantech can also cooperate with the 3rd party and provide proficient consulting services. With Advantech's professional support, the design process becomes much easier and product quality will be improved to meet their targets.

Integration stage:

This phase comprises of HW/SW integration, application development, and peripheral module implementation. Due to the lack of knowledge and experience on platforms, customers need to spend a certain amount of time on analyzing integration problems. In addition, peripheral module implementation has a lot to do with driver designs on carrier boards, RISC platforms usually have less support for ready-made drivers on the carrier board, therefore the customer has to learn from trial and error and finally get the best solution with the least effort. Advantech's team has years of experience in customer support and HW/SW development knowledge. Consequently, we can support customers with professional advice and information as well as shortening development time and enabling more effective product integration.

Validation stage:

After customer's ES sample is completed, the next step is a series of verification steps. In addition to verifying a product's functionality, the related test of the product's efficiency is also an important part at this stage especially for RISC platforms. As a supportive role, Advantech primarily helps customers solve their problems in the testing process and will give suggestions and tips as well. Through an efficient verification process backed by our technical support, customers are able to optimize their applications with less fuss. Furthermore, Advantech's team can provide professional consulting services about further testing and equipment usage, so customers can find the right tools to efficiently identify and performance.

RISC Technology eXtended

for Rugged Applications

RTX 2.0 – Ruggedized RISC Standard

By Kevin Chen, Product Manager, Advantech

Story

Today, modern control systems often apply different processor architectures such as x86, RISC and MCU to support suitable platforms for their applications. In general, most applications involving complex processes are used to adopting x86 as their hardware platform from key suppliers including Intel and AMD. Relatively simple control applications tend to select RISC and MCU platforms which are provided by ARM, and MIPS, SHx, and PowerPC for their solutions. Each hardware platform has its own advantages with some limitations. For example, x86 provides an excellent computing capability but has high power consumption, while RISC is totally the opposite. However, this point of view is gradually changing through recent advances like that of the Intel Atom processor which offers a low-power solution. RISC platforms are also strengthening their processing capabilities with dual-core or even quad-core architectures so as to meet higher complexity needs. This evolution blurs the distinction between both hardware platforms, so choosing the right solution has become essential for manufacturers.

Compared to RISC platforms, low-power x86 solutions such as Intel Atom still cannot meet the demands for harsh environments such as high-temperatures, low-power, and long standby times, which is why RISC is turning into the best choice for such requirements and has evolved into a popular mainstream platform. x86 architectures are developed for unified platforms such as ATX and Micro-iTX, but for RISC, most manufacturers had to design their own motherboards with inevitable limitations making them unsuitable for general use. Nevertheless this situation has been improving and in 2010, Congatec took the lead and developed the Qseven standard platform for RISC, and in the following year Kontron also proposed an SMARC (Smart Mobility ARChitecture) specification for RISC. After that, RISC platforms seem to have evolved more standard specifications, but strictly speaking, Qseven and SMARC defined their own specifications so cannot fully satisfy all market requirements yet, especially in the industrial, military, and rugged product categories. First of all, the Mobile PCI Express Module (MXM) format that RISC developers use incorporates gold finger connectors which easily oxidize and provides poor anti-vibration and moisture protection, resulting in signal and transmission problems. Furthermore, the thickness of the PCB is only 1.2mm which can cause plate bending and tin cracking issues in severe environments.

Platform Features	Qseven	SMARC	RTX 2.0
Connector	MXM 2.0	MXM 3.0	MATSUSHITA B2B
Pin count	230	314	400
Application	Portable	Portable	Ruggedized
PCB thickness	1.2mm	1.2mm	2.0mm
Connector mating force	55~60N	55~60N	98N
Connector operating temperature range	0~85°C	0~85°C	-40~85°C

Comparison Table for Qseven, SMARC and RTX 2.0 Standards

Advantech Ruggedized RISC Computer on Module, RTX 2.0

In order to make up for deficiencies in Oseven and SMARC based products, Advantech introduced the RTX 2.0 (RISC Technology eXtended) specification which is a RISC standard platform designed for demanding applications. Through its innovative mechanical and electrical design, products designed with RTX 2.0 can perform in complex and challenging environments such as military, logistics, transportation/fleet management, and many other industrial applications.

Innovative form factor – RTX (RISC Technology eXtended)

Built upon Advantech's extensive knowledge and experience over the years, an RTX 2.0-based module includes four

board-to-board connectors for all I/O signals and mounting hole locations as shown in figure-2 below. The asymmetrical mounting hole design provides two advantages. Firstly, they provide an effective mistake-proof solution during assembly. Secondly, the defined mounting holes not only allow screw fixing onto the carrier board via metal nuts, but also provide superior heat dispersion. As for I/O expansion, RTX 2.0 uses the standard 400-pin definition through four connectors providing customers with high I/O expandability. Also, Advantech takes the latest interface trends into account. RTX 2.0 supports both USB 3.0 and CSI (Camera Serial Interface) to offer better expansion that can meet a variety of different requirements.



RXT 2.0 Pin Assignment



Ultra compact size, greater reliability

At 68mm x 68mm, Advantech RTX 2.0 computer on module provides a compact sized product that fulfills portable market applications in harsh environments. The small-footprint with modular design not only offers a flexible solution but also reduces overall system design effort and development schedule. Moreover, its PCB thickness of 2.0mm provides better reliability and protection. The board strength is significantly increased with attendant improvement in product reliability and robustness. Meanwhile the strengthened PCB thickness also achieves anti-distortion and anti-vibration properties. The maximum board layer in RTX 2.0 incorporates twelve layers. The multilayer PCB reduces thermal impact and also includes more grounded layers to improve electrical performance, especially for extra rugged applications such as in industrial and military applications.

Highly stable B2B connector design

RTX 2.0 adopts four board to board connectors that offer better stability than traditional golden fingers with superior dirt and oxidation resistance. The holding force of this type of connector is 100gf/contact, so it provides advanced antivibration attributes. The operating temperature range of this board to board connector is -55 ~85°C, which perfectly fulfills harsh environment needs. Moreover, the maximum loading current of each pin is 10A, while the maximum bandwidth is up to 3.0 Gbps, meaning it can address demands for higher current and bandwidth from system integrators.

Advantech RTX 2.0 is strategically positioned as an optimized computer on module solution for mission critical applications based on RISC ARM processors. With an ultra compact size of just 68 x 68 mm, Advantech RTX 2.0 achieves anti-vibration, anti-distortion, oxide-resistant, and wide temperature properties that meet extreme harsh environment requirements with high vibration or humidity. RTX 2.0 provides system integrators with a worry-free, highly reliable, yet ultra compact computer on module solution that can be utilized across multiple rugged embedded applications.



ROM-3420

- Freescale i.MX6 Dual Core DDR3 1GB / Flash 4GB
- 24 bit LVDS / TTL
- 1 USB 2.0 / 1 OTG, 1 GbE 4 UART,2 CAN, 1 PCIe
- **68** x 68 mm



ROM-3310 Coming s

- TI Sitara AM335 Single Core
- DDR3 1GB / Flash 4GB
- 24 bit LVDS / TTL
- 2 USB 2.0
- 4 UART, 2 CAN, 1 GbE 68 x 68 mm

Integrated RISC Hardware and **Software Services**

Product Design Services

Schematic Review

- Layout Review
- Standard Thermal Solutions
- Carrier Board Design Guide

S/W Package Evaluation

 Booting Firmware Test Image

Board Support Package (BSP)

- Linux Kernel / Driver / Root-file System
- Tool Chain / Functional Test Utilities

Custom Design Service

- Peripheral Driver Integration
- Customized S/W Integration
- Customized O.S. Image
- Special Function Development (ex: GPIO function support)

Advantech has integrated RISC hardware with software to produce ready-to-run, RISC-based platforms that help customers reduce development time and design costs. We offer three levels of software services: from S/W Package Evaluation, to Board Support Package (BSP) to Custom Design Services. Advantech provides trusted RISC computing and services for the next-generation of ultra-compact applications for factories, energy industries, medicine, robotics, and transportation.



ROM-3420 (RTX 2.0)

- **RISC-based Boards** Freescale i.MX6 Dual Core DDR3 1GB / Flash 4GB
- 24 bit LVDS / TTL
- CAN / PCle



ROM-7420 (Qseven) Freescale i.MX6 Dual Core DDR3 1GB / Flash 4GB



ROM-5420 (SMARC)

- Freescale i.MX6 DualCore DDR3 1GB/Flash 4GB
- 24 bit LVDS/ HDMI/ VGA CAN/ PCIe/ GPIO/ Camera Input



RISC-based BOX PC

UBC-DS31

HDMI/VGA

RFB-740

- Freescale i.MX6 Dual Core 1 Mini PCIe Socket
- OPS Expansion w/ VGA, 8GPIO,
 4 UART, 1 I2C, 1 I2S, 1 SATA
 Supports +12/19/24 VDC-in

RISC-based Signage Player

Freescale i.MX6 Dual Core

DDR3 1GB/Flash 4GB



Enabling an Intelligent Planet

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SUSIAccess 2.0 – Cross-platform Solution for Remote Device Management

By Chris Lin, Senior Manager, Advantech

In November 2012, Advantech released the Linux version of SUSIAccess 2.0, an innovative remote device management software preloaded in all Advantech embedded solutions, allowing efficient remote monitoring, quick recovery and backup, and real-time remote configuration. The launch of the Linux version of SUSIAccess 2.0 provides System Integrators more flexible options for creating a more intelligent and interconnected embedded computing solution.

VDC Research: Over 1/3 Embedded Systems Use Linux Environment

According to an IDC survey, there will be 25 billion smart devices and intelligent systems in operation around the world by 2020, creating a future prototype for the intelligent city. "Intelligent Systems" combined with the "Internet of Things" will drive the next phase of the embedded device market. Another survey by VDC Research points out that currently more than 1/3 of embedded systems are developed using the Linux environment. However, among these embedded Linux systems, the lack of remote monitoring and management applications has been noticed by embedded developers. This is where Advantech SUSIAccess Linux version comes in. By providing a ready-to-use remote access solution, System Integrators can focus more on their own Linux applications and let SUSIAccess protect their systems, monitor their devices' health, and remotely configure power management.

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SUSIAccess 2.0 for Linux: Designed for Connected System Management

The Linux version of SUSIAccess 2.0 is a remote management application for customers to monitor, control and protect remote embedded devices in real-time, in their Linux environment. It provides cloud-based software services so customers can download and upgrade applications when they need.

All Advantech Embedded Computing products are pre-loaded with SUSIAccess, providing our customers with device monitoring, remote power on-off, remote desktop connection, and system recovery and system protection features that help customers to manage multiple remote client devices through a single console. Software programs installed on clients can record sudden equipment malfunctions and send alarms immediately. Power on-off features can switch off devices that are not in use saving energy and cost. System recovery and protection enhances each device's reliability and security.

All the above features provided by SUSIAccess significantly improve maintenance efficiency and reduce personnel cost and time as well as power consumption. SUSIAccess also has an intuitive graphical user interface that significantly reduces the learning curve. Even non-IT personnel can get familiar with SUSIAccess in a short time.

Benefits of SUSIAccess 2.0 for Linux

Complete protection

To help system administrators ensure all remote devices are protected from cyber threats and malware attacks, SUSIAccess, unlike traditional anti-virus software, adopts a "white list" mechanism to prevent all un-registered software from execution. This is an ultimate method of system protection. Automatic alarm notification is also supported. Note: This function is powered by McAfee's Embedded Security solution.

Simplicity of all backup and recovery

Used to back up a system image by schedule or on-demand, and then restore a system after disaster strikes. Hot-Backup can be executed in the background without stopping the OS operation. One-click recovery is also supported for fast system recovery.

Note: This function is powered by Acronis True Image technology.

Stay in sync with device health status

For inspecting the real-time status of embedded devices, such as temperatures, internet connection speeds, fan speeds and voltages, when monitored values exceed warning thresholds, alarm messages will be sent automatically. Maintenance personnel are able to resolve problems at the earliest time and prevent the potentially expensive losses.

Saving maintenance costs

To access remotely located embedded devices for diagnostics or trouble-shooting without the need for on-site service. SUSIAccess utilizes remote desktop technology that can allow system administrators to control remote devices from the console side, quickly achieving real-time support and significantly reducing time and labor costs.

Saving energy costs

To set the power on/off schedule for remotely located embedded devices. The software can turn-off devices when they are not being used so that the power consumption will be reduced. This green design can save the energy cost and save the planet.

Deploying SUSIAccess for Managing ATM Systems

The challenge

At present, ATM systems are widely deployed in urban and rural areas by banks, providing financial services for all people. The systems have to be robust, able to response customers' requests in short time without errors. Therefore, ATM devices must be highly available and easy to recover if errors happen.



SUSIAccess solution

Without an effective management system, it's hard to control and manage ATM systems which are often mounted in widely spread locations. That's why Advantech offers SUSIAccess software to provide centralized device management capabilities so that customers don't need to visit each individual device to maintain and update them.

SUSIAccess provides a robust system protection mechanism which is widely adopted by banks for ATMs. It can prevent all cyber attacks and malware/viruses from intruding systems. And, scheduled system backups ensure that devices can be recovered to their last working condition in case a system becomes unstable or damaged.

Moreover, many ATM systems are installed in remote locations and require a great deal of time and effort to maintain. Administrators can use the remote KVM functions to control remote ATM devices through a PC console in their office to greatly improve the efficiency of system maintenance.



Windows Embedded 8 – Bringing a Smarter Embedded System

By Wanger, interview with Lee Chun-Nan, BG Lead for Microsoft Taiwan and Lin Chi-Wen, Business Development Manager of Advantech

Intelligent systems have become an essential part of our lives even though we might not be aware of their existence. To further improve system performance, Microsoft will launch the Windows Embedded 8 family of operating systems, and Advantech will also offer relevant Embedded products specially for this architecture. Working together, this will bring Embedded intelligence to the next level.

The term "intelligent" has become commonly used in recent years. Though many industries boast the term "intelligent", such as "intelligent transportation" or "intelligent medicine" or "intelligent store", it is more than just meaningless industry jargon. The introduction of intelligent systems in most fields has indeed changed our lives. The Windows Embedded 8 platform that Microsoft launches in 2013 not only provides enhanced performance and an optimized interface, but also brings new innovation to Advantech's longtime expertise in Intelligent Embedded products. Working together with Microsoft will help Advantech to realize its vision of Intelligent Planet in a step-by-step fashion.

According to Windows Embedded BG Lead for Taiwan, Mr. Lee Chun-Nan, in terms of devices, intelligent systems consist of two major parts: the terminal and the host. The terminal includes various handheld devices, specialized IT equipment and industry devices. The operation of the overall architecture is to properly process the messages received by front-end devices and send them to back-end devices for storage, control, and analysis. The intelligent system concept is the extension of the emerging Internet of Things, mobility, and future development trends.

Embedded Platform Streamlines System Operation

The development of intelligent embedded architectures in recent years has taken a drastically different path than that of the past. In addition to horizontal expansion into more applications, existing applications are deepened vertically, such as point-of-sale in the retail industry, fleet management in the logistics industry, and versatile digital signage. Microsoft provides complete solutions for them all, such as Windows Embedded POS Ready and the upcoming Windows Embedded 8 Industry platform, for the front-end, and SQL Server for the back-end. Windows Embedded 8 Industry is the next generation of Windows Embedded POSReady, now extended to meet the needs of broader industry scenarios. Lee indicated that Microsoft's comprehensive investment in its embedded architecture makes the software interface linkage between front-end and back-end systems more compatible. Introduction, operation and service of the architecture also become easier and faster. Aside from the software systems for on- site appliances, Microsoft also expands system coverage to the cloud by offering Windows Azure. Lee also pointed out that the Windows Azure platform provides a complete set of cloud application services. Businesses don't have to set up a separate back-end host to enjoy business cloud services which can be customized to a certain degree, and therefore optimized to their finite resources.

On top of the existing operating software, Microsoft integrates its product technologies horizontally into intelligent systems, for example, the Kinect for Windows motion sensing technology that has been popularized with Xbox. This technology captures the body motions of the person standing in front of the screen, and then computes and analyzes them to give commands. It has begun to be introduced to other applications; for instance, clothing stores incorporate motion sensing technology, so while shopping, customers can change the color of clothes directly with hand gestures in front of a full-length mirror that is made of digital signage and motion sensing technology. Other applications, such as for kiosks, have also been introduced.

Windows Embedded 8's Optimized User Interface

Microsoft's comprehensive investment in intelligent systems has begun to pay off. Windows Embedded 8, set to launch in 2013, will bring embedded systems to the next level. Taking the above-mentioned digital signage as an example, Lee said that as more embedded products will enable touch technology, in particular multi-touch technology, the benefits of digital signage will significantly increase. The optimized multitouch user interface of Windows Embedded 8 allows users to manage and control the system intuitively.

The optimized multi-touch interface is just one of the many features of the product, Lee said. Judging by current developments, there will be six major device requirements for intelligent systems, including analysis, user experience, management, connection, information security, and identification. Windows Embedded 8 is designed with these six features in mind.

Windows Embedded 8 family of products offers a variety of platforms designed for individual applications, consisting of Windows Embedded 8 Standard, Windows Embedded 8 Pro, and Windows Embedded 8 Industry. Like its predecessor, Windows 7 for Embedded Systems, Windows Embedded 8 Pro delivers the full power and familiarity of the Windows operating system. Enterprises and partners can create quick-turn, industry-certified solutions, without concern for application and device compatibility. Windows Embedded 8 Standard is a flexible, modular, version of Windows 8 that gives enterprises and partners the freedom to choose which parts of the operating system they need for their unique requirements. Devices can also be locked down to block certain gestures and deliver a more secure and differentiated user experience. Unnecessary functions can be removed based on the industry need to ensure that system features fit end-user requirements perfectly. Historically, Windows Embedded POSReady has targeted retail pointof-service (POS) solutions. Moving forward, Microsoft will deliver the power of Windows 8 technologies to these and other scenarios requiring fixed experiences with enhanced lockdown, branding and the other benefits of Windows Embedded 8 - including peripheral support to other industry-specific scenarios, such as manufacturing and healthcare, in addition to POS.

Advantech and Microsoft Work Together to Develop Intelligent Systems Scenarios

Microsoft consulted Windows Embedded partners like Advantech during the product design phase of Windows Embedded 8. Lin Chi-Wen, Advantech Embedded Computing Core Business Development Manager, indicated that Advantech is one of the largest business partners for Microsoft in Taiwan in the embedded domain and have worked together on many efforts. Advantech assisted in the testing of Windows Embedded 8 in the early design phase, while Microsoft provided Advantech with actual products for testing and validation of the pilot introduction. This will allow Advantech to complete the testing of all the hardware product operating systems prior the launch of Windows Embedded 8.

Owing to the advantages of an early understanding of Windows Embedded 8's functions and features, Advantech was able to improve the software features that it had developed in the past in conjunction with Windows Embedded 8. For example, SUSIAccess, launched years earlier and widely known by system integrators, will be able to support the Windows Embedded 8 platform. Its remote management functionalities, including system monitoring, desktop control, remote configuration, and system security, transform the embedded systems into an across-the-board intelligent platform. Lin reckoned that on-site service may not be conveniently available for enterprises that incorporate industrial computing devices as they are distributed widely. With SUSIAccess' remote control functions, users can get a clear picture of the statuses of devices spread over different locations at any time. If a simple fault occurs, users can reboot or report the problem remotely, preventing service personnel from exhausting themselves and reducing maintenancerelated cost for enterprises.

In terms of information security for embedded systems, SUSIAccess can convert the conventional passive "Blacklist" mode into an active "Whitelist" in order to control unnecessary programs in the operating system for industrial computers. A Whitelist mode is made by creating a positive application list. Only programs in the list can be installed and executed, and those not on the list will be blocked, making information security management easier and more complete.

With Windows Embedded 8's various functions and features specifically designed for embedded systems, in addition to Advantech's rich professional expertise accumulated from years of hard work in various fields, we will be able to provide strong assistance to intelligent systems developers through close integration between hardware and software.



By Austin Lo, Product Manager, Advantech

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In business, time competition is fierce, and especially in the IT industry. Chipset vendors rapidly upgrade chipset designs generation by generation, and solution providers follow suit, providing products with the latest chipsets. System integrators are the last one in this chain, integrating computers, peripherals, chassis and software. Thus, it is important to operate on a short schedule, to have fast time-to-market, and insofar as possible to gain and keep the first-mover advantage.

More Flexibility: Meeting Additional Multiple I/O Specification Requirements

Advantech provides the MI/O Extension form factor, which was designed from the beginning from the system integrator's point of view, with consideration for compactness, minimum cabling, ease of assembly, unified mechanical design for easy future platform upgrades with minimum effort, and a centralized thermal design that enhances overall reliability. All these factors make system integration easier, and with minimum effort. The market, on the other hand, changes rapidly, with new specification demands, limited development resources, reduced budgets and tight scheduling. How to achieve these goals efficiently, while at the same time making specifications more flexible to meet various requirements is also very important.

In addition to the features mentioned above, the MI/O Extension Single Board Computer form factor has an important expansion interface: MIOe connector; it is a 2 x 40-pin, high speed connector up to 9GHz. It integrates several mainstream interfaces into one connector, including 4 PCIe x 1, display port, SMBus, USB 3.0/2.0, LPC, audio line out and power, and all are supported directly from the SBC.

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If additional SBC I/O is required, then an additional MIOe I/O module may be added. Signals which come from MIOe connector can add GbE, SATA, USB 2.0/3.0 from PCIe, and COM ports by adding Super I/O from LPC, converting SMBus to GPIO, and more. This kind of combination is flexible and adapts to various vertical markets to satisfy demands from different customers.

Reduce Investment: Save 20% of Total Development Cost and Shorten Development Time

Advantech provides various standard MIOe modules for different applications and immediate deployment, and also provides the MI/O extension SPEC and MIOe design guide for customers who want to create custom MIOe modules using their own design team. By using the above documentation and simplified MIOe design, MI/O Extension can help customers preserve their design domain knowledge and knowhow, and reduce the complexity of schematics and layout designs; and system integrators can quickly design their own MIOe modules using minimum resources and with minimum total cost. According to customer feedback, deploying MI/O can reduce at least 20% of their total development cost, when compared with other form factors.

Successful Applications Built on MI/O Solutions

MI/O already has a lot of great success stories worldwide, and it has been adopted in many kinds of vertical markets. Following are some cases from different vertical markets:

CNC device

The customer needed a fanless, low power SBC and originally considered PC/104 and COM SBCs, but ultimately chose MIO-2261 because other form factors had limited I/O support, required higher design effort, or went over budget. They designed an MIOe module with LVDS, 3 x USB, PCIe x1 and SATA. The USB was connected to keyboard, mouse and other USB device, and PCIe x1 was connected to a motion card. The customer took only six months to complete the whole project. Most effort was spent on motion card related design.

Navigation device for naval vessel

The demand for navigation devices for vessels in China has increased a lot due to the implementation of a new Chinese maritime law. One Advantech customer developed a navigation device based on MIO-2261, adding an MIOe module of his own design. The customer selected MIO-2261 for its low power and fanless design, but needed 24-bit LVDS support. The MIOe module provides LVDS and 8 x COM ports. 4 COM ports are from LPC with super I/O transfer, and the other 4 COM ports are from PCIe. The customer needed lots of COM ports to connect with all kinds of peripherals such as GPS, touchscreen, radar, compass, etc. The development was completed in a mere four months.





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Automated fare collection system

Automated fare collection systems or so-called AFCs represent an increasing market. AFC requires lots of I/O to connect with many peripherals. Normal SBCs can't fill the bill. So this customer used MIO-5250, and took advantage of its easy expansion. The customer designed his-own MIOe module to provide 10 x COM ports to connect with peripherals, for a total 14 of COM ports including those on the SBC. The customer added super I/O on LPC to create 4 x RS232 and 2 x RS485 and another 4 x RS232 from PCIe. This customer developed his MIOe module in only three months.

Portable ultrasound device

The standard ultrasound device is too expensive for some local hospitals and clinics. Therefore, demand for portal ultrasound devices has increased rapidly. This customer had not been using MIOe modules, but they chose MIO-5270 for the flexibility of its MIOe connector and its high graphic performance. The customer has reserved an expansion opportunity and plans to use an MIOe connector to provide TV-out through the display port on the MIOe connector and shorten the development schedule.

Intelligent Systems Made Easy and Fast – with MI/O Chassis

The innovative MI/O Extension form factor is a solution that considers all the issues which have disturbed some system integrators in the past, and also considers the details of future generation trends. In 2013, the MI/O chassis solution will also be available. This is a super flexible chassis choice that can be applied across different platforms: high computing or low power SBC, and can be combined with different MIOe I/O modules to add additional I/O interfaces per project requirements, and also can easily be combined with peripherals such as memory, HDD, miniPCIe modules, mSATA, and antenna, to efficiently make flexible chassis solutions. Below are five advantages of an MI/O Chassis.

Printe

Flexibility- The MI/O chassis is compatible with all MI/O-Compact (3.5") Series SBCs and different MIOe Modules. The system integrator can change SBC and module based on different application and performance requirements.

Easy Assembly- Assembling the MI/O chassis with MI/O SBC and MIOe module is easy. We have simplified mechanical design with ease of assembly in mind. This reduces maintenance complexity and time.

Slim & Compact- Dimensions of the MI/O chassis are 240 x 143 x 73 mm, for a compact and slim chassis. This compactness comes from the MI/O SBC centralized thermal design, and well-considered layout of peripherals such as HDD.

Unified Design- The MI/O chassis has 2 layers; the upper one is for the MI/O SBC and the bottom one is for the MIOe module. Due to the unified coastline of the MI/O SBC, the I/O bracket for the upper layer is the same. The I/O bracket for the bottom layer varies with different modules.

Reusable- Because of the flexibility and unified design described above, the chassis is reusable. This reduces the loss of cost for a new chassis when a system integrator decides to change SBC to a new platform.

MI/O Extension is an innovative form factor which is easy to use, flexible for application in all kinds of vertical markets, and with an attractive price compared with other, similar form factors. MI/O Extension is an up-to-date design that rapidly meets a wide range of demands.

MI/O Extension Platforms Flexible Development for Intelligent Systems





Enabling an Intelligent Planet

Advantech MI/O Extension Single Board Computers solution includes flexible modularized offerings from embedded boards, modules to chassis. Featuring extensible multiple I/O, MI/O provides the utmost flexibility in building up an ideal system for various vertical markets— it's fast, easy and cost-saving.

MIOe Modules



MI0e-210 Multiple COM Ports

MIOe-220 Triple Intel[®] Gigabit Ethernet

MI0e-230 48-bit LVDS, DisplayPort, 2 x USB 2.0

2.5" MI/O-Ultra SBC(PICO-ITX)



MI0-2261 Intel[®] Atom™ Processor

MI0-2262 Intel[®] Atom™ Processor N2600 / N2800 + NM10

N2600 / N2800 + NM10



MI0e-110

Multiple COM Ports with power and isolation/ 2 x USB

MI0e-120

Dual Intel[®] Gigabit Ethernet/Mini-PCIe with SIM holder/ HDMI/ Audio with Amp./2 x USB/ LPC

3" 5 MI/O-Compact SBC

MI0-5290

3rd i7/ MI Int

3rd Generation Intel[®] Core™ i7/i3 Processors + QM77

MI0-5250 Intel[®] Atom[™] Processor N2600 / D2550 + NM10

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Small Size, Big Impact –

COM R2.1 Specifications Introduce Small Form Factor

By James Wang, Product Manager, Advantech

The COM Express standard has been the standard in the market for Computer on Modules since 2005. A wide variety of applications are built on COM thanks to its many features which include different form factors, a 440 pin-out, an expansion interface, and I/O connectors enabled by advanced chipsets. As time evolves, the standard is adapting to new technologies and markets. In 2010, PICMG led numerous major changes in COM R2.0 specifications. And in 2012, COM R2.1 was released, bringing new innovation to a platform already known for its consistency and longevity.

New Mechanical Changes

COM R2.1 defines the standard for the small form factor, COMe-Mini, with a revised Type 10 pin-out definition. It offers high-speed interfaces such as LVDS, eDP, HDMI, DisplayPort, USB3.0, USB Client and CAN Bus for mobile devices, all on an 84 x 55mm card. COM R2.1 also supports a wide input voltage range from 4.75V to 20V, meeting the charging requirements of battery-operated mobile devices. As a result, more and more portable devices are being designed with embedded COM. The small size can fit in limited space, and lower power consumption means longer lasting operating time. There is also a promising future for COM in an increasing number of application areas, such as portable ultrasound machines, 3G testing equipment, mobile automotive repair systems, and mobile GPS devices.

Comparison of COM R2.0 and COM R2.1

		COM R2.0	COM R2.1	
	USB3.0	Туре б	Туре 6 & 10	
I/0	eDP	N/A	Туре 6 & 10	
	CAN Bus	N/A	Туре 6 & 10	
Form Factor		Basic, Compact	Basic, Compact, Mini	
Power Input		+12V fixed for all	4.75~20V for Mini Module	

Medical Device Quality is Enhanced by COM's Small Form Factor

One of Advantech's application case studies in small form factor COM deployment is the SOM-7565 COMe-Mini, which is designed for ultrasound devices. Clinical professionals rely heavily on ultrasound devices for internal examination of patients. High quality, high-definition ultrasound imaging is much more accessible these days; the technology has advanced, costs have come down and hospitals have invested a lot of capital to purchase both high-end fixed and entry-level portable models. What they look for is not merely highperformance computing power but also a rugged form factor that meets stringent environmental conditions, such as temperature extremes, shock, and vibration. With passive cooling, easy customization and integration, COM provides a cost-effective solution with broad standards-based availability and longevity support. Advantech SOM-7565 COM-mini is compliant with COM R2.1 and its core design includes SSD, wide-range voltage input, onboard memory and flash in a reliable card-sized board. The wide-range voltage input allows compatibility with a battery or charging device and reduces voltage loss.

Cross-Platform Remote Management

Ensuring proper sharing and recovery of critical medical data from ultrasound machines is still a challenge. In the past, it took time and resources to retrieve data from each machine and then move it to a central data center. These days, hospitals and medical practitioners demand a much more effective way to boost their work efficiency. Advantech's SOM-7565 Computer on Module with Advantech SUSIAccess remote management software has been chosen for its winning combination of powerful, reliable features and complete remote control functions. SUSIAccess provides seamless image recovery, back-up capability, and remote management, which helps staff manage ultrasound devices so they can operate under any conditions, more efficiently, and at reduced cost.

Expert-Integrated Design-in Services

While customers capitalize on COM's advantages—fast time-to-market, focused core knowledge, and simplified development-now they can also embrace the new COM R2.1 specifications, which make mobile applications possible due to size and lower power consumption. For long-term success, it is important to find a reliable partner to ensure investments in capital really pay off.

Advantech COM Design-in Services covers all your questions from the design-in process and volume production, to product lifecycle management. Customers gain benefits from easy selection of a full spectrum of boards, modules, and software, all backed up by Advantech expert know-how and consistent product integration. Advantech applies a strict process to all COM design-in projects from planning a suitable solution, designing a carrier board, design validation, integration of thermal solutions, and production, to end-of-life services and support. Customers find Advantech to be a flexible and trusted partner offering worldwide delivery services at each stage of product development.

Planning

- Technical feasibility study
- COM product selection
- Hardware & software
 proposal

Design

Schematic review
Placement and layout review
Documents and IP library

• Debugging and

- Debugging and verification
 Feasible solution
- BIOS customization

Integration

- Embedded OS & SW customization
 Thermal solution
- customization • Peripheral consultation
- & offering

Production Assured quality control

Ramp up management

Global logistics and

RMA center

- End of Life
- Product change
 notice
- Last-time buy & last shipment
- Product migration proposal



Industrial Motherboards 2.0:

One-step Ahead IMB Turnkey Solutions

By Betty Yang, Product Manager, Advantech

Industrial motherboards have been a stable mature product in the IPC field for many years because they offer greater reliability, longer lifetime support and strict revision control to ensure high ROI. That provides embedded developers with many similar product choices in the market. Differentiation and segmentation are therefore essential to go from product strategic oriented to customer focused orientated. To meet customer needs, embedded solution providers have to think hard about how to offer more important embedded features that really help customers achieve their specific embedded application goals. For cost and time saving, a domain focused motherboard was developed with intelligence built-in, as well as configure-to-order system level solutions. Advantech is committed to serving our customers with faster more intelligent industrial motherboard solutions. So to meet this objective, we proposed a new "One-step Ahead" concept - we call it Industrial Motherboards 2.0, in order to fulfill specific market demands for more intelligent smarter applications, and to provide a higher quality of service and system integration.

Intelligence Built-in: iManager & SUSIAccess

Cloud-based applications not only need high processing power and management, but they also need stable connectivity, and reliable data backup and storage to fulfill 365/24/7 non-stop operation. To meet these requirements, Advantech's new generation of industrial motherboard products come embedded with iManager intelligent self-management firmware agent, which gives applications smart self-control, resource management and auto-protection features to enhance security and system reliability, and simplify integration and configuration.

iManager is a firmware agent that by-passes device drivers and OS, and accesses the HW directly. That means, you don't need to worry about different OS versions (Windows or Linux), or different device driver architectures and hardware form factors. That's where Advantech iManager comes in with a multi-layer watchdog timer, data security, and HW monitoring functions—all OS and hardware, monitoring each devices health and handling errors in real time.

iManager is a parallel system running regardless of the OS to increase reliability and simplify integration. In the past, system integrators had to re-design and re-verify their application if they changed the hardware or software platform, resulting in unnecessary wastage of resources and duplicated tasks. Advantech Industrial Motherboards (AIMB) were the first to help lighten the design load, speed product time-to-market and improve system reliability.

Advantech develops intelligent industrial computers based on the latest Intel technology, 3rd generation Intel Core processors and Intel QM77 Express chipset. These are the AIMB-273/ 274/ 210/ 230. They feature enhanced CPU performance, next-generation I/O and power efficiency, as well as enhanced 3D graphics and media processing.

Other than iManager, all Advantech motherboards also come with SUSIAccess that centralizes monitoring and managing of embedded devices. System protection uses McAfee "whitelist" technology to block unauthorized apps. Remote monitoring for staying in sync with a device's health is powered by Acronis, with a backup and recovery tool for saving precious data. To save power consumption and energy there's a remote on/off control, and it's easy to set up multiple devices from a management console.

Domain Focused Selection

A standard motherboard cannot fully satisfy all the functions demanded from the industrial computer market. Normally, vertical market users will need to look for customization services in order to get their key vertical features, which might make development periods long and a BOM list greater than they expected. For example, signage customers require multiple HDMI graphic displays at HD (High Definition) resolution. They also need hardware functions that can provide system protection while the display content is being delivered and displayed, or remote scheduled On/Off commands that can be issued to save energy consumption. And, surveillance customers need to transfer recorded video from IP cameras via Ethernet, or video from capture cards delivered via stable reliable signals. Remote monitoring by KVM is valuable for IT people so they can send out immediate warning notifications of system alarms from their system. In the KIOSK/ATM industry, customers (mostly banking) need products with multiple display graphics with numerous I/O ports. They need reliable anti-virus & embedded security features to keep ATMs safe from attack; plus features to keep them in sync with the back office banking system.

By clearly understanding the demand and long-term trends in the industry, Advantech can better develop and engineer products for your application success. Advantech, in alignment with vertical market demands, has developed a series of offthe-shelf vertical industrial motherboards embedded with SUSIAccess 2.0, and iManager 2.0, as a quick turnkey solution without the fuss.

Configure-To-Order Integrated Services

At Advantech, we try to think beyond what our customers need. A single motherboard solution is fine but customers always want an easier, more complete and elegant solution. Advantech provides a series of hardware solutions with addon software tools and APIs. From board, chassis, storage peripherals, software Apps/Utilities/APIs, Advantech not only assembles, installs and embeds these, but also provides an intelligent platform selection and build-to-order-services for any customization requests required by customers. With the buildup of Configure-to-order support services (CTOS), customers can easily get a system certified configuration rapidly with multiple combinations through our flexible B2B ordering system (AOnline-Advantech Online System). The certified combination list includes options for compact embedded miniITX chassis and slim miniITX chassis, the latest Intel Core i and AMD processors, certified bend-proof thermal cooler and heat pipe, and cost effective peripherals as a complete solution. Advantech also extends the services with the software add-on value as a B2B option - Windows & Linux bases SUSIAccess, and iManager ready firmware solution, McAfee and Acronis ready embedded OS.

Summary

In the IoT and Cloud Computing era, we can't rely on traditional thinking. We need to offer better, more differentiated products with a value-added combination of service and embedded functions. We want to give system integrators the tools they need to build the new cloud-based intelligent planet applications. With Advantech industrial motherboard 2.0 series, customers worldwide can enjoy and benefit from Advantech's new 2.0 hardware and software turnkey solution.

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	Intelligence Built-In	Ideal for Digital Signage	Ideal for KIOSK/ATM	Ideal for Surveillance	Slim Chassis
	AIMB-273	AIMB-201DS	AIMB-501KS	AIMB-502SV	AIMB-B1000
	Mini-ITX	Mini-ITX	MicroATX	MicroATX	Mini-ITX Chassis
	Intel [®] Core™ i7/i5/i3 processor + QM77	Intel [®] Core™ i7/i5/i3 processor + QM77	Intel [®] Core™ i7/i5/i3 Processor + H61	Intel [®] Xeon/ Core™ i7/i5/i3 processor + Q77/C216	Slim height under 3.5 cm (250 x 190 x 35 mm)
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The Key to Accelerating Signage Deployment

By Jason Kao, Product Manager, Advantech

From the traditional promotion to the emerging digital media, Digital Out Of Home (DOOH) applications have not only widely been used in various fields, but also will significantly grow in the next few years. According to the latest report from MarketsandMarkets, the global digital signage market generated \$3.95 billion in 2011 and is estimated to grow to \$13.2 billion by 2016; at a CAGR of 27.29% from 2011 to 2016 due to a rise in awareness and the decrease in display prices.

Since the total market will be finally hitting a price sweet spot with the double-digit growth and average cost down in the coming years, most survey companies believe that it will spur a booming ecosystem of developers, manufacturers, retailers and consumers in digital signage applications. Simultaneously, the retail vertical sector is the highest by volume and is the most noteworthy field based on the statistical forecast. In order to keep up with market developments, System Integrators have to focus on the latest technology trends and look for solution designs that make their applications more valuable to users so as to capture such business opportunities in time.

Facing the Key Challenge - Remote Management vs. Cloud Services

One of the virtues of digital displays is that they can be placed anywhere in a retailer's store for branding, merchandising, promoting specials, and entertaining customers, so remote management is one of the key challenges for retailers and developers. Meanwhile, displaying vibrant messages on the screens to excite customers, improve their shopping experience, and further increase sales needs powerful, dynamic content management to providing the right message to the right person at the right time. As a result, qualified digital signage that not only supports rich media for dynamic content processing, but also offers remote or centralized management (covering content, as well as hardware and software) is regarded as the best solution to satisfy what this market demands and achieve the goal of effective remote control.

Fortunately, an Industrial Cloud-based player can really solve this issue. As a pioneering yet efficient approach to business operations, Cloud-based solutions have recently been gaining more attention than ever in the digital signage industry. By utilizing the Software as a Service (SaaS) concept, an IPC media player equipped with Industrial Cloud Services enables vendors to centralize monitoring and managing of remote embedded devices in real time, and even to reduce their maintenance costs and manpower. And providing Design-in Services also lets System Integrators easily build up customized, intelligent systems as well as helping them to focus more on their own applications.

Hitting Game-winning Shots: Multi-display, Ultra Slim Size and Interactivity

Today, digital signage continues to evolve and create more diverse features whether it's in shopping mall, hotel, airport or restaurant, stimulating more demand for video walls or multiple displays to gain better presence in the competitive market. In response to this, digital signage box PC provides a powerful graphics engine to support multiple independent displays or to connect several monitors together in a video wall. And each independent display output must handle full HD 1080p content to ensure the best display quality.

As displays get thinner and are mounted closer to the wall, the digital signage box PC, which is usually mounted behind the display or plugged into the display slot, also has to conform to the ultra slim size trend. In the first half of this year, Intel introduced its newest ultra small form factor platform which is called the "Next Unit of Computing" or NUC. The platform, which may be officially launched in the second half of 2013, measures just 4 x 4 inches and features an Intel Core family processor socket (Core i3/i5), two RAM SODIMM slots, two mini PCIe slots, support for HDMI, USB 3.0, Thunderbolt, Wi-Fi, and Bluetooth. This smaller, cutting edge platform will soon be available on the market, and its super compact-size box PC with advanced functions should better suit a variety of installation environments, inevitably leading another wave of digital signage applications.

Another technological trend is toward ever more interactive applications. A bevy of interactive features like gesture recognition and touch screen are fueling growth in the interactive digital signage market. Taking the shopping mall as an example, customers can virtually try on clothing via interactive displays, controlling the device simply by moving their hands in the air. All these interactive functions can be effortlessly implemented through the signage player with Microsoft Kinect technology. Along with a public audience that enjoys using new technology to get information and perform transactions, a similarly innovative approach can be widely applied in other retail stores or public spaces, further pleasing customers, promoting the vendor's products, and urging consumption.

Give Your Project a Head Start

For System Integrators, quick response to market needs always strengthens your competitive position. Many leading companies are already introducing ready-made HW/SW to help developers implement their digital signage applications. For example: Intel OPS (Open Pluggable Specification), Advantech SUSIAccess for remote management, Windows Embedded for multi-touch and motion sensor, Acronis Data Protection, McAfee System Security, etc. Integrating these HW/SW packages by yourself is not the best way to design digital signage applications however. A turnkey solution, and customized services which provide reliable hardware, embedded OS, trustworthy management software, and Industrial Cloud services can really accelerate your project implementation process and relieve the burden of compatibility testing.

Your Best Partner in Digital Signage

As technology continues to evolve with and affect customer behavior and user experience, digital signage is bringing a historical shift to retailers. Advantech knows that quality and reliability are invariably more important than other considerations for System Integrators, so we provide industrial-grade devices with application-ready solutions to meet your needs. Among Advantech's various turnkey solutions with customized services, you can always find a suitable IPC-based player for applications such as HD or Full HD, stand-alone or multi-display, slot-in module or all-in-one platform, small size or ultra slim. Advantech is committed to longer product life cycles and customer service as well. In addition to comprehensive product lines with a quality guarantee, Advantech's worldwide sales bases and technical teams offer dedicated support to deliver your solution to the market faster.



New Products



RISC-based Digital Signage Player-High Performance, Easy Implementation, Software Built-in

UBC-DS31 is Advantech's first RISC-based digital signage player, powered by the Freescale ARM[®] CortexTM-A9 i.MX6 Dual processor. The product supports dual displays with up to 1080p high resolution output on low power consumption. With compact size and flexible mounting design, including wall mount and VESA mount, UBC-DS31 is easy to assemble in

any application environment. Built for digital signage, UBC-DS31 is also preloaded with SUSIAccess software allowing content refresh, layout editing and status monitoring wirelessly.



Mini-ITX AIMB-201DS for Slim Multiple HDMI Digital Signage Solution

AIMB-201DS is powered by 3rd generation Intel[®] Core[™] i processors with Intel HD graphics and DX1 support. AIMB-201DS has 3 independent HDMI displays with CEC function to provide multi-display outputs simultaneously. AIMB-201DS is a slim design with ultra low profile thermal solution for its slim box system. Moreover, by integrated with SUSIAccess remote management and Acronis recovery function, AIMB-201DS is an ideal platform for the signage

market and can deliver advanced graphics performance for many signage applications such as FIDS (Flight Information Display System), menu boards in restaurants, and transportation and public spaces.





ARK-1122 Palm-Size and Ultra Low Power Intel Atom N2600/N2800 Fanless Embedded Box PC

ARK-1122 is a new ultra-compact and price-competitive fanless embedded system powered by an Intel[®] AtomTM N2600/2800 processor. Its compact size, affordable price, robust performance and support for both HDD and CompactFlash memory make the ARK-1122 attractive for a range of embedded usages. This product is well-suited for

applications that need a simple but dependable controller. ARK-1122 is ideal for thin client and factory automation applications with space limited or low-power-consumption designs.



MIO-5290 High Performance 3.5" MI/O-Compact SBC for Graphics Intense Applications

MIO-5290 SBC is in a 3.5" MI/O Extension (146 x 102 mm) form factor, and based on Intel[®] 3rd generation CoreTM i3/i7 processors with QM77 chipset, supports either 1600MHz DDR3 or low power 1333MHz DDR3L, USB 3.0, SATA III (600 MB/s), AMT 8.0, and can drive three independent displays (two DisplayPorts combine with any other device). MIO-5290 not only features high performance and a rich set of I/O functions, but it's also equipped with a flexible multiple I/O interface which can extend additional functions easily. MIO-5290 enables customers

to meet their vertical application development needs with more efficient scheduling and less resources whilst retaining their specialist domain know-how.



2013 Star Product Selection Guide





